

Pyramid Environmental & Engineering, P.C. Project # 2013-278
Preliminary Site Assessment (PSA) – Parcel 49, Martha Robbins

PRELIMINARY SITE ASSESSMENT
PARCEL 49, MARTHA ROBBINS
2259 U.S. HIGHWAY 1 NORTH
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
STATE PROJECT: R-2501C
WBS ELEMENT: 34437.1.1
JANUARY 21, 2014

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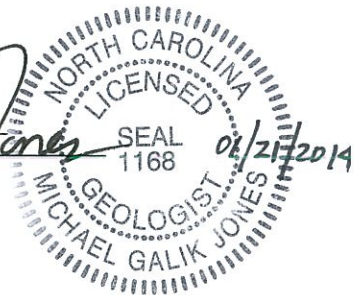


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**PRELIMINARY SITE ASSESSMENT
PARCEL 49, MARTHA ROBBINS
2259 N. US 1
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA**

EXECUTIVE SUMMARY OF RESULTS

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this Preliminary Site Assessment (PSA) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 49, the Martha Robbins property. The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs) and impacted soils at the subject property within the proposed right-of-way (ROW) and/or easement and edge of pavement (State Project R-2501C). The PSA was conducted with particular attention to the areas to be cut as indicated by slope stake lines and cross sections or to be excavated for the installation of drainage features. This preliminary site assessment was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's October 16, 2013, technical proposal.

The following statements summarize the results of the PSA:

- **Site History:** A review of the North Carolina Department of Environment and Natural Resources (DENR) registered UST database and incident database indicated no environmental incidents were on file for the Martha Robbins property (Parcel 49). On November 26, 2013, Pyramid emailed the Richmond County R-2501C parcel addresses to Mr. Kenneth Currie, the Richmond County Incident Manager for the DENR UST Section, with a request to investigate any environmental incidents associated with the parcels. On December 2, 2013, Mr. Currie responded to the email and stated that site address 2259 N. US 1 (Parcel 49) did not have any environmental incidents in the DENR database. Mr. Currie did respond with two other incidents in the general area, however, these properties were observed to be several miles north/northeast of the Martha Robbins property.

Mr. Currie also indicated that a file was on record for the "Robbins Exxon," which was listed at an address of Route 1, Box 34. A subsequent interview with Martha Robbins' son Mike Robbins indicated that the "Robbins Exxon" file for Route 1, Box 34 was in fact associated with the vacant store building on the property, which used to operate as a gas station. Mr. Robbins stated that all USTs associated with the gas station had been removed, and that an NFA letter had been obtained from the DENR. Pyramid's review of these documents did not indicate that any open incidents were associated with the site, and it appeared that the

gasoline and kerosene USTs were removed in April and May of 1993, according to the file.

- **Geophysical Survey:** The geophysical investigation recorded evidence of one probable metallic UST (likely a septic tank) and two possible metallic USTs at the property.
- **Limited Soil Assessment:** A total of eleven borings were performed across the property and at least one soil sample from each boring was analyzed with the QED UVF HC-1 Analyzer system from QROS-US for total petroleum hydrocarbon (TPH) petroleum contamination. If field screening detected an elevated reading, then additional soil samples from each boring were selectively analyzed with the QED UVF HC-1 Analyzer. The QED did not detect TPH gasoline range organic (GRO) or TPH diesel range organic (DRO) concentrations above 10 mg/kg in any of the soil samples analyzed. The DENR action levels for both TPH-GRO and TPH-DRO are 10 mg/kg. A duplicate of soil sample 49-1(7.5-10) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 49-1(7.5-10) did not detect GRO or DRO concentrations above detection limits. A slight petroleum odor was detected in the borings near the former pump island during the field screening.
- **Limited Groundwater Assessment:** Soil boring 49-4 was converted into a 1-inch diameter temporary monitoring well 49-4(TW) to a total depth of 20 feet BLS. The depth-to-groundwater was measured at 18.8 feet BLS. The minimal amount of groundwater at the bottom of the temporary well prevented a sample from being collected. The significant depth of the groundwater indicates that it is unlikely the NCDOT will encounter groundwater at this property during construction activities.
- **Contaminated Soil Volumes:** No petroleum-impacted soils above 10 mg/kg were encountered during the PSA investigation at Parcel 49. Therefore, no recommendations are necessary for the treatment or disposal of such materials. It should be noted that, if impacted soil is encountered during road construction outside of the area analyzed by this investigation, the impacted soil should be managed according to NC DENR Division of Waste Management (DWM) UST Section Guidelines and disposed of at a permitted facility.

1.0 Introduction

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this Preliminary Site Assessment (PSA) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 49, the Martha Robbins property. The Martha Robbins property currently contains a vacant commercial store building and a residence, and is located at 2259 N. US 1 in Rockingham, NC. This preliminary site assessment was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's October 16, 2013, technical proposal.

The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs) and the potential for impacted soils at the subject properties within the proposed ROW and/or easement and edge of pavement (State Project R-2501C). The location of the subject site is shown on **Figure 1**.

1.1 Background Information

Based on the NCDOT's October 10, 2013, *Request for Technical and Cost Proposal*, the PSA was conducted in the proposed easement/proposed right of way (ROW) and the area between the existing NCDOT right of way and the edge of pavement, with emphasis on the areas to be cut as indicated by slope stake lines and cross sections or to be excavated for the installation of drainage features and/or other utilities, in accordance with the CADD files provided to Pyramid by the NCDOT. The PSA included the following:

- Research the properties for past uses and possible releases.
- Conduct a preliminary geophysical site assessment and limited soil assessment in the proposed easement and the area between the existing ROW and the edge of pavement with emphasis on the areas to be cut as indicated by slope stake lines and cross sections or to be excavated for the installation of drainage features and/or other utilities.
- Should groundwater be encountered at a depth that might impact the NCDOT construction activities, report the depth to groundwater for that site and attempt to obtain one groundwater sample for laboratory analysis by installing a temporary monitoring well.

1.2 Project Information

Prior to field activities, a Health and Safety Plan was prepared. Prior to drilling activities, the public underground utilities were located and marked by the North Carolina One-Call Service. A private utility locator, Northstate Utility Locating Incorporated of Colfax, North Carolina was used to mark the on-site private, buried utilities.

2.0 Site History

The NCDOT description of the parcel in the RFP provided to Pyramid on October 10, 2013, provided the following background information related to the site:

This parcel is located on the north side of US 1 and southwest of SR 1486 (Beaver Dam Church Road). The storefront of a closed curiosity shop is located approximately 85 feet from the existing US 1 centerline. According to local historians, the on-site building formerly operated as Robin's Exxon Gas Station. Approximately 70 feet from the existing US 1 centerline, exposed pipe and conduit and an apparent pump island was observed during field reconnaissance along the project corridor on November 14, 2007. A handheld metal detector did not locate any metallic anomalies. No Facility ID or Groundwater Incident numbers have been discovered for this parcel. There may be environmental concerns with this site such as USTs, hydraulic lifts, or chemical concerns.

Pyramid completed a records review of the parcel, interviewed DENR personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed historical aerial photographs dating back to 1938 available from the Richmond County Soil and Water Conservation office in Rockingham and on Google Earth for past uses. The 1938, 1956, 1975, 1993, 1999, 2005, 2008, and 2013 aerial photographs are included in **Appendix A**. Historical information reviewed as part of the PSA indicated that the store building and the residential structure were constructed between 1938 and 1956 (it is possible the residential building was constructed later, the 1956 aerial image quality is low). The earliest aerial to show the buildings appears to be the 1956 aerial. The 1938 aerial shows the property to be undeveloped agricultural land.

On November 26, 2013, Pyramid emailed the Richmond County R-2501C parcel addresses to Mr. Kenneth Currie, the Richmond County Incident Manager for the DENR UST Section, with a request to investigate any environmental incidents associated with the parcels. On December 2, 2013, Mr. Currie responded to the email and stated that site address 2259 N. US 1 (Parcel 49) does not have any environmental incidents in the DENR database. Mr. Currie did respond with two other incidents in the general area, however, these properties were observed to be several miles north/northeast of the Martha Robbins property.

Mr. Currie also indicated that a file was on record for the "Robbins Exxon," which was listed at an address of Route 1, Box 34. Further investigation and interviews (see below) indicated that this file was associated with the gas station that occupied the vacant store building on Parcel 49 in the past. This correlated to the NCDOT background information in the October 10, 2013 RFP. Mr. Currie indicated that the file contained a letter of No Further Action (NFA) from the DENR, and a UST-2 Closure Form.

On December 6, 2013, Pyramid Project Manager Eric Cross interviewed Mr. Peter Jones of Appraisal Associates of the Carolinas, Inc. Mr. Jones indicated he was the property appraiser assigned to handle the Marth Robbins property transaction associated with the NCDOT property acquisition process. Mr. Jones was not aware of any incidents associated with the property, or any USTs that may be present. Mr. Jones provided Pyramid with the contact information for Martha Robbins’ son, who was handling the property transaction.

On December 17, 2013, Pyramid Project Manager Eric Cross conducted a phone interview with Mike Robbins, the son of Martha Robbins. He indicated during the interview that a septic tank was present on the north side of the residential building at the property. He also indicated that the “Robbins Exxon” file for Route 1, Box 34 discussed above was in fact associated with the vacant store building on the property, which used to operate as a gas station. Mr. Robbins stated that all USTs associated with the gas station had been removed, and that an NFA letter had been obtained from the DENR. Copies of the NFA letter and the UST Closure Form were sent by Martha Robbins’ son to Pyramid, and are included in **Appendix B**. The documents did not indicate that any open incidents were associated with the site, and they suggested that the gasoline and kerosene USTs were removed in April and May of 1993.

3.0 Geophysical Investigation

Pyramid performed electromagnetic (EM) and ground penetrating radar (GPR) surveys across the accessible portions of the Parcel. The majority of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features.

Parcel 049 Probable/Possible UST Locations		
North Carolina State Plane (US Survey Feet)		
UST	Northing	Easting
Probable UST#1	447741.369	1820524.865
Possible UST#1	447749.622	1820709.784
Possible UST#2	447745.304	1820713.667

The GPR survey recorded evidence of one probable metallic UST directly to the north of the residential building on the property which is most likely a septic tank. The GPR survey recorded evidence of two possible metallic USTs adjacent to the southeast corner of the vacant store building. These possible USTs measured approximately 12 feet long and 7 feet wide. GPR transects indicated former product lines directly to the north of the former pump island on the south side of the vacant store building.

The geophysical investigation recorded evidence of one probable metallic UST and two possible metallic USTs at the property.

The full details of the geophysical investigation are included in the Geophysical Investigation Report as **Appendix C**.

4.0 Soil Sampling Activities & Results

4.1 Soil Assessment Field Activities

On December 18, 2013, Pyramid mobilized to the site and drilled soil borings, installed one temporary monitoring well, and collected the proposed soil samples for the PSA. The soil borings and temporary well (TW) were completed using a track mounted Geoprobe® Direct-Push rig. Eleven (11) soil borings (49-1, 49-2, 49-3...to 49-11) were advanced on the subject property between the NCDOT proposed ROW and easements, and edge of pavement. The selected locations were chosen to avoid public utilities along U.S. 1 and private utilities associated with the business while remaining in the proposed right of way. The soil borings were installed parallel to U.S. 1 and/or Beaverdam Church road in areas proposed to be cut as indicated by the slope stake line, or adjacent to proposed drainage features as indicated on the NCDOT engineering plans. The locations of the borings are shown on **Figure 2**.

Soil samples were continuously collected in four foot long disposable sleeves from each boring for geologic description, and visual examination for signs of contamination. Soil recovered from each sleeve was screened in the field using a Photo-Ionization Detector (PID) approximately every 2 feet depending on the soil recovery of each sleeve. In general, the soil sample with the highest PID reading was selected from each boring for laboratory analysis. If field screening detected an elevated reading, then additional soil samples from each boring were selectively analyzed with the QED UVF HC-1 Analyzer. The soil boring logs with the soil descriptions, visual examination, and PID screening results are included in Appendix D. The PID field screening results are summarized in Table 1. To prevent cross contamination, new disposable nitrile gloves were worn by the sampling technician during the sampling activities, and were changed between samples. A slight petroleum odor was detected in the borings near the former pump island during the field screening.

The soil samples selected for Total Petroleum Hydrocarbon (TPH) analyses were analyzed utilizing the QED UVF HC-1 Analyzer system from QROS-US. The NCDOT has indicated that this instrument is an acceptable method to provide total petroleum hydrocarbon (TPH) results for soil analysis for the PSA projects. Pyramid's QED-certified technician performed the soil analyses. The soil samples selected for analysis using the QED Analyzer were analyzed for TPH as diesel range organics (DRO) and TPH as gasoline range organics (GRO). The soil samples selected for analysis using the

QED were preserved in the field with methanol and were analyzed at the end of each day using the QED. One duplicate soil sample was selected for laboratory analysis from Parcel 49.

The duplicate soil sample selected for laboratory analyses 49-1(7.5-10) was placed in laboratory prepared containers and shipped to Pace Analytical in Huntersville, NC for analysis. The selected soil sample was analyzed for TPH as GRO by EPA Method 8015C and DRO by EPA Method 8015C/3541.

4.2 Soil Sample Analytical Results

The QED results did not detect TPH-GRO or TPH-DRO concentrations above 10 mg/kg for any of the soil samples analyzed. The DENR action levels for both TPH-GRO and TPH-DRO are 10 mg/kg. The soil sample QED results are summarized in **Table 2**. A copy of the QED analysis report is included in **Appendix E**.

A duplicate of soil sample 49-1(7.5-10) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 49-1(7.5-10) did not detect GRO or DRO concentrations above detection limits. A copy of the laboratory report and chain-of-custody is included in **Appendix F**. To maintain consistency, the QED results are utilized in this report to determine the presence and level of potential contamination.

4.3 Temporary Monitoring Well Installation

On December 18, 2013, Pyramid converted soil boring 49-4 into a 1-inch diameter temporary monitoring well (TW). Soil boring 49-4(TW) was completed to a total depth of 20 feet below land surface (BLS). The temporary well was constructed with 10 feet of 1-inch diameter of schedule 80 PVC casing and 10 feet of 1-inch diameter of schedule 80 PVC slotted screen. The temporary well was set in the boring with 10 feet of slotted screen at the bottom of the well.

On December 18, 2013, the temporary monitoring well 49-4(TW) was gauged using a properly decontaminated electric water level probe. The depth-to-groundwater was measured at 18.8 feet BLS. An attempt was made to sample the temporary monitoring well using a new 0.5-inch diameter disposable bailer, however, the minimal amount of water at the bottom of the well prevented a sample from being collected. Upon completion of the gauging and sampling, the temporary monitoring well was properly abandoned by the drillers by removing the casing, and filling the borehole with bentonite chips and portland cement.

4.4 Groundwater Analytical Results

As mentioned above, the minimal amount of groundwater at the bottom of the temporary well prevented a sample from being collected. The significant depth of the groundwater (18.8 feet BLS) indicates that it is unlikely the NCDOT will encounter groundwater at this property during their construction activities.

5.0 Conclusions and Recommendations

As requested by NCDOT, Pyramid has completed a PSA at the Martha Robbins property located 2259 N. US 1, Rockingham, NC (Parcel 49). The following is a summary of the assessment activities and results.

5.1 Geophysical Investigation

The geophysical investigation recorded evidence of one probable metallic UST (likely a septic tank) and two possible metallic USTs at the property.

5.2 Limited Soil Assessment

The QED did not detect TPH gasoline range organic (GRO) or TPH diesel range organic (DRO) concentrations above 10 mg/kg in any of the soil samples analyzed. The DENR action levels for both TPH-GRO and TPH-DRO are 10 mg/kg. A duplicate of soil sample 49-1(7.5-10) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 49-1(7.5-10) did not detect GRO or DRO concentrations above detection limits. To maintain consistency, the QED results are utilized in this report to determine the presence and level of potential contamination.

5.3 Limited Groundwater Assessment

Soil boring 49-4 was converted into a 1-inch diameter temporary monitoring well to a total depth of 20 feet BLS. The depth-to-groundwater was measured at 18.8 feet BLS. The minimal amount of groundwater at the bottom of the temporary well prevented a sample from being collected. The significant depth of the groundwater indicates that it is unlikely the NCDOT will encounter groundwater at this property during their construction activities.

5.4 Recommendations

No petroleum-impacted soils above 10 mg/kg were encountered during the PSA investigation at Parcel 49. Therefore, no recommendations are necessary for the treatment or disposal of such materials. Pyramid would recommend that the former pump islands and apparent former product lines detected by the geophysical survey be removed and properly disposed of. Congruently, it is recommended that verification of the two possible USTs be made, and should these features be USTs, it is recommended that they also be removed and properly disposed of.

It should be noted that, if impacted soil is encountered during road construction outside of the area analyzed by this investigation, the impacted soil should be managed according to NC DENR Division of Waste Management (DWM) UST Section Guidelines and disposed of at a permitted facility.

6.0 Limitations

The results of this preliminary investigation are limited to the boring locations completed during this limited assessment and presented in this report. The laboratory results only reflect the current conditions at the locations sampled on the date this PSA was performed.

7.0 Closure

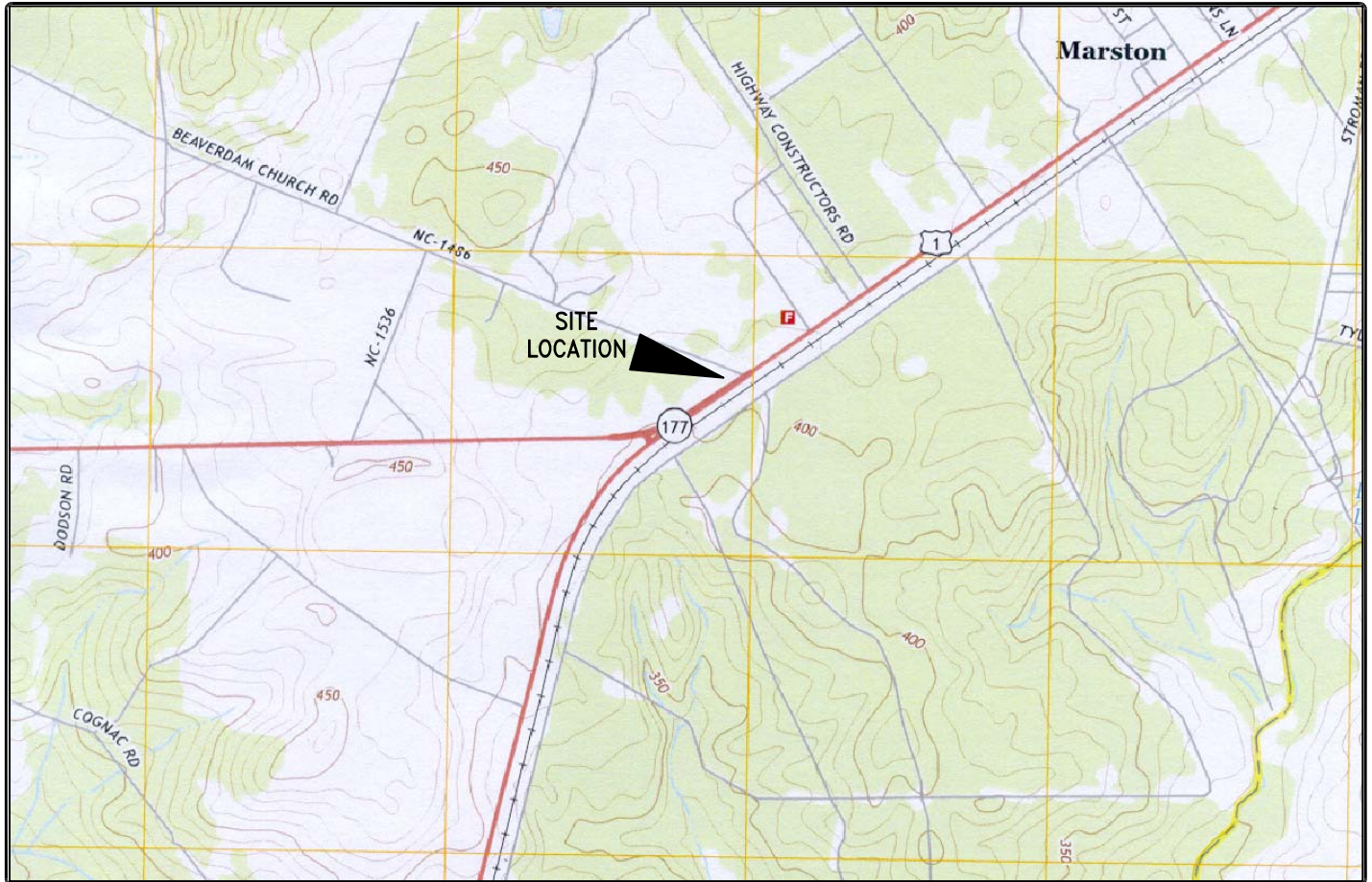
This report was prepared for, and is available solely for use by NCDOT and their designees. The contents thereof may not be used or relied upon by any other person without the express written consent and authorization of Pyramid Environmental & Engineering, P.C. (Pyramid). The observations, conclusions, and recommendations documented in this report are based on site conditions and information reviewed at the time of Pyramid's investigation. Pyramid appreciates the opportunity to provide this environmental service.

FIGURES

USGS TOPOGRAPHIC MAP

SITE: 2259 U.S. HIGHWAY 1 NORTH

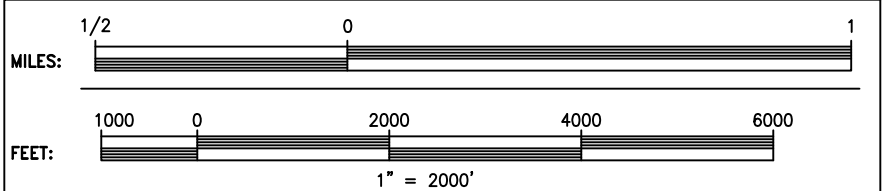
LOCATION: ROCKINGHAM, NORTH CAROLINA



USGS IDENTIFICATION

SCALES

USGS 7.5 MINUTE MAP	MARSTON, N.C.
ORIGINAL DATE:	2013
PHOTOREVISION DATE:	NA



	PRIMARY HIGHWAY, HARD SURFACE
	SECONDARY HIGHWAY, HARD SURFACE
	LIGHT-DUTY ROAD HARD OR IMPROVED SURFACE
	UNIMPROVED ROAD
	STATE ROAD
	U.S. ROUTE
	INTERSTATE ROUTE

NOTES: TOPOGRAPHICAL CONTOUR INTERVAL = 10 FEET
 PHOTOREVISIONS DENOTED IN PURPLE

MAGNETIC NORTH

COUNTY MAP OF: **NORTH CAROLINA**

COUNTY: **RICHMOND**

APPROXIMATE SITE LOCATION

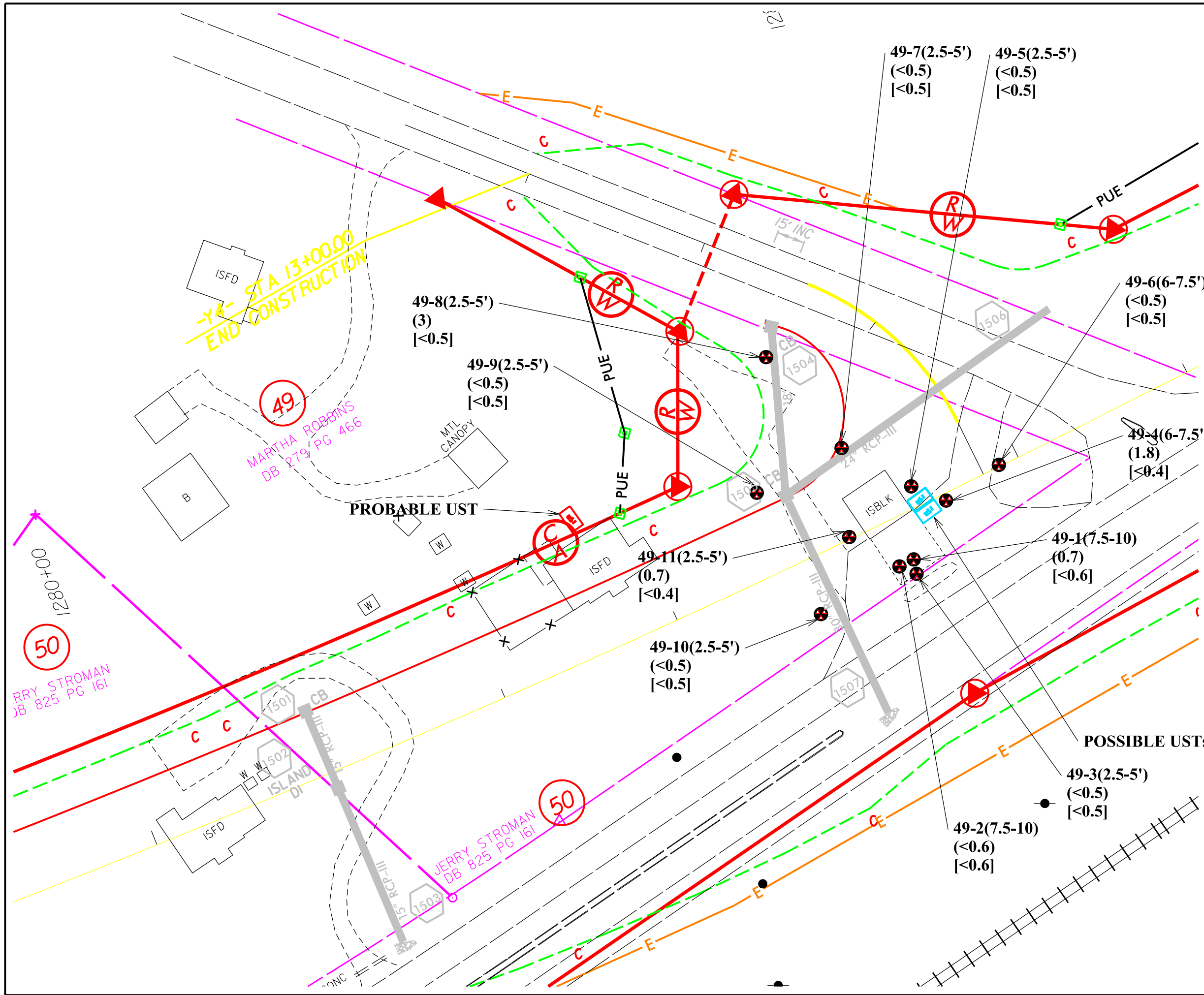


CLIENT: NC DOT R-2501C	SCALE: 1"=2000'
PROPERTY NAME: PARCEL 049, MARTHA ROBBINS	DRAWN BY: KAM
CITY: ROCKINGHAM STATE: NORTH CAROLINA	CHECK BY: TDL
TITLE: TOPOGRAPHIC MAP	DATE: 1/7/14
	JOB NO.: 2013-278
	TYPE: PSA
	FIGURE NUMBER: 1
	DRAWING NAME: USGSTOPO

NOTES

TOPOGRAPHIC MAP USED IN THIS GRAPHIC IS MAPPED, EDITED, AND PUBLISHED BY THE UNITED STATES GEOLOGIC SURVEY, DEPARTMENT OF THE INTERIOR, RESTON VIRGINIA.

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS.



TITLE	SOIL BORING LOCATIONS AND QED ANALYTICAL RESULTS	
PROJECT	NCDOT ROW PROJECT R-2501C (34437.1.1) MARTHA ROBBINS - PARCEL 049 U.S. 1, RICHMOND COUNTY, NORTH CAROLINA	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology
DATE: 12-19-13	REVISION NO. 0	
PYRAMID PROJECT NO. 2012-278	FIGURE NO. 2	

TABLES

TABLE 1
Summary of Soil Field Screening Results
NCDOT Project R-2501C
2259 US Highway 1 North - Parcel 049
Rockingham, Richmond County, North Carolina

SOIL BORING	SAMPLE ID	DEPTH (feet bgs)	PID READINGS (PPM)
49-1	49-1(2.5-5)	2.5 to 5	0.1
	49-1(7.5-10)	7.5 to 10	2.3
49-2	49-2(2.5-5)	2.5 to 5	0.3
	49-2(7.5-10)	7.5 to 10	1.3
49-3	49-3(2.5-5)	2.5 to 5	0.8
	49-3(7.5-10)	7.5 to 10	0.3
49-4	49-4(2.5-5)	2.5 to 5	0.2
	49-4(6-7.5)	6 to 7.5	0.3
	49-4(7.5-10)	7.5 to 10	0.1
49-5	49-5(2.5-5)	2.5 to 5	0.2
	49-5(7.5-10)	7.5 to 10	0.1
49-6	49-6(2.5-5)	2.5 to 5	0.0
	49-6(6-7.5)	6 to 7.5	0.2
	49-6(7.5-10)	7.5 to 10	0.1
49-7	49-7(2.5-5)	2.5 to 5	0.2
	49-7(7.5-10)	7.5 to 10	0.1
49-8	49-8(2.5-5)	2.5 to 5	1.2
	49-8(6-7.5)	6 to 7.5	0.5
	49-8(7.5-10)	7.5 to 10	0.2
49-9	49-9(2.5-5)	2.5 to 5	0.6
	49-9(7.5-10)	7.5 to 10	0.2
49-10	49-10(2.5-5)	2.5 to 5	0.2
	49-10(7.5-10)	7.5 to 10	0.2
49-11	49-11(2.5-5)	2.5 to 5	7.0
	49-11(7.5-10)	7.5 to 10	0.2

bgs= below ground surface

PID= photo-ionization detector

PPM= parts-per-million

☐ = sampled for lab analysis &/or QROS-QED analysis

OVA= Organic Vapor Analyzer

TABLE 2
Summary of Soil Sample Analytical Results
 NCDOT State Project R-2501C
 2259 US Highway 1 North - Parcel 049
 Rockingham, Richmond County, North Carolina

SAMPLE ID	DATE	DEPTH (feet)	PID (ppm)	QROS - QED Analysis			Laboratory Analysis (Pace)	
				GRO (mg/kg) (C5-C10)	DRO (mg/kg) (C10-C35)	TPH (mg/kg) (C5-C35)	EPA Method 3550 DRO (mg/kg)	EPA Method 5035 GRO (mg/kg)
49-1 (7.5-10)	12/18/2013	7.5 to 10	2.3	<0.6	0.7	0.7	<5.2	<4.9
49-2(7.5-10)	12/18/2013	7.5 to 10	1.3	<0.6	<0.6	<0.6	-----	-----
49-3(2.5-5)	12/18/2013	2.5 to 5	0.8	<0.5	<0.5	<0.5	-----	-----
49-4(6-7.5)	12/18/2013	6 to 7.5	0.3	<0.4	1.8	1.8	-----	-----
49-5(2.5-5)	12/18/2013	2.5 to 5	0.2	<0.5	<0.5	<0.5	-----	-----
49-6(6-7.5)	12/18/2013	6 to 7.5	0.2	<0.5	<0.5	<0.5	-----	-----
49-7(2.5-5)	12/18/2013	2.5 to 5	0.2	<0.5	<0.5	<0.5	-----	-----
49-8(2.5-5)	12/18/2013	2.5 to 5	1.2	<0.5	3	3	-----	-----
49-9(2.5-5)	12/18/2013	2.5 to 5	0.6	<0.5	<0.5	<0.5	-----	-----
49-10(2.5-5)	12/18/2013	2.5 to 5	0.2	<0.5	<0.5	<0.5	-----	-----
49-11(2.5-5)	12/18/2013	2.5 to 5	7.0	<0.4	0.7	0.7	-----	-----
NC Initial Action Level - UST Section for 5035/5030-GRO; 3550-DRO				10	10	NA	10	10

PID= photo-ionization detector
 PPM= parts-per-million

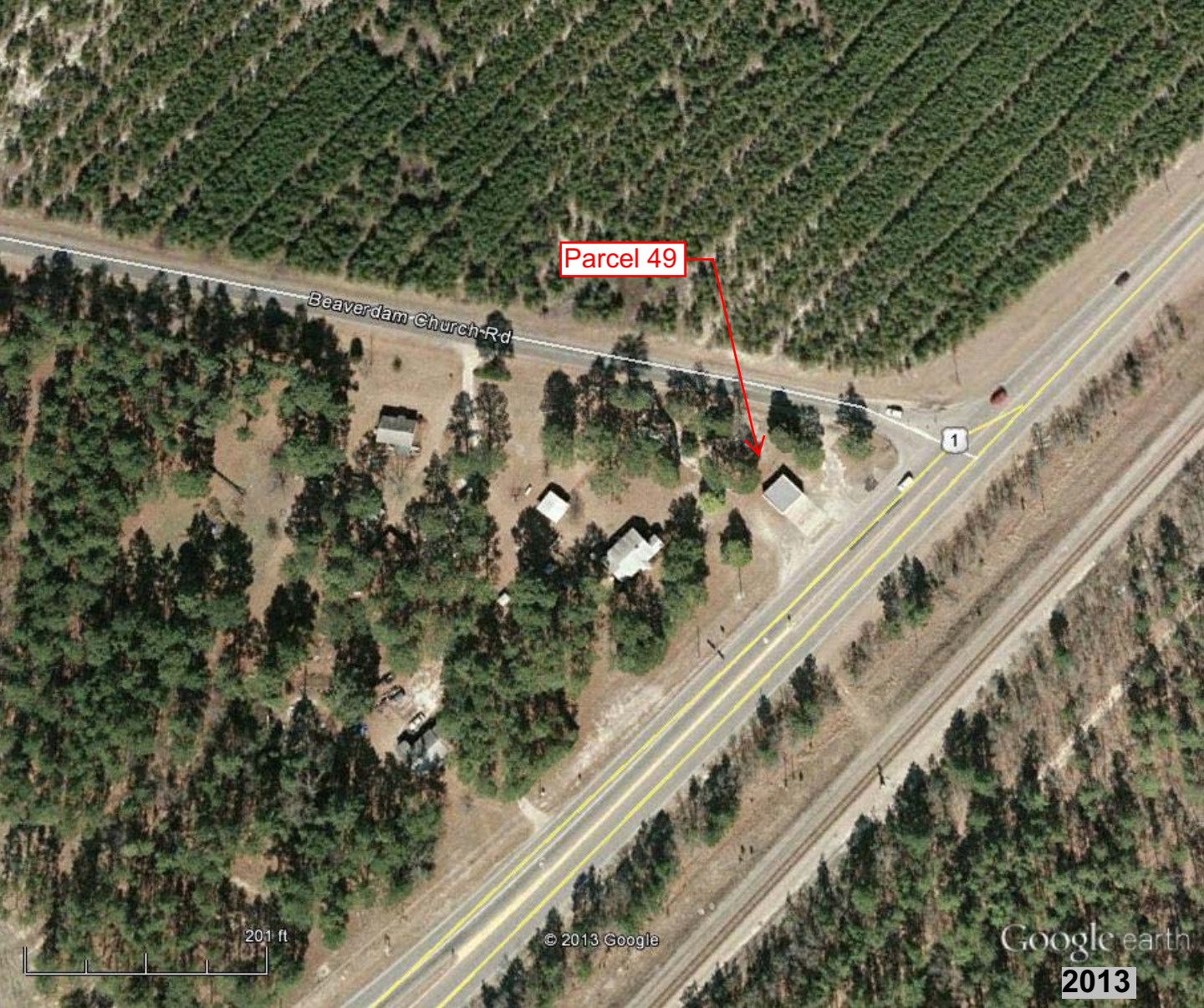
GRO= Gasoline Range Organics
 DRO= Diesel Range Organics
 mg/kg= milligrams-per-kilogram

TPH= Total Petroleum
 Hydrocarbons (GRO + DRO)

NA= Not Applicable
 "-----" = No Laboratory Analysis

* Bold values indicate concentrations above initial action levels

APPENDIX A



Parcel 49

Beaverdam Church Rd

1

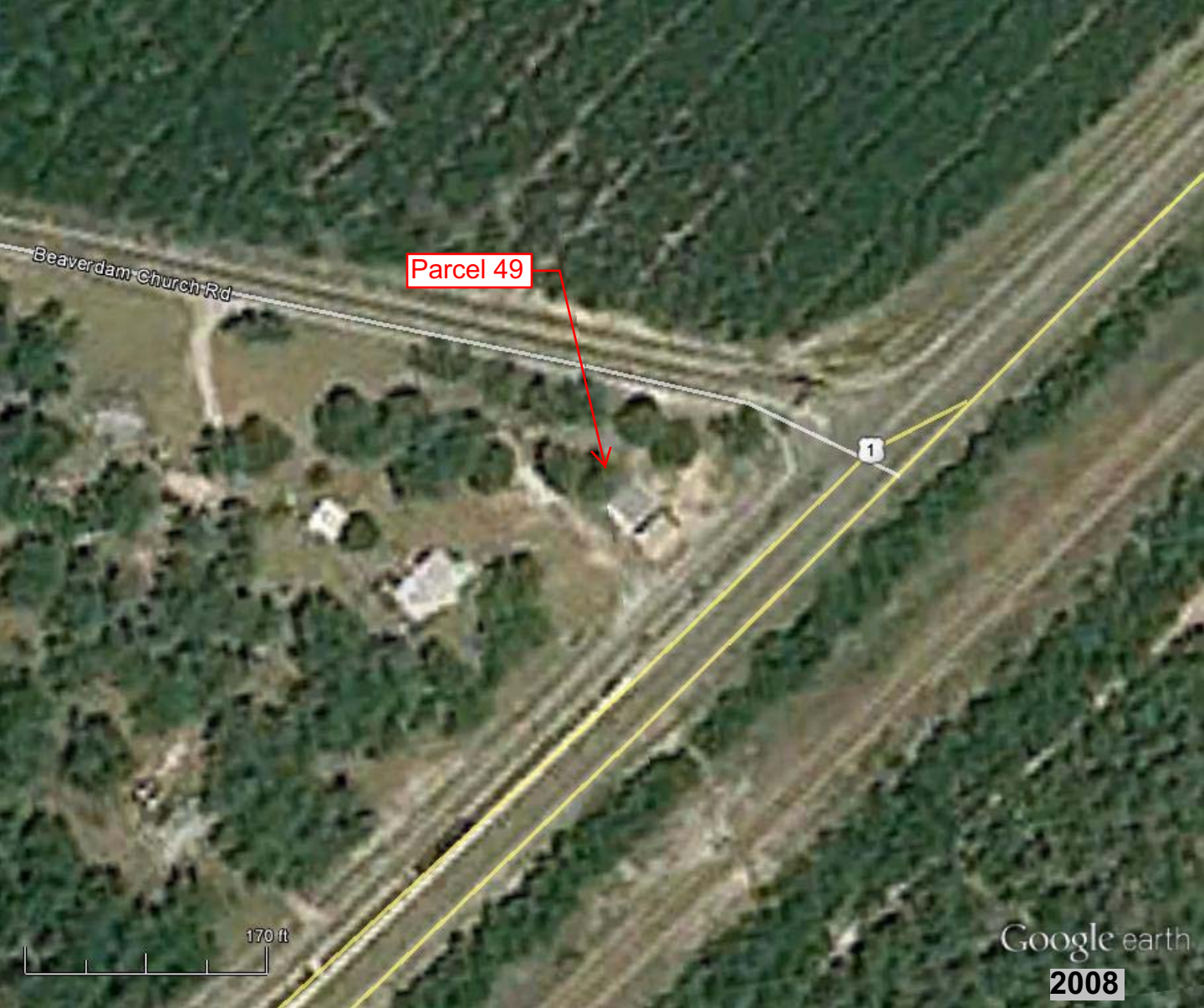
201 ft

© 2013 Google

Google earth
2013

Google earth





Beaverdam Church Rd

Parcel 49

1

170 ft

Google earth
2008

Google earth

feet 400
meters 100





Parcel 49

Beaverdam Church Rd

1

170 ft

Google earth
2005

Google earth

feet 400
meters 100





Beaverdam Church Rd

Parcel 49

1

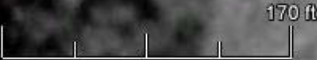


Image U.S. Geological Survey

Google earth
1999

Google earth





Beaverdam Church Rd

Parcel 49

1



Image U.S. Geological Survey

Google earth
1993

Google earth





Parcel 49

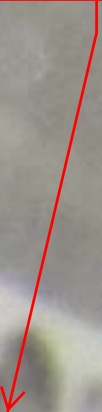
1975



Parcel 49

1956

Parcel 49



1938

APPENDIX B

UST-2

Report For Permanent Closure or Change-in-Service of U.S.T.

FOR TANKS IN NC

Return to Regional Office according to the county of the facility's location.
 (SEE REVERSE SIDE OF OWNER'S COPY (PINK) FOR REGIONAL ADDRESS)

State Use Only
 I.D. Number _____
 Date Received _____

INSTRUCTIONS

Complete and return within (30) days following completion of site investigation.

I. Ownership of Tank(s)

II. Location of Tank(s)

Owner Name (Corporation, Individual, Public Agency, or Other Entity)
Service Oil Company INC.
 Street Address **P.O. Box 949**
 County **Scotland**
 City **Laurinburg** State **N.C.** Zip Code **28353**
 Area Code (919) Telephone Number **276-1673**

Facility Name or Company
Robbins Exxon
 Facility ID # (if available) **018198**
 Street Address or State Road
Rt. 1 Box 34
 County **Richmond** City **Marston** Zip Code **28363**
 Area Code (919) Telephone Number **582-0116**

III. Contact Person

Name **Larry F. Graham, P.E.** Job Title **Engineer** Telephone No. (Area Code) **(919) 673-0487**
 Closure Contractor (Name) **Highway Constructors, Inc.** (Address) **P. O. Drawer 100 Marston, N. C. 28363** Telephone No. (Area Code) **(919) 582-2600**
 Lab (Name) **Carolina Environmental Laboratories** (Address) **1229 N Horner Blvd. Sanford, N. C. 27530** Telephone No. (Area Code) **(919) 775-**

IV. U.S.T. Information

V. Excavation Condition

VI. Additional Information Required

Tank No.	Size in Gallons	Tank Dimensions	Last Contents	Water In Excavation		Free Product		Notable Odor or Visible Soil Contamination	
				Yes	No	Yes	No	Yes	No
1	2000 gal	64 in. x 141 in.	Gasoline		x		x		x
2	2000	64 in. x 141 in.	Gasoline		x		x		x
3	1000	48 in. x 120 in.	Gasoline		x		x		x
4	500	42 in x 92 in.	Kerosene		x		x		x

See reverse side of pink copy (owner's copy) for additional information required by N.C. - DEM in the written report and sketch.

VII. Check List

Check the activities completed.

- Contact local fire marshal
 - Notify DEM Regional Office before abandonment
 - Drain & flush piping into tank.
 - Remove all product and residuals from tank
 - Excavate down to tank
 - Clean and inspect tank
 - Remove drop tube, fill pipe, gauge pipe, vapor recovery tank connectors, submersible pumps and other tank fixtures.
 - Cap or plug all lines except the vent and fill lines.
 - Purge tank of all product & flammable vapors.
 - Cut one or more large holes in the tanks.
 - Backfill the area.
- Date Tank(s) Permanently closed: **4-30-93, 5-3-93**
 Date of Change-in-Service: _____

- ABANDONMENT IN PLACE**
- Fill tank until material overflows tank opening;
 - Plug or cap all openings;
 - Disconnect and cap or remove vent line
 - Solid inert material used - specify: _____

- REMOVAL**
- Create vent hole
 - Label tank
 - Dispose of tank in approved manner
- Final tank destination: **M.M.M., Inc. La Grange, N. C.**

VIII. Certification (Read and Sign)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the submitted information is true.

APPENDIX C



PYRAMID ENVIRONMENTAL & ENGINEERING
(PROJECT 2013-278)


GEOPHYSICAL SURVEY


PARCEL 049 – MARTHA ROBBINS
2259 N. US 1
NCDOT PROJECT R-2501C (34437.1.1)

ROCKINGHAM, RICHMOND COUNTY, NC

JANUARY 13, 2013

Report prepared for: Mr. Gordon Box
GeoEnvironmental Project Manager
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

Prepared by: 
Eric C. Cross, P.G.
NC License #2181

Reviewed by: 
Douglas A. Canavello, P.G.
NC License #1066

GEOPHYSICAL INVESTIGATION REPORT
Parcel 049, 2259 N. US 1
Rockingham, Richmond County, North Carolina

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Introduction.....2
Field Methodology.....2
Discussion of Results.....3
Summary and Conclusions4
Limitations5

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- Figure 2 – Parcel 049 – EM61 Bottom Coil Results Contour Map
- Figure 3 – Parcel 049 – EM61 Differential Results Contour Map
- Figure 4 – Parcel 049 – Overlay of EM61 Contour Map On Engineering Plans
- Figure 5 – Parcel 049 – GPR Transect Locations & Select Images

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT), at the Martha Robbins Property, Parcel 049, 2259 N. US 1, Rockingham, Richmond County, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-2501C). The geophysical survey boundaries at the project site were designed to include the portions of the property between the existing edge of pavement and the proposed ROW and easements, whichever distance was greater. The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys.

Geophysical Results: The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area. The majority of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features. The GPR survey recorded evidence of one probable metallic UST directly to the north of the residential building on the property (likely a septic tank). The GPR survey recorded evidence of two possible metallic USTs adjacent to the southeast corner of the vacant store building. These possible USTs measured approximately 12 feet long and 7 feet wide. GPR transects indicated former product lines directly to the north of the former pump island on the south side of the vacant store building. The geophysical investigation recorded evidence of one probable metallic UST and two possible metallic USTs at the property.

Parcel 049 Probable/Possible UST Locations

North Carolina State Plane (US Survey Feet)

UST	Northing	Easting
Probable UST#1	447741.369	1820524.865
Possible UST#1	447749.622	1820709.784
Possible UST#2	447745.304	1820713.667

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT), at the Martha Robbins Property, Parcel 049, 2259 N. US 1, Rockingham, Richmond County, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-2501C). The geophysical survey boundaries at the project site were designed to include the portions of the property between the existing edge of pavement and the proposed ROW and easements, whichever distance was greater. The main survey grid spanned approximately 420 feet from west to east and approximately 220 feet from north to south. An additional area on the northeast side of the parcel was investigated by reconnaissance EM transects that extended 140 feet north of the north boundary of the main survey area, and 20 feet from Beaverdam Church Rd. to the east. Conducted on December 6 and 9, 2013, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site contained a vacant store building and a residential structure, and otherwise consisted primarily of open grassy areas. Aerial photographs showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

Prior to conducting the geophysical investigation, a 20-foot by 10-foot survey grid was established across the geophysical survey areas using measuring tapes and water-based marking paint. These grid marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. The EM survey was performed on December 6, 2013, using a Geonics EM61 metal detection instrument. According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller

objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8 foot intervals along north-south trending or east-west trending, parallel survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics DAT61 and Surfer for Windows Version 11.0 software programs.

GPR data were acquired across select EM differential anomalies on December 9, 2013, using a Geophysical Survey Systems, Inc. (GSSI) SIR-2000 unit equipped with a 400 MHz antenna. Data were collected generally from east to west and north to south across the property. The GPR data were viewed in real time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 8 feet, based on an estimated two-way travel time of 8 nanoseconds per foot. GPR Transects across specific anomalies were saved to the hard drive of the SIR unit for post-processing and figure generation.

DISCUSSION OF RESULTS

Contour plots of the EM61 bottom coil and differential results obtained across survey area at the property are presented in **Figures 2 and 3**, respectively. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines; small, isolated metal objects, and areas containing insignificant metal debris. The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drum and UST-size objects and ignore the smaller insignificant metal objects.

Discussion of EM Anomalies: The EM anomaly at X=20, Y=20 was the result of a street sign. The EM anomaly at X=135, Y=120 was the result of a metal enclosure in the yard of the residence. The EM anomaly at X=200, Y=25 was the result of a street sign. The EM anomaly at X=200, Y=160 was suspected to be the result of a septic tank behind the residence. The EM anomaly at X=255, Y=35 was the combined result of a water meter cover and a utility junction box. The EM feature extending from X=280 to X=300 centered at Y=50 was suspected to be the result of minor debris or a utility. The EM anomaly at X=315, Y=135 was the result of a power

pole. The EM anomaly at X=325, Y=115 was the result of suspected metallic debris. The EM anomaly centered at X=350, Y=100 was the result of multiple reinforced concrete posts. The EM response surrounding the vacant store building was the result of reinforcement in the foundation of the structure, however, the EM feature extending off of the southeast corner of the building was suggestive of possible buried metallic objects. The two EM features centered at X=435, Y=40 were the result of a drop inlet and a street sign.

Reconnaissance EM transects were performed across a 20-foot wide (east/west) corridor extending 140 north of the northeast boundary of the main survey area (refer to **Figure 1**). No metallic anomalies were observed in this area of the property. **Figure 4** presents an overlay of the EM61 bottom coil contour map on the NCDOT engineering plans for reference.

Discussion of the GPR survey: GPR Transects were performed across specific differential anomalies that were not explained by visible cultural features. **Figure 5** presents the location of the formal GPR transects that were saved to the hard drive, as well as the transect images and photographs of the probable and possible USTs that were encountered (see below). GPR reconnaissance transects were performed across the suspected septic tank on the north side of the residential building. GPR Transect 1 was performed across the suspected septic tank, and recorded a distinct reflector that provided evidence of an underground structure. The correlating EM61 data resulted in the categorizing this feature as a probable metallic UST, and was likely the septic tank. The property owner's son also indicated that this area was where the septic tank was located. The edges of the structure were indistinct, and an exact size was not determined. The total area encompassing the structure was marked in the field with white spray paint.

GPR Transect 2 was performed to the north of the former apparent pump island, and recorded reflectors that were consistent with utility lines in this area. The location of the lines adjacent to the pump island indicates that the utilities are likely former product lines leading to the location of the former USTs. GPR Transects 3 and 4 were performed across the EM feature on the southeast side of the store building. These transects recorded evidence of two apparent subsurface structures. The width and length of the structures was consistent with possible USTs, however the shape of the top of the objects as well as the lower than expected EM signature resulted in classifying these two objects as possible metallic USTs. The two possible USTs were

approximately 12 feet in length and 7 feet in width. The location of the tanks were marked with white spray paint.

Parcel 049 Probable/Possible UST Locations

North Carolina State Plane (US Survey Feet)

UST	Northing	Easting
Probable UST#1	447741.369	1820524.865
Possible UST#1	447749.622	1820709.784
Possible UST#2	447745.304	1820713.667

SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across Parcel 049 in Rockingham, North Carolina, provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- The majority of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features.
- The GPR survey recorded evidence of one probable metallic UST directly to the north of the residential building on the property (likely a septic tank).
- The GPR survey recorded evidence of two possible metallic USTs adjacent to the southeast corner of the vacant store building. These possible USTs measured approximately 12 feet long and 7 feet wide.
- GPR transects indicated former product lines directly to the north of the former pump island on the south side of the vacant store building.
- The geophysical investigation recorded evidence of one probable metallic UST and two possible metallic USTs at the property.

LIMITATIONS

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




Approximate Boundaries of the Geophysical Survey Area



View of West Portion of Survey Area
(Facing Approximately West)

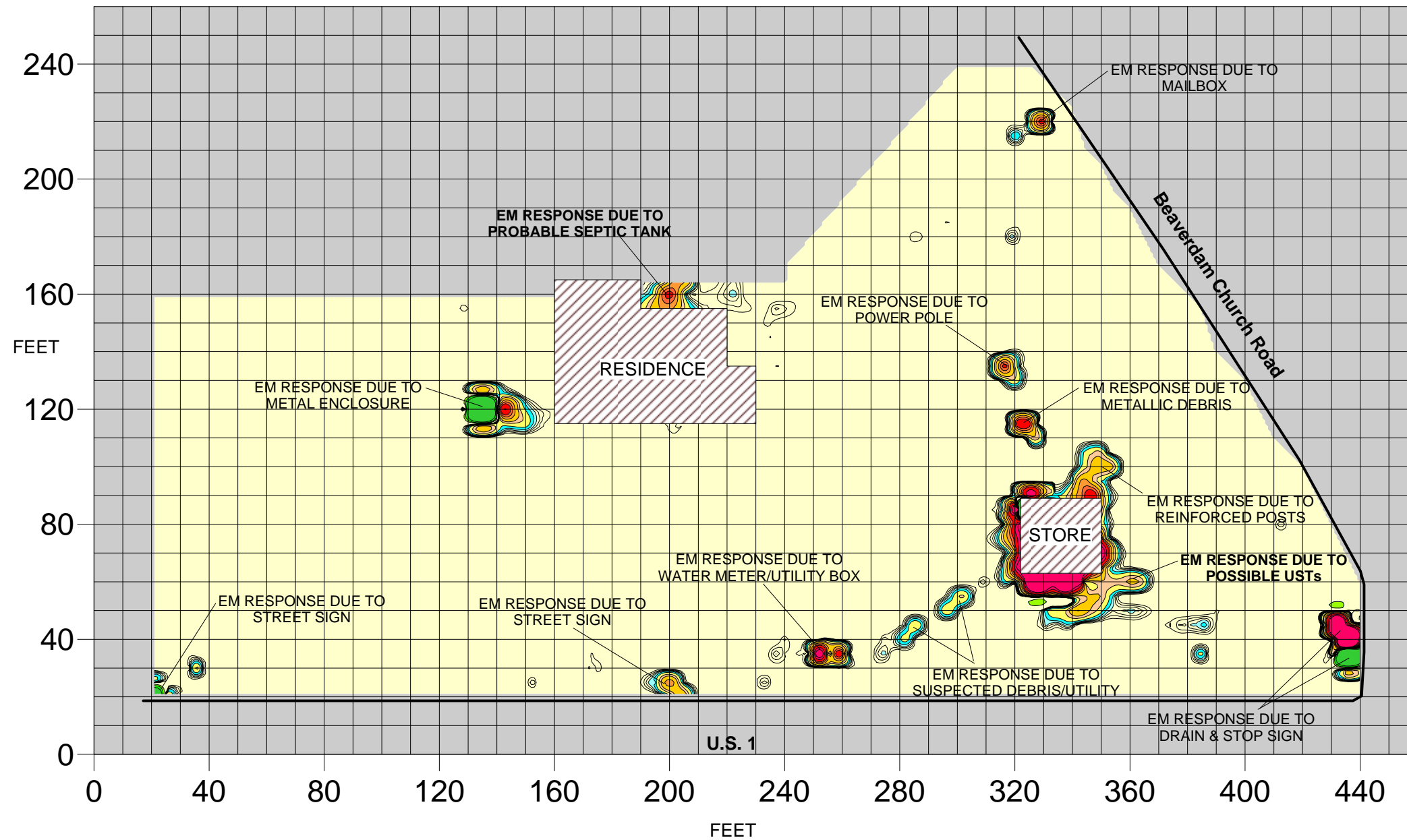


View of East Portion of Survey Area
(Facing Approximately East)

TITLE		PARCEL 049: GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	
PROJECT		NCDOT PROJECT R-2501C (34437.1.1) ROCKINGHAM, RICHMOND COUNTY, NC	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	1/6/2014	CLIENT	NCDOT
PYRAMID PROJECT #:	2013-278	FIGURE 1	



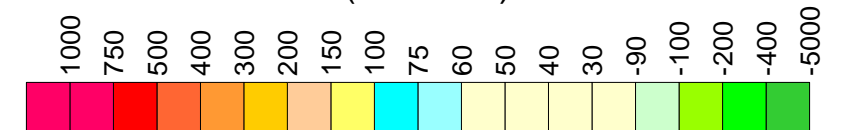
EM61 Bottom Coil Results




EVIDENCE OF ONE PROBABLE & TWO POSSIBLE METALLIC USTs OBSERVED

The contour plot shows the bottom coil (most sensitive) results of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM61 data were collected on December 4, 2013 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were collected on December 9, 2013, using a GSSI SIR 2000 unit coupled to a 400 MHz antennae.

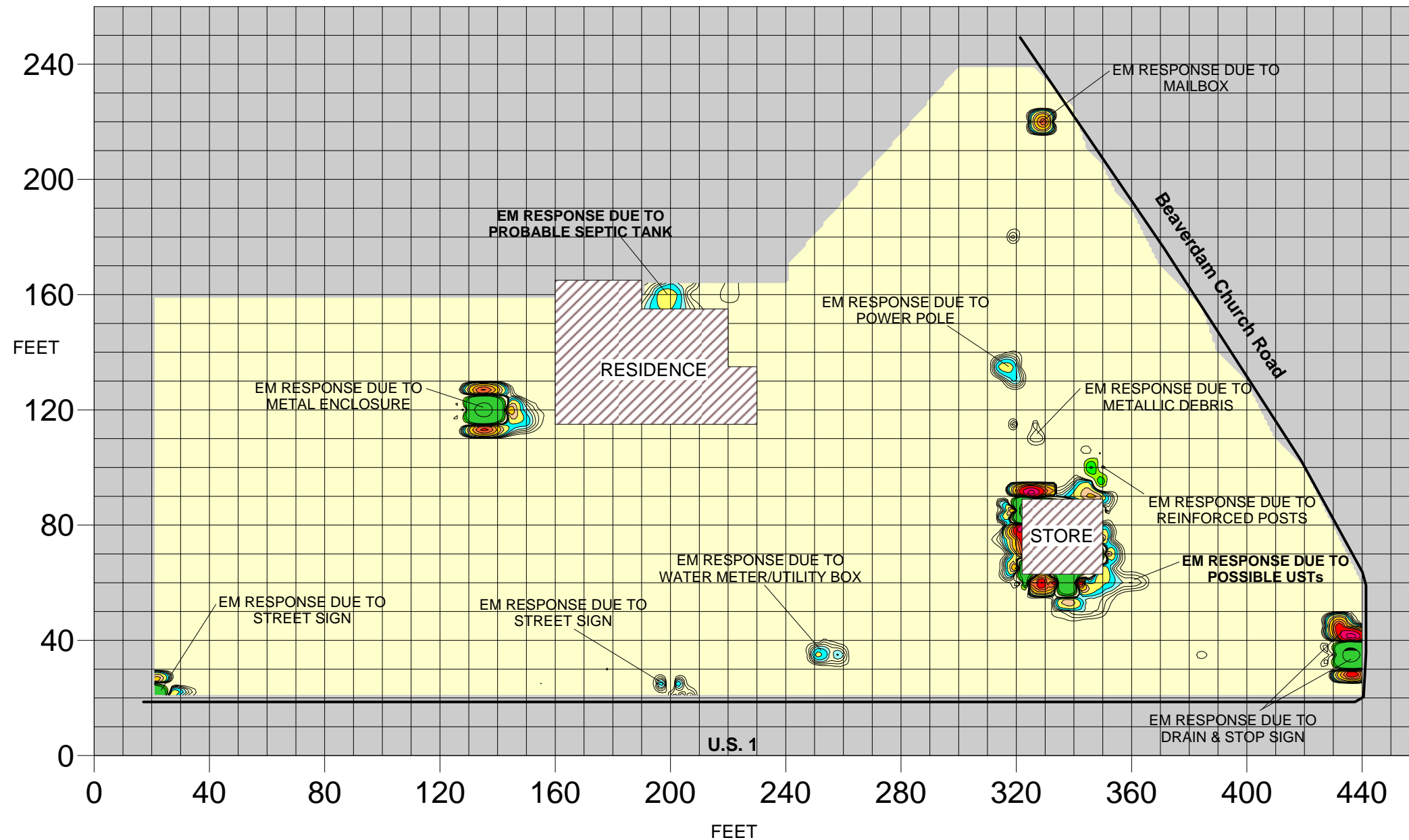
EM61 Metal Detection Response (millivolts)



TITLE	PARCEL 049: EM61 BOTTOM COIL RESULTS CONTOUR MAP	
PROJECT	NCDOT PROJECT R-2501C (34437.1.1) ROCKINGHAM, RICHMOND COUNTY, NC	
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	1/6/2014	CLIENT NCDOT
PYRAMID PROJECT #:	2013-278	FIGURE 2



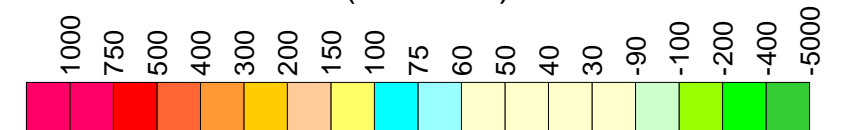
EM61 Differential Results



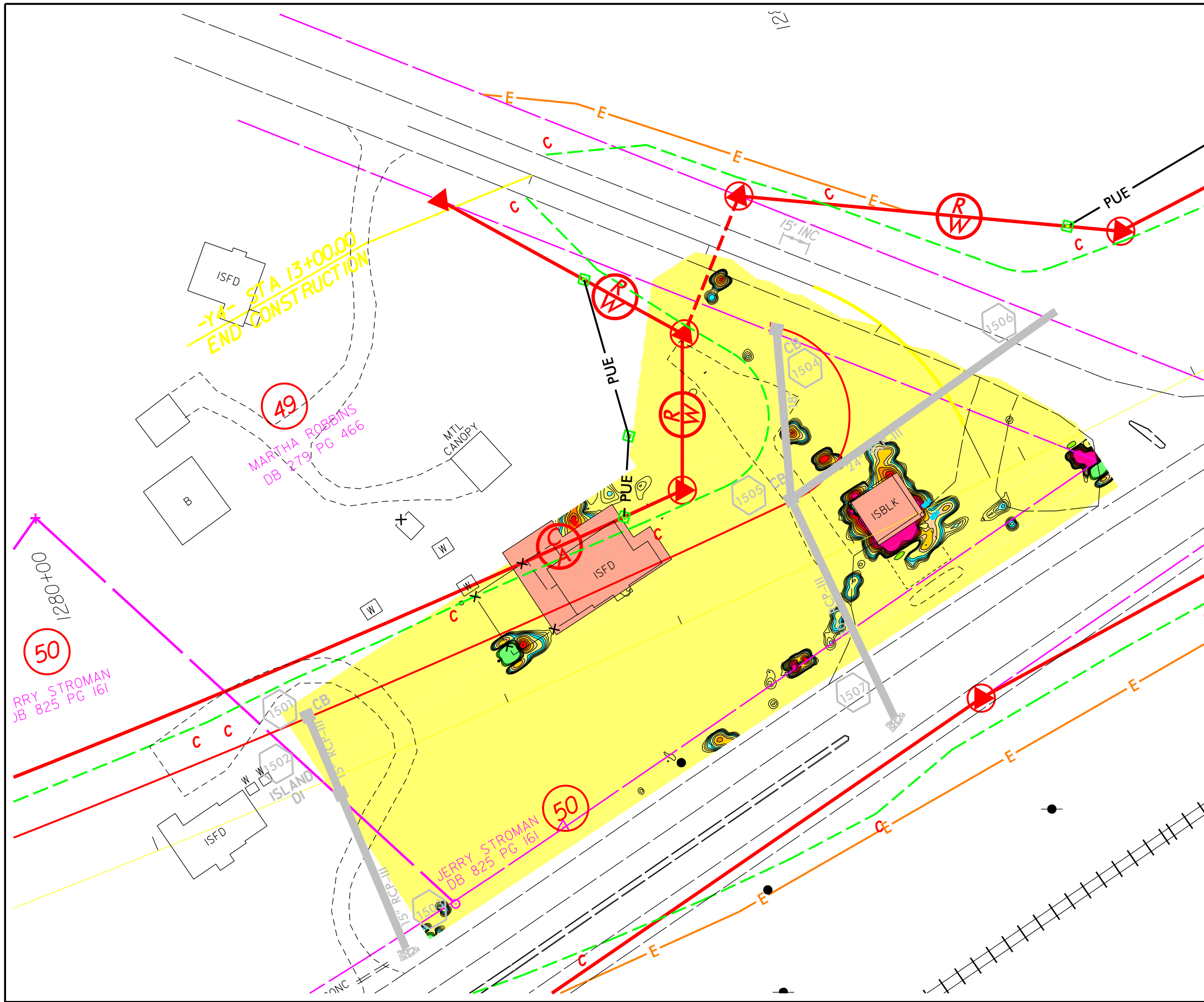
EVIDENCE OF ONE PROBABLE & TWO POSSIBLE METALLIC USTs OBSERVED

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous buried, metal debris. The EM61 data were collected on December 6, 2013, using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were collected on December 9, 2013, using a GSSI SIR 2000 unit coupled to a 400 MHz antennae.

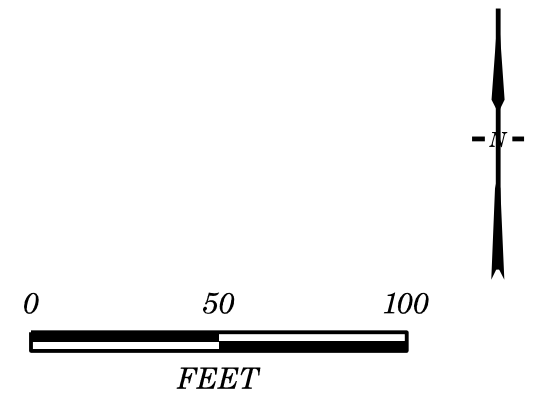
EM61 Metal Detection Response (millivolts)



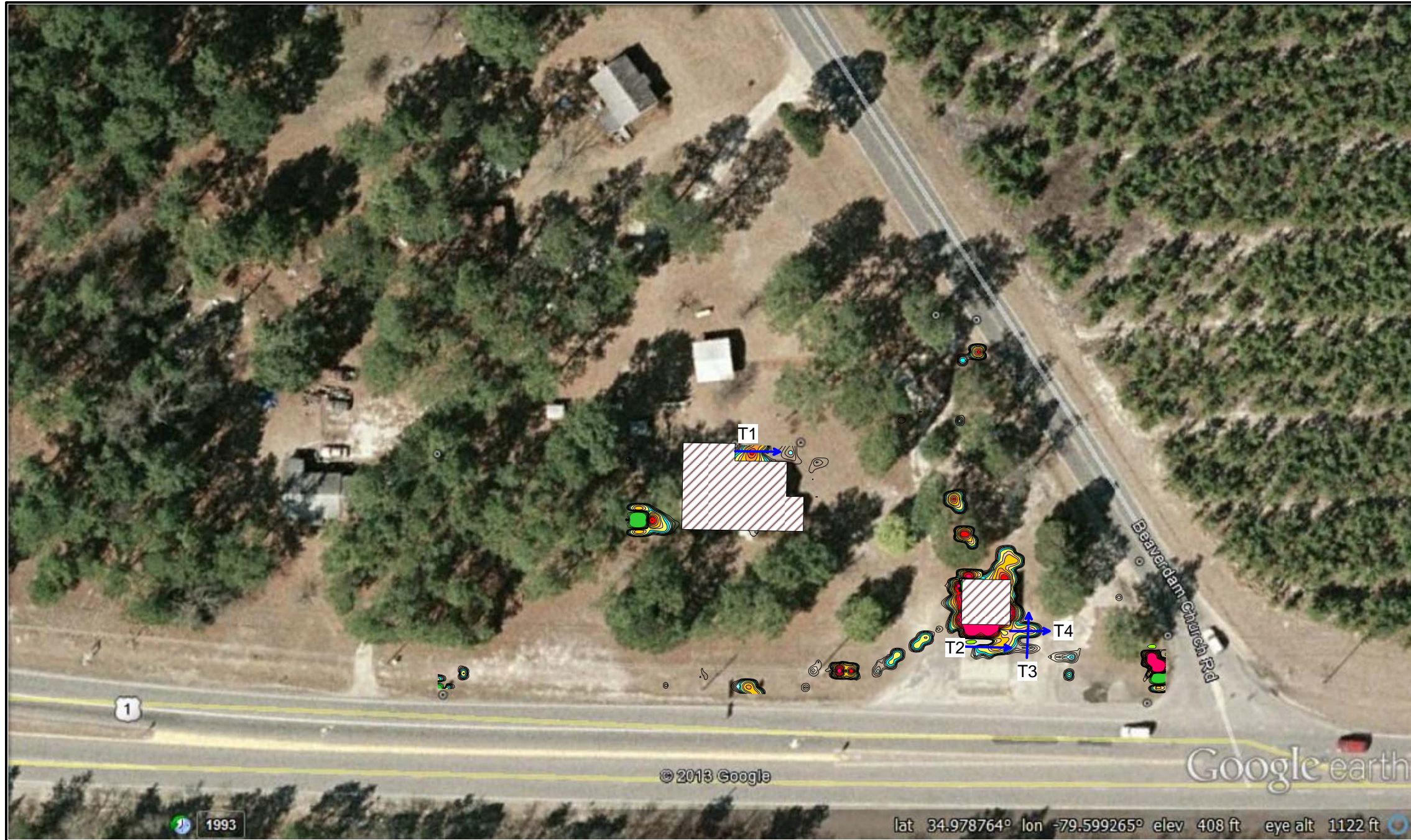
TITLE	PARCEL 049: EM61 DIFFERENTIAL RESULTS CONTOUR MAP	
PROJECT	NCDOT PROJECT R-2501C (34437.1.1) ROCKINGHAM, RICHMOND COUNTY, NC	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE	1/6/2014	CLIENT NCDOT
PYRAMID PROJECT #:	2013-278	FIGURE 3



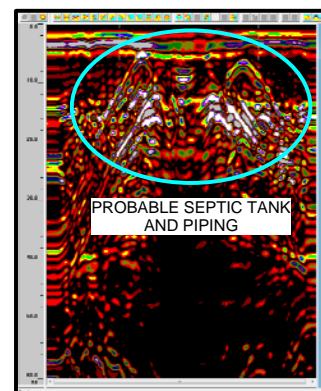
- LEGEND**
- PUE PROPOSED UTILITY EASEMENT
 - EXISTING ROW
 - EXISTING PROPERTY BOUNDARY
 - PROPOSED ROW
 - PROPOSED CONST. EASEMENT
 - PROP. DRAINAGE UTIL. EASEMENT
 - PROPOSED SS CUT LINE
 - PROPOSED SS FILL LINE
 - PROPOSED SS TRANSITION LINE
 - PROPOSED DRAINAGE PIPING
 - PROPOSED DRAINAGE EASEMENT
 - YELLOW ZONE REPRESENTS GEOPHYSICAL SURVEY AREA, CONTOURS ARE EM61 RESULTS (METALLIC RESPONSES)



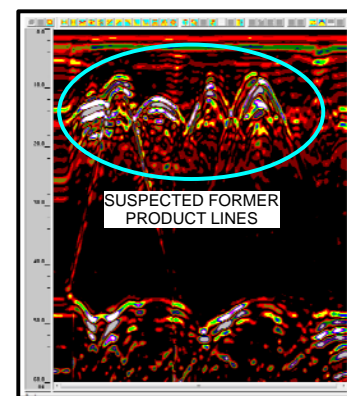
TITLE	OVERLAY OF EM61 CONTOUR MAP ON ENGINEERING PLANS	
PROJECT	NCDOT ROW PROJECT R-2501C (34437.1.1) MARTHA ROBBINS - PARCEL 049 U.S. 1, RICHMOND COUNTY, NORTH CAROLINA	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology
DATE: 12-19-13	REVISION NO. 0	
PYRAMID PROJECT NO. 2012-278	FIGURE NO. 4	



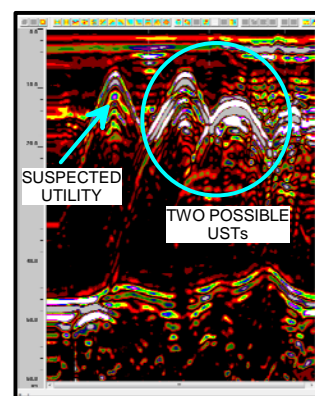
Approximate Boundaries of the Geophysical Survey Area



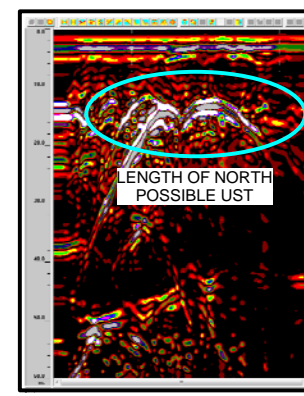
GPR Transect 1



GPR Transect 2



GPR Transect 3



GPR Transect 4




Area containing probable UST (suspected septic tank)



Area containing two possible USTs



TITLE	PARCEL 049: GPR TRANSECT LOCATIONS AND IMAGES	
PROJECT	NCDOT PROJECT R-2501C (34437.1.1) ROCKINGHAM, RICHMOND COUNTY, NC	
	 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	1/6/2014	CLIENT NCDOT
PYRAMID PROJECT #:	2013-278	FIGURE 5

APPENDIX D

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-2501C, Parcel 049, Martha Robbins Property, Rockingham, NC / 2013-278	BORING/WELL NO:	49-4
SITE LOCATION:	Richmond County, NC	BORING/WELL LOCATION:	Parcel 049, Martha Robbins Property, East Old Store Near Former UST Location
START DATE:	12/18/13	COMPLETED:	12/18/13
GEOLOGIST:	Tim Leatherman	DRILLER:	Geologic Exploration
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	20 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
-------------	---	--

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
	Depths correspond to soil type transitions	Core Sample Depths
	Landscape Surface	
2.5-5'	Brown, fine to medium grain clayey-sand (SC), moist, no odor	PID=49-4(2.5-5): 0.2 PPM
6-7.5'	Brown to tan, fine to medium grain sand (SP) to clayey-sand (SC), moist, no odor	PID=49-4(6-7.5): 0.3 PPM
7.5-10'	Tan, fine to medium grain sand (SP) to clayey-sand (SC), soft, moist, no odor	PID=49-4(7.5-10): 0.1 PPM
10-15'	Brown to tan, fine grain sandy-clay (CL), firm, moist, no odor	
15-20'	Brown to tan, fine to medium grain sandy-clay (CL) to clay, grades into clayey-sand (SC), very moist, no odor	
	No recovery from 0 to 2.5 feet and 5 to 7.5 feet	
	Set temporary well 49-4(TW) at 20 feet deep with 10 feet of screen.	
	On December 19th, gauged 49-4(TW) with a water level indicator.	
	Depth to groundwater in 49-4(TW) was 18.83 feet BLS.	
	Not enough water in temporary well to collect groundwater sample.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) 10 DEPTH (ft) 0-10 DIAMETER (in) 1 MATERIAL PVC
 SCREEN LENGTH (ft) 10 DEPTH (ft) 10-20 DIAMETER (in) 1 MATERIAL PVC
 DEPTH TO TOP OF SAND 8 BAGS OF SAND
 DEPTH TO TOP SEAL 4 BENTONITE USED BAGS OF CEMENT USED 0

APPENDIX E



Hydrocarbon Analysis Results

Client: NCDOT Richmond County R-2501C
Address: PARCEL 049
2259 US Highway 1 North
Rockingham, NC

Samples taken: Eight (8) Samples Taken
Samples extracted: Eight (8) Samples Extracted
Samples analysed: Eight (8) Samples Analysed

Contact: Tim Leatherman

Project: NCDOT Richmond R-2501C

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 % light % mid % heavy	HC Fingerprint Match
S	49-2(7.5-10)	12.7	<0.6	<0.6	#DIV/0!	#DIV/0!	<0.64	0.28	<0.032	0 100 0	Match not possible
S	49-2(7.5-10) R	12.7	<0.6	<0.6	<0.6	<0.6	<0.64	<0.06	<0.032	0 0 100	Background Organics
S	49-1(7.5-10)	12.0	<0.6	<0.6	0.7	0.7	0.73	0.09	<0.03	56.7 25.8 17.4	Match not possible
S	49-3(2.5-5)	9.3	<0.5	<0.5	<0.5	<0.5	<0.47	<0.05	<0.023	0 0 100	Background Organics
S	49-4(6-7.5)	8.9	<0.4	<0.4	1.8	1.8	1.85	0.17	<0.022	43.9 44.5 11.6	Match not possible
S	49-5(2.5-5)	9.6	<0.5	<0.5	<0.5	<0.5	<0.48	<0.05	<0.024	0 0 100	Degraded Fuel (est) 0%
S	49-6(6-7.5)	9.4	<0.5	<0.5	#DIV/0!	#DIV/0!	<0.47	<0.05	<0.024	0 0 100	Match not possible
S	49-6(6-7.5)	9.4	<0.5	<0.5	<0.5	<0.5	<0.47	<0.05	<0.024	0 0 100	Match not possible
S	49-7(2.5-5)	9.3	<0.5	<0.5	<0.5	<0.5	<0.47	<0.05	<0.023	0 47.6 52.4	Match not possible
S	49-8(2.5-5)	9.5	<0.5	<0.5	3	3	1.85	0.17	<0.024	90.9 9.1 0	Match not possible

Initial Calibrator QC check

Low Range Calibrator Final check
High Range Calibrator Final check

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 based on operator selected library matches
Fingerprint match abbreviations Est = Specific calibrator not used, result estimated (PFM)= Poor library fingerprint match
(SBS)= site specific background subtracted (LBS)= Library background subtracted % = match confidence



Hydrocarbon Analysis Results

Client: NCDOT Richmond County R-2501C
Address: PARCEL 049
 2259 US Highway 1 North

Samples taken Three (3) Samples Taken
Samples extracted Three (3) Samples Extracted
Samples analysed Three Samples Analysed

Contact: Tim Leatherman

Project: NCDOT Richmond R-2501C

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 % light % mid % heavy	HC Fingerprint Match
s	49-9(2.5-5)	10.4	<0.5	<0.5	#DIV/0!	#DIV/0!	< 0.52	< 0.05	< 0.026	0 0 100	Match not possible
s	49-9(2.5-5) R	10.4	<0.5	<0.5	<0.5	<0.5	< 0.52	< 0.05	< 0.026	0 0 100	Deg.Fuel (PFM)
s	49-10(2.5-5)	9.5	<0.5	<0.5	<0.5	<0.5	< 0.48	< 0.05	< 0.024	0 0 100	Match not possible
s	49-11(2.5-5)	8.7	<0.4	<0.4	0.7	0.7	0.72	0.09	< 0.022	47.3 31.4 21.3	Match not possible

Initial Calibrator QC check

Low Range Calibrator Final check
 High Range Calibrator Final check

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 based on operator selected library matches
 Fingerprint match abbreviations Est = Specific calibrator not used, result estimated (PFM)= Poor library fingerprint match
 (SBS)= site specific background subtracted (LBS)= Library background subtracted % = match confidence

APPENDIX F

December 31, 2013

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

RE: Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

Dear Chemical Engineer:

Enclosed are the analytical results for sample(s) received by the laboratory on December 20, 2013. 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,



Jon D Bradley

jon.bradley@pacelabs.com
Project Manager

Enclosures

cc: Tim Leatherman, Pyramid



REPORT OF LABORATORY ANALYSIS

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(828)254-7176

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

CERTIFICATIONS

Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

Charlotte Certification IDs

9800 Kinsey 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

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(704)875-9092

SAMPLE ANALYTE COUNT

Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92184281001	49-1 (7.5-10)	EPA 8015 Modified	NU1	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C

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PROJECT NARRATIVE

Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

Method: EPA 8015 Modified
Description: 8015 GCS THC-Diesel
Client: NCDOT East Central
Date: December 31, 2013

General Information:

1 sample was analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: RICHMOND CO 049 WBS#344371

Pace Project No.: 92184281

Method: EPA 8015 Modified
Description: Gasoline Range Organics
Client: NCDOT East Central
Date: December 31, 2013

General Information:

1 sample was analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 5035A/5030B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: RICHMOND CO 049 WBS#344371

Pace Project No.: 92184281

Sample: 49-1 (7.5-10) **Lab ID: 92184281001** Collected: 12/18/13 10:55 Received: 12/20/13 14:15 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	ND	mg/kg	5.2	1	12/20/13 18:42	12/23/13 15:54	68334-30-5	
Surrogates								
n-Pentacosane (S)	70	%	41-119	1	12/20/13 18:42	12/23/13 15:54	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	4.9	1	12/30/13 14:50	12/31/13 02:12	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	101	%	70-167	1	12/30/13 14:50	12/31/13 02:12	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	3.3	%	0.10	1		12/28/13 10:38		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: RICHMOND CO 049 WBS#344371

Pace Project No.: 92184281

QC Batch:	GCV/7658	Analysis Method:	EPA 8015 Modified
QC Batch Method:	EPA 5035A/5030B	Analysis Description:	Gasoline Range Organics
Associated Lab Samples:	92184281001		

METHOD BLANK: 1114325 Matrix: Solid

Associated Lab Samples: 92184281001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	6.0	12/30/13 20:25	
4-Bromofluorobenzene (S)	%	103	70-167	12/30/13 20:25	

LABORATORY CONTROL SAMPLE: 1114326

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	49.7	49.5	100	70-165	
4-Bromofluorobenzene (S)	%			103	70-167	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1114327 1114328

Parameter	Units	92184283001 Result	MS		MSD		% Rec		% Rec Limits	RPD	Qual
			Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Gasoline Range Organics	mg/kg	ND	34.7	34.7	38.2	38.4	110	111	47-187	1	
4-Bromofluorobenzene (S)	%						107	102	70-167		

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QUALITY CONTROL DATA

Project: RICHMOND CO 049 WBS#344371

Pace Project No.: 92184281

QC Batch: OEXT/25303 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 3546 Analysis Description: 8015 Solid GCSV
Associated Lab Samples: 92184281001

METHOD BLANK: 1111061 Matrix: Solid
Associated Lab Samples: 92184281001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Components	mg/kg	ND	5.0	12/23/13 12:23	
n-Pentacosane (S)	%	89	41-119	12/23/13 12:23	

LABORATORY CONTROL SAMPLE: 1111062

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Components	mg/kg	66.7	49.8	75	49-113	
n-Pentacosane (S)	%			81	41-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1111063 1111064

Parameter	Units	92184266001 Result	MS		MSD		% Rec		% Rec Limits	RPD	Qual
			Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Diesel Components	mg/kg	ND	78.4	78.4	54.8	62.2	68	77	10-146	13	
n-Pentacosane (S)	%						77	82	41-119		

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QUALITY CONTROL DATA

Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

QC Batch: PMST/6122 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 92184281001

SAMPLE DUPLICATE: 1113487

Table with 6 columns: Parameter, Units, 92184176001 Result, Dup Result, RPD, Qualifiers. Row 1: Percent Moisture, %, 99.0, 99.0, 0.

SAMPLE DUPLICATE: 1113488

Table with 6 columns: Parameter, Units, 92184283002 Result, Dup Result, RPD, Qualifiers. Row 1: Percent Moisture, %, 6.7, 6.2, 7.

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QUALIFIERS

Project: RICHMOND CO 049 WBS#344371

Pace Project No.: 92184281

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: RICHMOND CO 049 WBS#344371
Pace Project No.: 92184281

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92184281001	49-1 (7.5-10)	EPA 3546	OEXT/25303	EPA 8015 Modified	GCSV/16310
92184281001	49-1 (7.5-10)	EPA 5035A/5030B	GCV/7658	EPA 8015 Modified	GCV/7661
92184281001	49-1 (7.5-10)	ASTM D2974-87	PMST/6122		

REPORT OF LABORATORY ANALYSIS

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Document Name: **Sample Condition Upon Receipt (SCUR)**

Document Revised: December 15, 2010
Page 1 of 2

Document Number:
F-CHR-CS-03-rev.13

Issuing Authority:
Pace Huntersville Quality Office

Client Name: Pyramid Environmental

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Optional
Proj. Due Date:
Proj. Name:

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used: IR Gun T1102 T1301 Type of Ice: Yes Blue None Samples on ice, cooling process has begun

Temp Correction Factor T1102: No Correction T1301: No Correction

Corrected Cooler Temp.: 2.3 °C Biological Tissue is Frozen: Yes No N/A

Date and Initials of person examining contents: EWB/12/20/13

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: _____		
All containers needing preservation have been checked.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): _____		

Client Notification/ Resolution:

Field Data Required? Y / / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

SCURF Review:	<u>JDB</u>	Date:	<u>12/20/13</u>
SRF Review:	<u>JDB</u>	Date:	<u>12/20/13</u>

WO# : 92184281



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

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A
Required Client Information:

Company: Pyramid Environmental
Address: P.O. Box 16265
Greensboro, NC 27416
Email To: Jim
Phone: 336.335.3174 Fax:
Requested Due Date/TAT: Normal

Section B
Required Project Information:

Report To: Jim Leatherman - Pyramid
Copy To: NCDDOT
Purchase Order No.: WB5# 34437.1
Project Name: NCDDOT Richmond County Parcel 1049
Project Number: 2013-278/#34437.1

Section C
Invoice Information:

Attention: NCDDOT
Company Name: NCDDOT
Address:
Pace Quote Reference #: WB5# 34437.1
Pace Project Manager: Jon Bradley
Pace Profile #:

Page: 1 of 1

1667367

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Site Location
STATE: NC

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	Preservatives							Analysis Test ↑ Y/N	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB				HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other				
1	49-1(7.5-10)	DW WT WW P SL OL WP AR TS OT	SLG	DATE 12/13	TIME 10:55		4	X										
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		SAMPLE CONDITIONS	
	DATE	TIME	DATE	TIME	Temp in °C	Received on Ice (Y/N)
Pyramid Environmental	12/20	11:20	12/20	11:20		
Pyramid	12/20	14:15	12/20/13	14:15	2.3	Y
Pyramid						W
						Y

SAMPLER NAME AND SIGNATURE		Sealed Custody (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Timothy D. Leatherman</u>	DATE Signed (MM/DD/YYYY): <u>12/20/13</u>		
SIGNATURE of SAMPLER: <u>Timothy D. Leatherman</u>			

ORIGINAL

*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.

APPENDIX G
