## PRELIMINARY SITE ASSESSMENT

PARCEL 45, HOUSE OF PRAYER CHURCH 2068 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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C-257 - Geology C-1251 - Engineering

# TABLE OF CONTENTS

Executive Summary of Results	1
1.0 Introduction	3
1.1 BACKGROUND INFORMATION	
2.0 Site History	4
3.0 Geophysical Investigation	4
4.0 Soil Sampling Activities & Results	5
4.1 SOIL ASSESSMENT FIELD ACTIVITIES	6
4.4 GROUNDWATER ANALYTICAL RESULTS	6
5.0 Conclusions and Recommendations	7
5.1 GEOPHYSICAL INVESTIGATION	
5.3 LIMITED GROUNDWATER ASSESSMENT	
6.0 Limitations	8
7.0 Closure	8

# **TABLE OF CONTENTS (Continued)**

#### **FIGURES**

Figure 1: Topographic Map

Figure 2: Soil Boring Locations and QED Analytical Results

#### **TABLES**

Table 1 : Summary of Soil Field Screening Results
Table 2 : Summary of Soil Sample Analytical Results
Table 3 : Summary of Groundwater Analytical Results

## **APPENDICES**

Appendix A: Historical Aerial Photographs Appendix B: Geophysical Investigation Report

Appendix C : Soil Boring Logs

Appendix D : QROS QED HC-1 Hydrocarbon Analyzer Appendix E : Laboratory Report & Chain-of-Custody Form

Appendix F: Personnel Logs

## PRELIMINARY SITE ASSESSMENT PARCEL 45, HOUSE OF PRAYER CHURCH 2068 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 45, the House of Prayer Church 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 due to 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 incidents were on file for the House of Prayer Church property (Parcel 45). 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 2068 N. US 1 (Parcel 45) does not have any environmental incidents in the DENR database.

On November 26, 2013, Pyramid Project Manager Eric Cross performed a site visit at the property. Neither the owner nor any other personnel were present to conduct an interview.

- **Geophysical Survey:** The geophysical investigation provided no evidence of metallic USTs within the existing and proposed ROW and/or easement.
- Limited Soil Assessment: A total of three 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 had detected an elevated reading, then additional soil samples from each boring would be 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 milligrams per kilogram (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 45-2(2.5-5) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 45-2(2.5-5) did not detect GRO or DRO concentrations above detection limits. No odors were detected during the field screening.

• Limited Groundwater Assessment: Soil boring 45-2 was converted into a 1-inch diameter temporary monitoring well 45-2(TW) to a total depth of 13 feet BLS. The depth-to-groundwater was measured at 5.5 feet BLS. The laboratory analysis of groundwater from 45-2(TW) did not detect any volatile organic compounds above laboratory detection limits in the groundwater sample.

Review of the NCDOT engineering plans indicates that depending on groundwater level fluctuations associated with precipitation, the NCDOT may encounter groundwater at the property during construction activities. However, no evidence of contamination was observed in the groundwater sample collected by Pyramid.

• Contaminated Soil Volumes: No petroleum-impacted soils above 10 mg/kg were encountered during the PSA investigation at Parcel 45, nor was any evidence of probable or possible USTs recorded within the proposed right of way or easement. 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 45, the House of Prayer Church property. The House of Prayer Church property currently contains a church building located at 2068 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* (*RFP*), 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:

The church on this parcel is located in a former store. The front of the building is approximately 130 feet south of the existing US 1 centerline. The building does have the appearance of a former gas station, and no UST Section Facility ID has been discovered. No evidence of USTs or UST removal was observed field reconnaissance along the project corridor on November 14, 2007. However, 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, 2011, and 2013 aerial photographs are included in **Appendix A**. Historical information reviewed as part of the PSA indicated that the building was constructed between 1975 and 1993. The earliest aerial to show the building was the 1993 aerial. The building appears consistent with being a former store or church, with no evidence of industrial or gas station use. The 1938, 1956, and 1975 aerials show 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 2068 N. US 1 (Parcel 45) does not have any environmental incidents in the DENR database.

On November 26, 2013, Pyramid Project Manager Eric Cross performed a site visit at the property. Neither the owner nor any other personnel were present to conduct an interview. No activities were being performed at the site during our investigation.

# 3.0 Geophysical Investigation

Pyramid performed an electromagnetic (EM) survey across the <u>accessible</u> portions of the Parcel. All of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features.

The geophysical investigation <u>did not record evidence of metallic USTs</u> within the proposed ROW and/or easement.

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

# 4.0 Soil Sampling Activities & Results

#### **4.1 Soil Assessment Field Activities**

On December 17, 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. Three (3) soil borings (45-1, 45-2, and 45-3) 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. Borings 43-2 and 43-3 were installed in an area proposed to be cut as indicated by the slope stake line. Boring 43-1 was installed at the location of a proposed drainage structure (15-inch pipe), as indicated by 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 C**. 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. No odors were detected 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 45.

The duplicate soil sample selected for laboratory analyses 45-2(2.5-5) 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 for soil samples 45-1(7.5-10), 45-2(2.5-5), 45-3(1.5-2.5) and 45-3(7.5-10) did not detect TPH-GRO or TPH-DRO concentrations above 10 mg/kg. 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 D**.

A duplicate of soil sample 45-2(2.5-5) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 45-2(2.5-5) did not detect GRO or DRO concentrations above detection limits. A copy of the laboratory report and chain-of-custody is included in **Appendix E**. 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 17, 2013, Pyramid converted soil boring 45-2 into a 1-inch diameter temporary monitoring well (TW). Soil boring 45-2(TW) was completed to a total depth of 13 feet below land surface (BLS). The temporary well was constructed with 3 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 17, 2013, the temporary monitoring well 45-2(TW) was gauged using a properly decontaminated electric water level probe. The depth-to-groundwater was measured at 5.5 feet BLS. The temporary monitoring well was sampled using a new 0.5-inch diameter disposable bailer. 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

The groundwater sample 45-2(TW) was placed in laboratory prepared containers for analysis of volatile organic compounds (VOCs) using EPA Method 6200B, and the sample was shipped to Pace Analytical in Huntersville, NC. The laboratory analysis did not detect any volatile organic compounds above laboratory detection limits in the groundwater sample. The groundwater results for sample 45-2(TW) are summarized in **Table 3**. A copy of the laboratory report and chain-of-custody is included in **Appendix E**.

# 5.0 Conclusions and Recommendations

As requested by NCDOT, Pyramid has completed a PSA at the House of Prayer Church property located 2068 N. US 1, Rockingham, NC (Parcel 45). The following is a summary of the assessment activities and results.

#### **5.1 Geophysical Investigation**

The geophysical investigation provided no evidence of metallic USTs within the existing and proposed ROW and/or easement.

#### **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 45-2(2.5-5) was shipped to Pace Analytical for laboratory analysis. The laboratory results for soil sample 45-2(2.5-5) 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 45-2 was converted into a 1-inch diameter temporary monitoring well to a total depth of 13 feet BLS. The depth-to-groundwater was measured at 5.5 feet BLS. The laboratory analysis did not detect any volatile organic compounds above laboratory detection limits in the groundwater sample.

Review of the NCDOT engineering plans indicates that depending on groundwater level fluctuations associated with precipitation, the NCDOT may encounter groundwater at the property during construction activities. However, no evidence of contamination was observed in the groundwater sample collected by Pyramid.

#### **5.4 Recommendations**

No petroleum-impacted soils above 10 mg/kg were encountered during the PSA investigation at Parcel 45, nor was any evidence of probable or possible USTs recorded within the proposed right of way or easement. Therefore, no recommendations are necessary for the treatment or disposal of such materials.

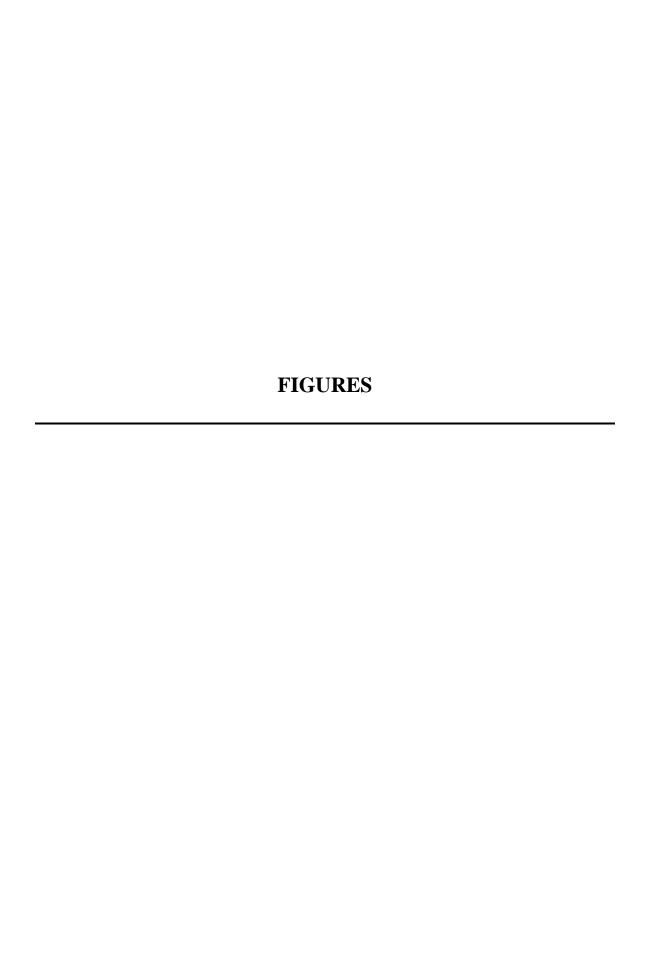
It should be noted that, if impacted soil is encountered during road construction outside of the area analyzed by this investigation, the impacted soil should be managed according to NC DENR Division of Waste Management (DWM) UST Section Guidelines and disposed of at a permitted facility.

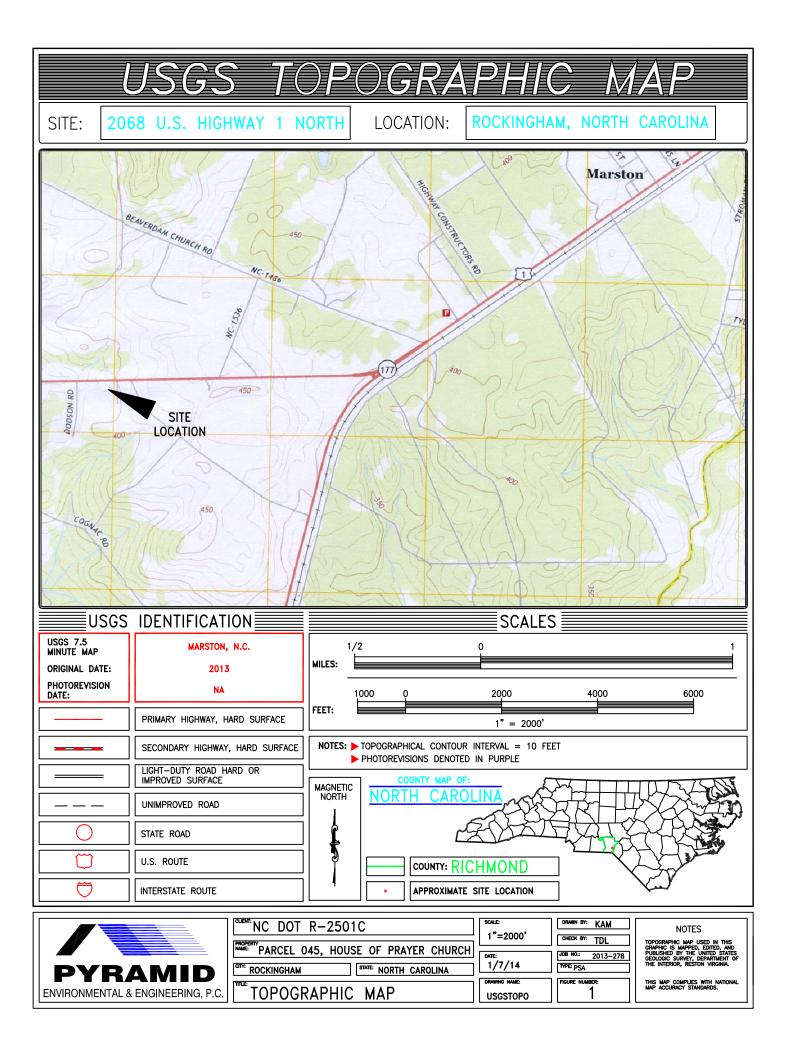
## 6.0 Limitations

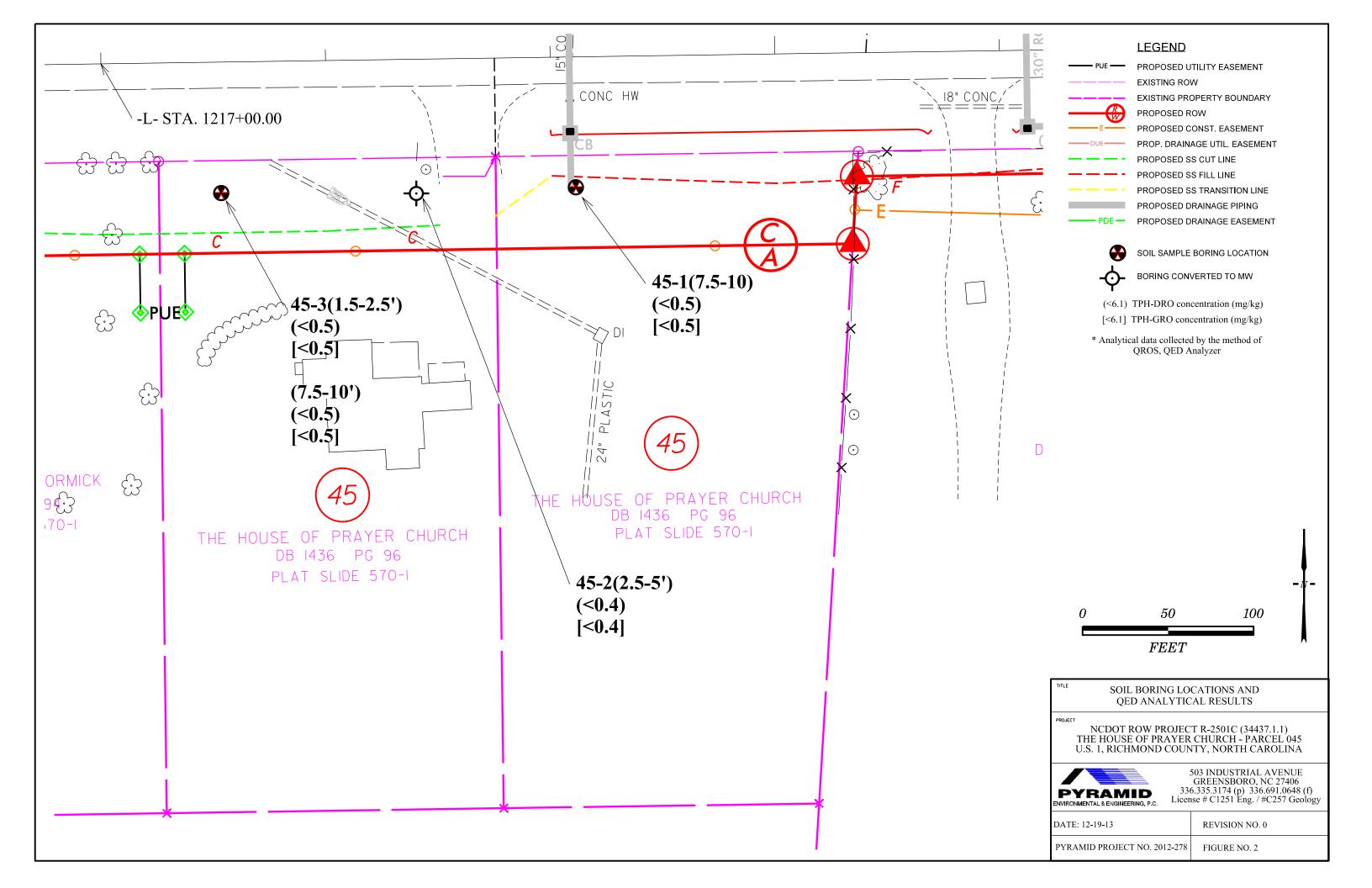
The results of this preliminary investigation are limited to the boring locations completed during this limited assessment and presented in this report. The laboratory results only reflect the current conditions at the locations sampled on the date this PSA was performed.

# 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.







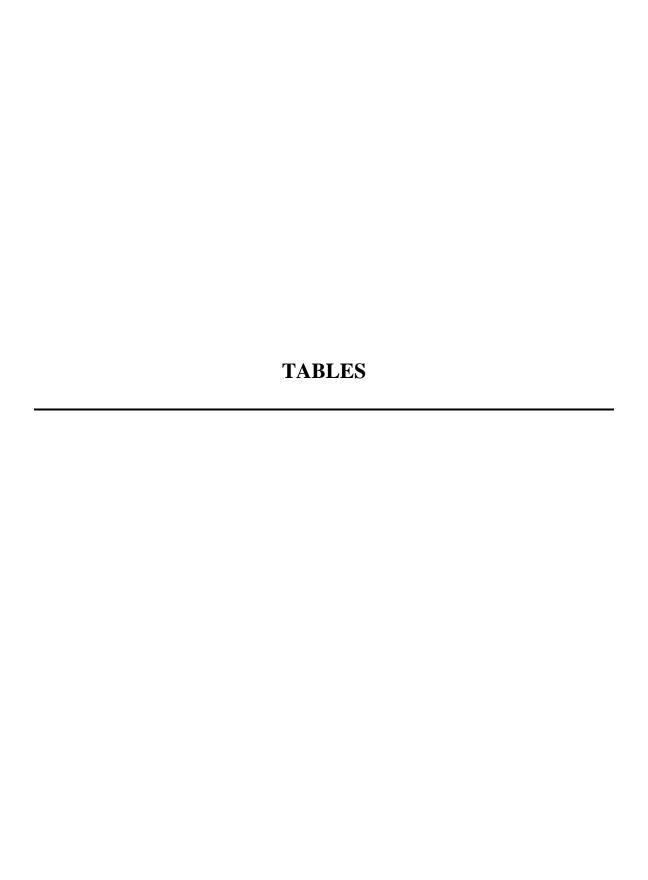


TABLE 1
Summary of Soil Field Screening Results
NCDOT Project R-2501C
2068 US Highway 1 North - Parcel 045
Rockingham, Richmond County, North Carolina

SOIL BORING	SAMPLE ID	DEPTH	PID
		(feet bgs)	READINGS (PPM)
	45-1(2.5-5)	2.5 to 5	0.3
45-1	45-1(5-7.5)	5 to 7.5	0.5
	45-1(7.5-10)	7.5 to 10	0.6
	45-2(2.5-5)	2.5 to 5	0.6
45-2	45-2(5-7.5)	5 to 7.5	0.1
	45-2(7.5-10)	7.5 to 10	0.3
	45-3(1.5-2.5)	1.5 to 2.5	0.2
45-3	45-3(2.5-5)	2.5 to 5	0.2
	45-3(5-7.5)	5 to 7.5	0.2
	45-3(7.5-10)	7.5 to 10	0.5

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 2068 US Highway 1 North - Parcel 045 Rockingham, Richmond County, North Carolina

				QROS - QED Analysis			Laboratory Analysis (Pace)		
SAMPLE ID	DATE	DEPTH (feet)	PID (ppm)	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)	
45-1 (7.5-10)	12/17/2013	7.5 to 10	0.5	<0.5	<0.5	<0.5			
45-2(2.5-5)	12/17/2013	2.5 to 5	0.6	<0.4	<0.4	<0.4	<5.4	<4.1	
45-3(1.5-2.5)	12/17/2013	1.5 to 2.5	0.2	<0.5	<0.5	<0.5			
45-3(7.5-10)	12/17/2013	7.5 to 10	0.5	<0.5	<0.5	<0.5			
NC Initial Action Level - UST Section for									
503	5/5030-GRO;	3550-DRO		10	10	NA	10	10	

PID= photo-ionizaton detector

GRO= Gasoline Range Organics

TPH= Total Petroleum

NA= Not Applicable

PPM= parts-per-million

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

Hydrocarbons (GRO + DRO)

"-----" = No Laboratory Analysis

<sup>\*</sup> Bold values indicate concentrations above initial action levels

# TABLE 3

# **Summary of Groundwater Analytical Results**

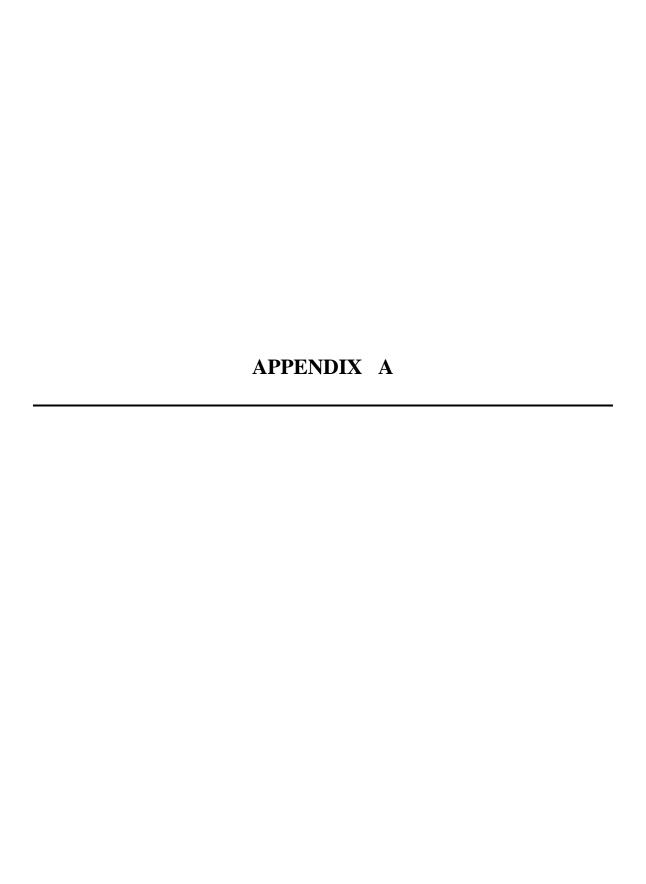
NCDOT State Project R-2501C 2068 US Highway 1 North - Parcel 045 Rockingham, Richmond County, North Carolina

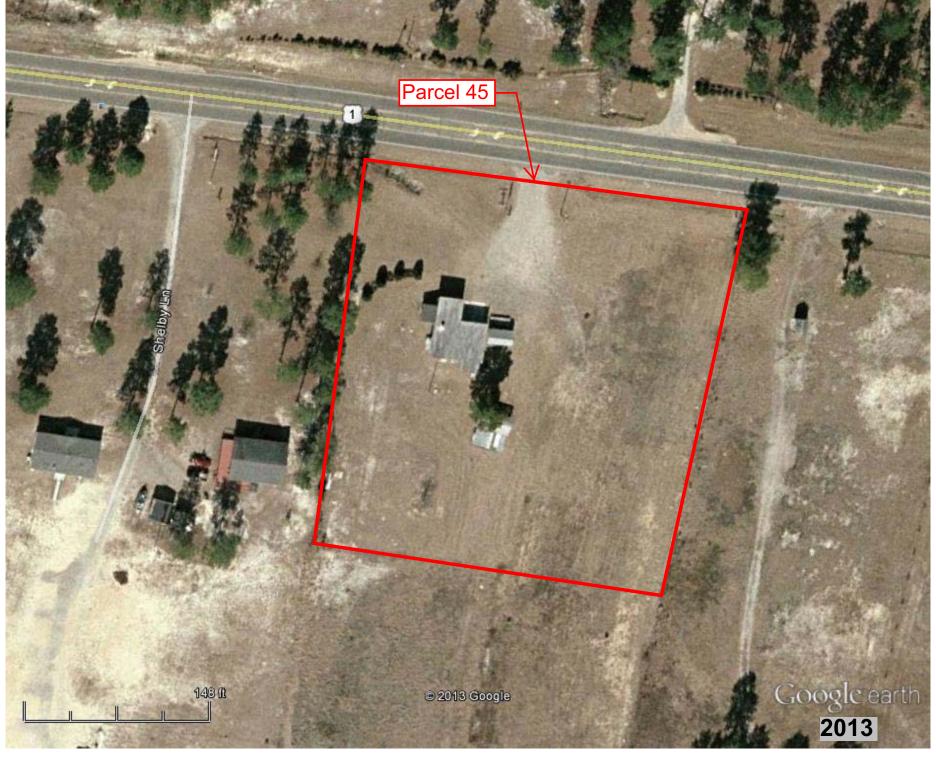
		SAMPLE ID	NCAC 2L
PARAMETER	UNITS		GROUNDWATER
		45-2(TW)	STANDARD
EPA Method 6200B VOCs; Sam	tion Date: 12/	17/13	
Benzene	ug/L	ND	1
Chloroform	ug/L	ND	70
Diisopropyl Ether (IPE)	ug/L	ND	70
Ethyl Benzene	ug/L	ND	600
Isopropylbenzene (Cumene)	ug/L	ND	70
Naphthalene	ug/L	ND	6
Styrene	ug/L	ND	70
Toluene	ug/L	ND	600
Total Xylenes	ug/L	ND	500
n-Propylbenzene	ug/L	ND	70
sec-Butylbenzene	ug/L	ND	70
tert-Butyl methyl ether (MTBE)	ug/L	ND	20
tert-Butylbenzene	ug/L	ND	70
1,2,4-Trimethylbenzene	ug/L	ND	400
1,2-Dichloroethane	ug/L	ND	0.4
1,3,5-Trimethylbenzene	ug/L	ND	400
4-Isopropyltoluene	ug/L	ND	25
All Other Parameters	ug/L	ND	NA

ug/L= micrograms-per-liter

ND= Not Detected at or above adjusted reporting limit.

NA= Not Applicable





































# APPENDIX B



## PYRAMID ENVIRONMENTAL & ENGINEERING (PROJECT 2013-278)

# GEOPHYSICAL SURVEY

# PARCEL 045 - HOUSE OF PRAYER CHURCH 2068 N. US 1 NCDOT PROJECT R-2501C (34437.1.1)

ROCKINGHAM, RICHMOND COUNTY, NC **JANUARY 13, 2013** 

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#### GEOPHYSICAL INVESTIGATION REPORT

## Parcel 045, 2068 N. US 1

#### Rockingham, Richmond County, North Carolina

# **Table of Contents**

Executive Summary	1
Introduction	
Field Methodology	
Discussion of Results	
Summary and Conclusions	
Limitations	

# **Figures**

- Figure 1 Parcel 045 Geophysical Survey Boundaries and Site Photographs
- Figure 2 Parcel 045 EM61 Bottom Coil & Differential Results Contour Maps
- Figure 3 Parcel 045 Overlay of EM61 Contour Map On NCDOT Engineering Plans

#### **EXECUTIVE SUMMARY**

**Project Description:** Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT), at the House of Prayer Church, Parcel 045, 2068 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 survey.

**Geophysical Results:** All of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features. The geophysical investigation <u>did not record evidence of any metallic USTs</u> at the property.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for the North Carolina Department

of Transportation (NCDOT), at the House of Prayer Church, Parcel 045, 2068 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 survey grid spanned

approximately 320 feet from west to east and approximately 70 feet from north to south.

Conducted on December 4 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 church building, 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 an electromagnetic (EM) induction-metal detection

survey. The EM survey was performed on December 4, 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

2 | Page

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.

DISCUSSION OF RESULTS

Contour plots of the EM61 bottom coil and differential results obtained across survey area at the

property are presented in Figure 2. 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 three EM anomalies at the western boundary of the survey

area were the result of a street sign, utility box, and guy wire (from north to south). The EM

anomaly at X=140, Y=60 was the result of a large metal sign for the church. The EM anomaly at

X=191, Y=55 was the result of metal pipes. The EM anomaly at X=205, Y=85 was the result of

a drainage culvert. The EM anomaly at X=215, Y=60 was the result of a water meter cover. The

EM anomaly at X=290, Y=30 was the result of a metal sign. No other significant anomalies were

recorded at the property. Figure 3 presents an overlay of the EM61 bottom coil contour map on

the NCDOT engineering plans for reference.

A GPR survey was not required due to all EM anomalies being directly attributable to visible

cultural features at the ground surface. The geophysical investigation did not record evidence of

any metallic USTs at the property.

3 | Page

#### **SUMMARY & CONCLUSIONS**

Our evaluation of the EM61 data collected across Parcel 045 in Rockingham, North Carolina, provides the following summary and conclusions:

- The EM61 survey provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- All of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs, culverts, and other cultural features.
- The geophysical investigation <u>did not record evidence of any metallic USTs</u> 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 045:

GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS

PROJECT

NCDOT PROJECT R-2501C (34437.1.1) ROCKINGHAM, RICHMOND COUNTY, NC

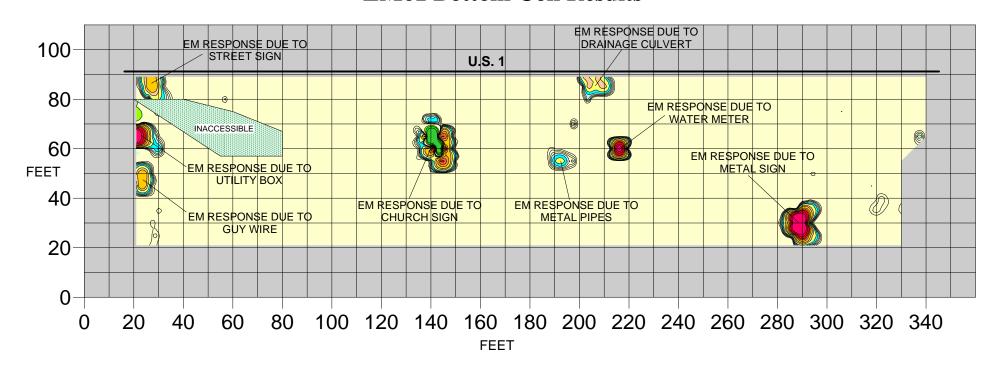


503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

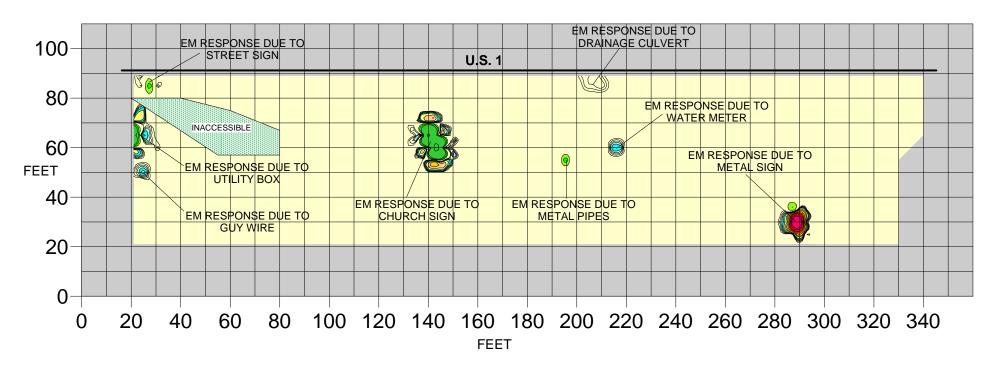
DATE	1/6/2014	CLIENT NCDOT		
PYRAMID PROJECT#:	2013-278	F	FIGURE 1	



### **EM61 Bottom Coil Results**



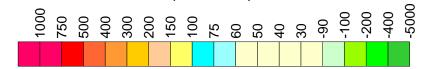
### **EM61 Differential Results**



### NO EVIDENCE OF METALLIC USTs OBSERVED

The contour plots show the bottom coil (most sensitive) and differential results of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. 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 4, 2013 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were not required due to all anomalies being explained by cultural features at the ground surface.

### EM61 Metal Detection Response (millivolts)



PARCEL 045:
EM61 BOTTOM COIL & DIFFERENTIAL
RESULTS CONTOUR MAPS

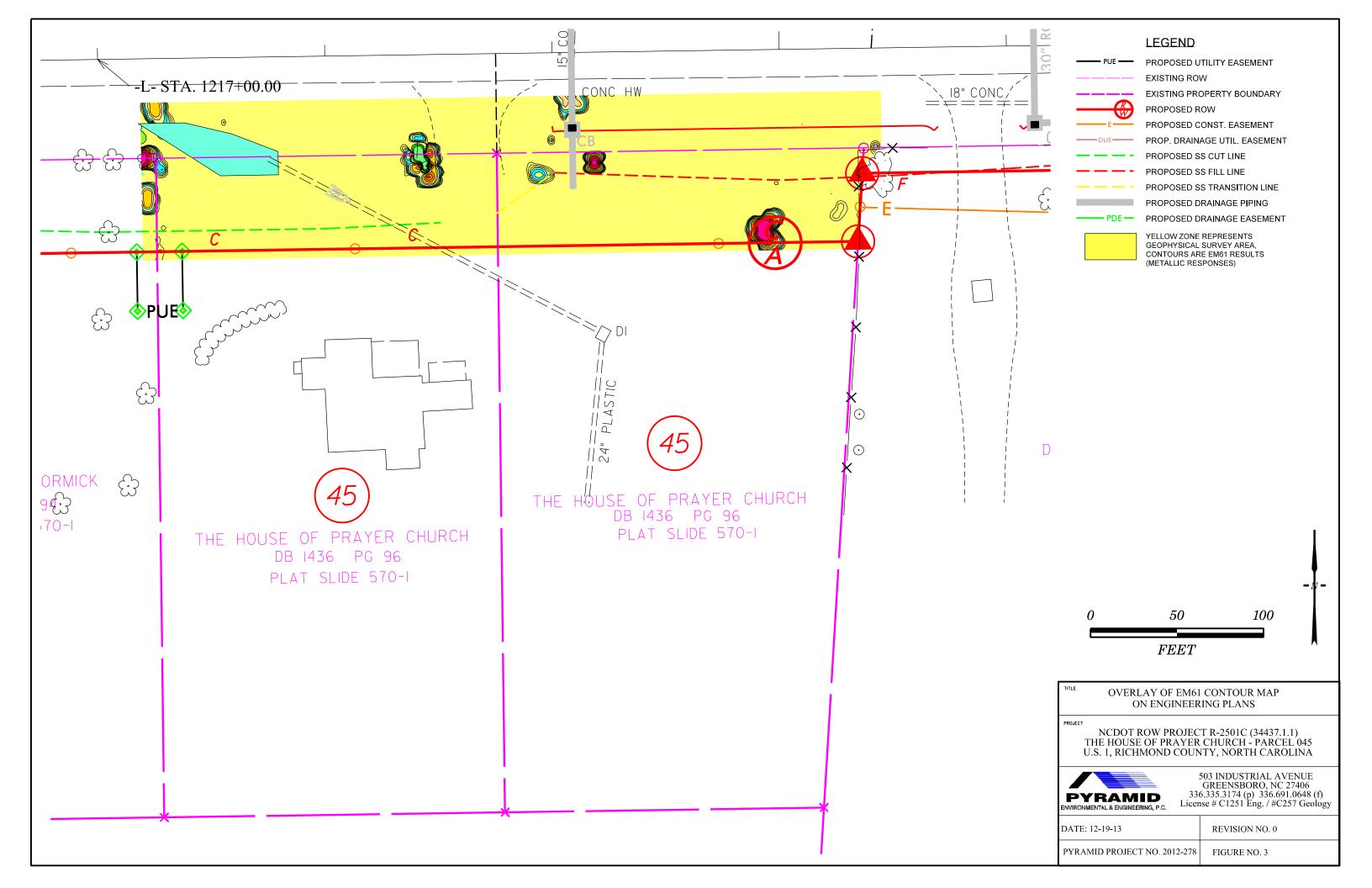
PROJECT

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	F	FIGURE 2



## APPENDIX C

### Pyramid Environmental & Engineering, P.C.

### FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-2501C, Parcel 045, House of Prayer Church, Rockingham, NC / 2013-278	BORING/WELL NO:	45-1	
SITE LOCATION:	Richmond County, NC	BORING/WELL LOCATION:	Parcel 045, House of Prayer Church, East of Entrance Near Drainage Feature	
START DATE:	12/17/13	COMPLETED:	12/17/13	
GEOLOGIST:	Tim Leatherman	DRILLER:	Geologic Exploration	
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core	
BORING DIA:	2-inch	CASING DIA:	N/A	
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A	

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'	Light gray, fine to medium grain clayey-silty-sand (SC), soft,	PID=45-1(2.5-5): 0.2 PPM
	moist, no odor	
5-7.5'	Light gray to white, sandy-clay (CL) to clayey-sand (SC), firm,	PID=45-1(5-7.5): 0.3 PPM
	very moist, no odor	
7.5-10'	Light gray to white, sandy-clay (CL) to clayey-sand (SC), firm,	PID=45-1(7.5-10): 0.5 PPM
	very moist to saturated, no odor	
	No recovery from 0 to 2.5 feet	
	MONITORING WELL INFORMATION (IF APPLICA	

### MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft)	DEPTH (ft)	DIAMETER (in)	MATERIAL
SCREEN LENGTH (ft)	DEPTH (ft)	DIAMETER (in)	MATERIAL
DEPTH TO TOP OF SAND		BAGS OF SAND	
DEPTH TO TOP SEAL	BENTONIT	ΓE USED	BAGS OF CEMENT USED 0

### Pyramid Environmental & Engineering, P.C.

### FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-2501C, Parcel 045, House of Prayer Church, Rockingham, NC / 2013-278	BORING/WELL NO:	45-2	
SITE LOCATION:	Richmond County, NC	BORING/WELL LOCATION:	Parcel 045, House of Prayer Church, West of Entrance	
START DATE:	12/17/13	COMPLETED:	12/17/13	
GEOLOGIST:	Tim Leatherman	DRILLER:	Geologic Exploration	
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core	
BORING DIA:	2-inch	CASING DIA:	N/A	
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A	

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 to light gray, fine to medium grain sand (SP), soft, moist, no odor	PID=45-2(2.5-5): 0.6 PPM
5-7.5'	Light gray to white, sandy-clay (CL) to clayey-sand (SC), firm,	PID=45-2(5-7.5): 0.1 PPM
	very moist, no odor	
7.5-10'	Light gray to white, clayey-sand (SC), firm, very moist, no odor	PID=45-2(7.5-10): 0.3 PPM
	very moist to saturated, no odor	
	No recovery from 0 to 2.5 feet	
10-13'	Light gray to white, mottled red, sandy-clayey-silt (CL to ML) - weathered	
	sandstone to mudstone, no odor	
	Geoprobe refusal at 13 feet	
	l	

### MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) 3SCREEN LENGTH (ft) 10	DEPTH (ft) 0-3 DEPTH (ft) 3-13	DIAMETER (in) 1 DIAMETER (in) 1	MATERIAL PVC . MATERIAL PVC .
DEPTH TO TOP OF SAND 2 DEPTH TO TOP SEAL 1	<u> </u>	BAGS OF SAND	BAGS OF CEMENT USED <sup>0</sup>
DEPTH TO TOP SEAL !	_ BENTONIT	E USED	BAGS OF CEMENT USED •

### Pyramid Environmental & Engineering, P.C.

### FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-2501C, Parcel 045, House of Prayer Church, Rockingham, NC / 2013-278	BORING/WELL NO:	45-3	
SITE LOCATION:	Richmond County, NC	BORING/WELL LOCATION:	Parcel 045, House of Prayer Church, Western Edge of Property	
START DATE:	12/17/13	COMPLETED:	12/17/13	
GEOLOGIST:	Tim Leatherman	DRILLER:	Geologic Exploration	
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core	
BORING DIA:	2-inch	CASING DIA:	N/A	
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A	

DEPTH	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY
(ft.)		BLOW COUNTS
	Depths correspond to soil type transitions	Core Sample Depths
	Landscape Surface	
1.5-2.5'	Brown to tan, fine to medium sand (SP) to clayey-sand (SC), soft,	PID=45-3(1.5-2.5): 0.2 PPM
	moist, no odor	
2.5-5'	Tan, fine to medium grain clayey-silty-sand (SC), soft, moist, no odor	PID=45-3(2.5-5): 0.2 PPM
5-7.5'	Tan, light gray to white, sandy-clayey-silt (CL to ML) to clayey-sand (SC),	PID=45-3(5-7.5): 0.2 PPM
	firm, very moist, no odor	
7.5-10'	Tan to white, clayey-sand (SC), very moist to saturated, no odor	PID=45-3(7.5-10): 0.5 PPM
	On top of weathered sandstone to mudstone	
	No recovery from 0 to 1.5 feet	
	MONITORING WELL INFORMATION (IF APPLICA	BIE)

### MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft)	DEPTH (ft)	DIAMETER (in)	MATERIAL
SCREEN LENGTH (ft)	DEPTH (ft)	DIAMETER (in)	MATERIAL
DEPTH TO TOP OF SAND _		BAGS OF SAND	
DEPTH TO TOP SEAL	BENTONIT	TE USED	BAGS OF CEMENT USED 0

## APPENDIX D





### **Hydrocarbon Analysis Results**

NCDOT Richmond County R-2501C Client:

Address: PARCEL 45

2068 US Highway 1 North

Rockingham, NC

Contact:

Samples analysed

Four (4) Samples Taken

Samples taken Samples extracted

Four (4) Samples Extracted Four (4) Samples Analyzed

Operator

Tim Leatherman

Project: NCDOT Richmond County R-2501C

				N.									
Matrix	Sample ID	Dilution	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	ů.	Ratios		HC Fingerprint Match
									- 6	% light % mid		% heavy	
s	45-1(7.5-10)	10.1	<0.5	<0.5	#DIV/0i	#DIV/0i	< 0.51	< 0.05	< 0.05 < 0.025	0	0	100 M	100 Match not possible
S	45-2(2.5-5)	8.3	<0.4	<0.4	<0.4	<0.4	< 0.42	< 0.04 < 0.021	< 0.021	0	0	100	#DIV/0i
S	45-3(7.5-10)	9.5	<0.5	<0.5	<0.5	<0.5	< 0.46	< 0.05	< 0.05 < 0.023	0	0	100 M	100 Match not possible
တ	45-3(1.5-2.5)	9.3	<0.5	<0.5	<0.5	<0.5	< 0.46	< 0.05	< 0.05 < 0.023	0	100	0	0 Match not possible
ဖ	45-1(7.5-10) R	10.1	<0.5	<0.5	<0.5	<0.5	< 0.51	< 0.05	< 0.05 < 0.025	0	0	100 M	100 Match not possible
		ibrator C	(C check				Low Range Calibrator Final check High Range Calibrator Final check	Calibrate Calibrate	tor Final c	theck		-	
Results ger Concentrati Soil values	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	er samples		ingerprints p ingerprint ma SBS)= site sp	Fingerprints provide a tentative Fingerprint match abbreviations (SBS)= site specific background	ative hydrocar tions ound subract	Fingerprints provide a tentative hydrocarbon identification based on operator selected library matches Fingerprint match abbreviations  Est = Specific calibrator not used, result estimated (PFM)= P. (SBS)= site specific background subtracted % = ma	on based or alibrator no ary backgro	n operator so ot used, resu ound subtrace	elected lib ult estimat cted	rary mated (PFN)	ches 1)= Poor = match	bon identification based on operator selected library matches  Est = Specific calibrator not used, result estimated (PFM)= Poor library fingerprint match  ed (LBS)= Library background subtracted % = match confidence

Requested Analysis GRO Date Signed: [A]アル XX Methano Tlme preserved 10000 10000 Date Latherman Containers Accepted By / Affiliation (2000) (2000) (2000) (2000) Time COLLECTED SAMPLER NAME AND SIGNATURE Date Purchase Order No.: Project Name: N Project Number: C=Comp. G=Grab Print Name of Sampler: Signature of Sampler: illine illine <sup>৬</sup> ৬ ৬ Matrix Date Pyramid Environmental & Engineering, P.C. Pyramid Environmental & Engineering, P.C. Address: 503 Industrial Ave. Greensboro, NC 27406 Relinquished By / Affillation SAMPLE ID TEM

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Page:

CHAIN-OF-CUSTODY / Analytical Request Document - QROS / QED

# APPENDIX E



Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804 (828)254-7176 Pace Analytical Services, Inc. 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

December 31, 2013

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

RE: Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

### 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





Pace Analytical Services, Inc.

205 East Meadow Road - Suite A Eden, NC 27288 (336)623-8921 Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804

(828)254-7176

Pace Analytical Services, Inc. 9800 Kincey Ave. Suite 100 Huntersville, NC 28078

(704)875-9092

### **CERTIFICATIONS**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

**Charlotte Certification IDs** 

9800 Kincey Ave. Ste 100, Huntersville, NC 28078 North Carolina Drinking Water Certification #: 37706 North Carolina Field Services Certification #: 5342 North Carolina Wastewater Certification #: 12 South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627 Kentucky UST Certification #: 84 West Virginia Certification #: 357 Virginia/VELAP Certification #: 460221



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### **SAMPLE ANALYTE COUNT**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92184284001	45-2 (2.5-5)	EPA 8015 Modified		2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92184284002	45-2 (TW)	SM 6200B	CAH	63	PASI-C



Pace Analytical Services, Inc. 205 East Meadow Road - Suite A

Eden, NC 27288 (336)623-8921 Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804 (828)254-7176 Pace Analytical Services, Inc. 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

### **PROJECT NARRATIVE**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

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:**



Pace Analytical Services, Inc. 205 East Meadow Road - Suite A

Eden, NC 27288 (336)623-8921 Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804 (828)254-7176 Pace Analytical Services, Inc. 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

### **PROJECT NARRATIVE**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

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:



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### **PROJECT NARRATIVE**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Method: SM 6200B Description: 6200B MSV

Client: NCDOT East Central Date: December 31, 2013

### **General Information:**

1 sample was analyzed for SM 6200B. 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.

### 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.



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Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804 (828)254-7176

12/30/13 14:50 12/30/13 23:07 460-00-4

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

### **ANALYTICAL RESULTS**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Surrogates

4-Bromofluorobenzene (S)

Date: 12/31/2013 03:27 PM

Lab ID: 92184284001 Collected: 12/17/13 11:20 Received: 12/20/13 14:15 Sample: 45-2 (2.5-5) 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 5.4 12/20/13 18:42 12/23/13 16:17 68334-30-5 Surrogates 75 % 41-119 n-Pentacosane (S) 12/20/13 18:42 12/23/13 16:17 629-99-2 Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B **Gasoline Range Organics** ND mg/kg Gasoline Range Organics 4.1 12/30/13 14:50 12/30/13 23:07 8006-61-9

70-167

Percent Moisture Analytical Method: ASTM D2974-87

102 %

Percent Moisture 7.9 % 0.10 1 12/28/13 09:52



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### **ANALYTICAL RESULTS**

Project: RICH. CO. 045 WSB #34437.1.1

Date: 12/31/2013 03:27 PM

Sample: 45-2 (TW)	Lab ID: 9218428400	2 Collected: 12/17/1	3 13:15	Received:	12/20/13 14:15	Matrix: Water	
Parameters	Results Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qua
6200B MSV	Analytical Method: SM	6200B					
Benzene	ND ug/L	0.50	1		12/24/13 21:5	7 71-43-2	
Bromobenzene	ND ug/L	0.50	1		12/24/13 21:5	7 108-86-1	
Bromochloromethane	ND ug/L	0.50	1		12/24/13 21:5	7 74-97-5	
Bromodichloromethane	ND ug/L	0.50	1		12/24/13 21:5	7 75-27-4	
Bromoform	ND ug/L	0.50	1		12/24/13 21:5	7 75-25-2	
Bromomethane	ND ug/L	5.0	1		12/24/13 21:5	7 74-83-9	
n-Butylbenzene	ND ug/L	0.50	1		12/24/13 21:5	7 104-51-8	
sec-Butylbenzene	ND ug/L	0.50	1		12/24/13 21:5	7 135-98-8	
ert-Butylbenzene	ND ug/L	0.50	1		12/24/13 21:5	7 98-06-6	
Carbon tetrachloride	ND ug/L	0.50	1		12/24/13 21:5		
Chlorobenzene	ND ug/L	0.50	1		12/24/13 21:5		
Chloroethane	ND ug/L	1.0	1		12/24/13 21:5		
Chloroform	ND ug/L	0.50	1		12/24/13 21:5		
Chloromethane	ND ug/L	1.0	1		12/24/13 21:5		
2-Chlorotoluene	_	0.50	1				
2-Chlorotoluene 1-Chlorotoluene	ND ug/L				12/24/13 21:5 12/24/13 21:5		
	ND ug/L	0.50	1				
,2-Dibromo-3-chloropropane	ND ug/L	1.0	1		12/24/13 21:5		
Dibromochloromethane	ND ug/L	0.50	1		12/24/13 21:5		
,2-Dibromoethane (EDB)	ND ug/L	0.50	1		12/24/13 21:5		
Dibromomethane	ND ug/L	0.50	1		12/24/13 21:5		
,2-Dichlorobenzene	ND ug/L	0.50	1		12/24/13 21:5		
,3-Dichlorobenzene	ND ug/L	0.50	1		12/24/13 21:5	7 541-73-1	
,4-Dichlorobenzene	ND ug/L	0.50	1		12/24/13 21:5	7 106-46-7	
Dichlorodifluoromethane	ND ug/L	0.50	1		12/24/13 21:5	7 75-71-8	
,1-Dichloroethane	ND ug/L	0.50	1		12/24/13 21:5	7 75-34-3	
1,2-Dichloroethane	ND ug/L	0.50	1		12/24/13 21:5	7 107-06-2	
1,1-Dichloroethene	ND ug/L	0.50	1		12/24/13 21:5	7 75-35-4	
sis-1,2-Dichloroethene	ND ug/L	0.50	1		12/24/13 21:5	7 156-59-2	
rans-1,2-Dichloroethene	ND ug/L	0.50	1		12/24/13 21:5	7 156-60-5	
1,2-Dichloropropane	ND ug/L	0.50	1		12/24/13 21:5		
I,3-Dichloropropane	ND ug/L	0.50	1		12/24/13 21:5		
2,2-Dichloropropane	ND ug/L	0.50	1		12/24/13 21:5		
I,1-Dichloropropene	ND ug/L	0.50	1		12/24/13 21:5		
sis-1,3-Dichloropropene	ND ug/L	0.50	1			7 10061-01-5	
	ND ug/L	0.50	1				
rans-1,3-Dichloropropene	•		•			7 10061-02-6	
Diisopropyl ether	ND ug/L	0.50	1		12/24/13 21:5		
Ethylbenzene	ND ug/L	0.50	1		12/24/13 21:5		
Hexachloro-1,3-butadiene	ND ug/L	2.0	1		12/24/13 21:5		
sopropylbenzene (Cumene)	ND ug/L	0.50	1		12/24/13 21:5		
Methylene Chloride	ND ug/L	2.0	1		12/24/13 21:5		
Methyl-tert-butyl ether	ND ug/L	0.50	1		12/24/13 21:5		
Naphthalene	ND ug/L	2.0	1		12/24/13 21:5		
n-Propylbenzene	ND ug/L	0.50	1		12/24/13 21:5	7 103-65-1	
Styrene	ND ug/L	0.50	1		12/24/13 21:5	7 100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L	0.50	1		12/24/13 21:5	7 630-20-6	
I,1,2,2-Tetrachloroethane	ND ug/L	0.50	1		12/24/13 21:5	7 79-34-5	
Tetrachloroethene	ND ug/L	0.50	1		12/24/13 21:5		



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### **ANALYTICAL RESULTS**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

Sample: 45-2 (TW)	Lab ID: 92184284	<b>002</b> Collected: 12/17/	13 13:15	Received: 12	2/20/13 14:15 N	Matrix: Water	•
Parameters	Results U	nits Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6200B MSV	Analytical Method: S	M 6200B					
Toluene	ND ug/L	0.50	1		12/24/13 21:57	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L	2.0	1		12/24/13 21:57	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L	2.0	1		12/24/13 21:57	120-82-1	
1,1,1-Trichloroethane	ND ug/L	0.50	1		12/24/13 21:57	71-55-6	
1,1,2-Trichloroethane	ND ug/L	0.50	1		12/24/13 21:57	79-00-5	
Trichloroethene	ND ug/L	0.50	1		12/24/13 21:57	79-01-6	
Trichlorofluoromethane	ND ug/L	1.0	1		12/24/13 21:57	75-69-4	
1,2,3-Trichloropropane	ND ug/L	0.50	1		12/24/13 21:57	96-18-4	
1,2,4-Trimethylbenzene	ND ug/L	0.50	1		12/24/13 21:57	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L	0.50	1		12/24/13 21:57	108-67-8	
Vinyl chloride	ND ug/L	1.0	1		12/24/13 21:57	75-01-4	
m&p-Xylene	ND ug/L	1.0	1		12/24/13 21:57	179601-23-1	
o-Xylene	ND ug/L	0.50	1		12/24/13 21:57	95-47-6	
Surrogates							
1,2-Dichloroethane-d4 (S)	107 %	70-130	1		12/24/13 21:57	17060-07-0	
4-Bromofluorobenzene (S)	95 %	70-130	1		12/24/13 21:57	460-00-4	
Toluene-d8 (S)	101 %	70-130	1		12/24/13 21:57	2037-26-5	



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

### **QUALITY CONTROL DATA**

Project:

RICH. CO. 045 WSB #34437.1.1

Pace Project No.:

92184284

QC Batch: QC Batch Method: GCV/7658

EPA 5035A/5030B

Analysis Method: Analysis Description: EPA 8015 Modified

Gasoline Range Organics

Associated Lab Samples: 92184284001

Parameter

METHOD BLANK: 1114325

Matrix: Solid

Associated Lab Samples:

92184284001

Blank Result

Reporting Limit

Qualifiers Analyzed

Gasoline Range Organics 4-Bromofluorobenzene (S)

mg/kg %

Units

Units

92184283001

Result

ND

ND 103

12/30/13 20:25 6.0 70-167 12/30/13 20:25

LABORATORY CONTROL SAMPLE:

Parameter

1114326

Spike Conc.

LCS Result

LCS % Rec

% Rec Limits

Qualifiers

Gasoline Range Organics 4-Bromofluorobenzene (S)

mg/kg %

Units

mg/kg

%

49.7

100 103 70-165

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:

1114327

1114328

49.5

MSD

MS

MSD

MS MSD % Rec

70-167

% Rec Limits **RPD** 

Qual

Gasoline Range Organics 4-Bromofluorobenzene (S)

Date: 12/31/2013 03:27 PM

Parameter

MS Spike

34.7

Spike Conc. Conc.

Result 34.7

Result 38.2 38.4

% Rec 110

107

111 102

47-187 70-167

**REPORT OF LABORATORY ANALYSIS** 

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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

QC Batch: MSV/25363 Analysis Method: SM 6200B
QC Batch Method: SM 6200B Analysis Description: 6200B MSV

Associated Lab Samples: 92184284002

METHOD BLANK: 1112442 Matrix: Water

Associated Lab Samples: 92184284002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND ND	0.50	12/24/13 16:42	
1,1,1-Trichloroethane	ug/L	ND	0.50	12/24/13 16:42	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	12/24/13 16:42	
1,1,2-Trichloroethane	ug/L	ND	0.50	12/24/13 16:42	
1,1-Dichloroethane	ug/L	ND	0.50	12/24/13 16:42	
1,1-Dichloroethene	ug/L	ND	0.50	12/24/13 16:42	
1,1-Dichloropropene	ug/L	ND	0.50	12/24/13 16:42	
1,2,3-Trichlorobenzene	ug/L	ND	2.0	12/24/13 16:42	
1,2,3-Trichloropropane	ug/L	ND	0.50	12/24/13 16:42	
1,2,4-Trichlorobenzene	ug/L	ND	2.0	12/24/13 16:42	
1,2,4-Trimethylbenzene	ug/L	ND	0.50	12/24/13 16:42	
1,2-Dibromo-3-chloropropane	ug/L	ND	1.0	12/24/13 16:42	
1,2-Dibromoethane (EDB)	ug/L	ND	0.50	12/24/13 16:42	
1,2-Dichlorobenzene	ug/L	ND	0.50	12/24/13 16:42	
1,2-Dichloroethane	ug/L	ND	0.50	12/24/13 16:42	
1,2-Dichloropropane	ug/L	ND	0.50	12/24/13 16:42	
1,3,5-Trimethylbenzene	ug/L	ND	0.50	12/24/13 16:42	
1,3-Dichlorobenzene	ug/L	ND	0.50	12/24/13 16:42	
1,3-Dichloropropane	ug/L	ND	0.50	12/24/13 16:42	
1,4-Dichlorobenzene	ug/L	ND	0.50	12/24/13 16:42	
2,2-Dichloropropane	ug/L	ND	0.50	12/24/13 16:42	
2-Chlorotoluene	ug/L	ND	0.50	12/24/13 16:42	
4-Chlorotoluene	ug/L	ND	0.50	12/24/13 16:42	
Benzene	ug/L	ND	0.50	12/24/13 16:42	
Bromobenzene	ug/L	ND	0.50	12/24/13 16:42	
Bromochloromethane	ug/L	ND	0.50	12/24/13 16:42	
Bromodichloromethane	ug/L	ND ND	0.50	12/24/13 16:42	
Bromoform	ug/L	ND	0.50	12/24/13 16:42	
Bromomethane	ug/L	ND	5.0	12/24/13 16:42	
Carbon tetrachloride	ug/L	ND ND	0.50	12/24/13 16:42	
Chlorobenzene	ug/L	ND ND	0.50	12/24/13 16:42	
Chloroethane	ug/L	ND ND	1.0	12/24/13 16:42	
Chloroform	ug/L	ND ND	0.50	12/24/13 16:42	
Chloromethane	ug/L	ND ND	1.0	12/24/13 16:42	
cis-1,2-Dichloroethene	ug/L	ND ND	0.50	12/24/13 16:42	
•	-	ND ND	0.50		
cis-1,3-Dichloropropene	ug/L			12/24/13 16:42	
Dibromochloromethane	ug/L	ND ND	0.50	12/24/13 16:42	
Dibromomethane	ug/L	ND	0.50	12/24/13 16:42	
Dichlorodifluoromethane	ug/L	ND	0.50	12/24/13 16:42	
Diisopropyl ether	ug/L	ND	0.50	12/24/13 16:42	
Ethylbenzene	ug/L	ND	0.50	12/24/13 16:42	
Hexachloro-1,3-butadiene	ug/L	ND	2.0	12/24/13 16:42	
Isopropylbenzene (Cumene)	ug/L	ND	0.50	12/24/13 16:42	



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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

METHOD BLANK: 1112442 Matrix: Water

Associated Lab Samples: 92184284002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
m&p-Xylene	 ug/L		1.0	12/24/13 16:42	
Methyl-tert-butyl ether	ug/L	ND	0.50	12/24/13 16:42	
Methylene Chloride	ug/L	ND	2.0	12/24/13 16:42	
n-Butylbenzene	ug/L	ND	0.50	12/24/13 16:42	
n-Propylbenzene	ug/L	ND	0.50	12/24/13 16:42	
Naphthalene	ug/L	ND	2.0	12/24/13 16:42	
o-Xylene	ug/L	ND	0.50	12/24/13 16:42	
sec-Butylbenzene	ug/L	ND	0.50	12/24/13 16:42	
Styrene	ug/L	ND	0.50	12/24/13 16:42	
tert-Butylbenzene	ug/L	ND	0.50	12/24/13 16:42	
Tetrachloroethene	ug/L	ND	0.50	12/24/13 16:42	
Toluene	ug/L	ND	0.50	12/24/13 16:42	
trans-1,2-Dichloroethene	ug/L	ND	0.50	12/24/13 16:42	
trans-1,3-Dichloropropene	ug/L	ND	0.50	12/24/13 16:42	
Trichloroethene	ug/L	ND	0.50	12/24/13 16:42	
Trichlorofluoromethane	ug/L	ND	1.0	12/24/13 16:42	
Vinyl chloride	ug/L	ND	1.0	12/24/13 16:42	
1,2-Dichloroethane-d4 (S)	%	96	70-130	12/24/13 16:42	
4-Bromofluorobenzene (S)	%	95	70-130	12/24/13 16:42	
Toluene-d8 (S)	%	103	70-130	12/24/13 16:42	

LABORATORY CONTROL SAMPLE: 1112443

Date: 12/31/2013 03:27 PM

		Cnilco	1.00	1.00	0/ Doo	
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L		47.5	95	60-140	
1,1,1-Trichloroethane	ug/L	50	43.3	87	60-140	
1,1,2,2-Tetrachloroethane	ug/L	50	46.9	94	60-140	
1,1,2-Trichloroethane	ug/L	50	48.7	97	60-140	
1,1-Dichloroethane	ug/L	50	45.5	91	60-140	
1,1-Dichloroethene	ug/L	50	40.2	80	60-140	
1,1-Dichloropropene	ug/L	50	47.5	95	60-140	
1,2,3-Trichlorobenzene	ug/L	50	48.1	96	60-140	
1,2,3-Trichloropropane	ug/L	50	44.6	89	60-140	
1,2,4-Trichlorobenzene	ug/L	50	47.5	95	60-140	
1,2,4-Trimethylbenzene	ug/L	50	47.0	94	60-140	
1,2-Dibromo-3-chloropropane	ug/L	50	52.8	106	60-140	
1,2-Dibromoethane (EDB)	ug/L	50	48.0	96	60-140	
1,2-Dichlorobenzene	ug/L	50	45.6	91	60-140	
1,2-Dichloroethane	ug/L	50	42.4	85	60-140	
1,2-Dichloropropane	ug/L	50	47.6	95	60-140	
1,3,5-Trimethylbenzene	ug/L	50	47.0	94	60-140	
1,3-Dichlorobenzene	ug/L	50	43.9	88	60-140	
1,3-Dichloropropane	ug/L	50	46.9	94	60-140	
1,4-Dichlorobenzene	ug/L	50	43.9	88	60-140	
2,2-Dichloropropane	ug/L	50	45.2	90	60-140	



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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

_ABORATORY CONTROL SAMP	LE: 1112443	0 11	1.00	1.00	0/ D	
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
						Qualifiers
2-Chlorotoluene	ug/L	50	43.7	87	60-140	
4-Chlorotoluene	ug/L	50	46.0	92	60-140	
Benzene	ug/L	50	52.8	106	60-140	
Bromobenzene	ug/L	50	45.2	90	60-140	
Bromochloromethane	ug/L	50	46.1	92	60-140	
Bromodichloromethane	ug/L	50	46.3	93	60-140	
Bromoform	ug/L	50	46.1	92	60-140	
Bromomethane	ug/L	50	60.5	121	60-140	
Carbon tetrachloride	ug/L	50	44.3	89	60-140	
Chlorobenzene	ug/L	50	44.1	88	60-140	
Chloroethane	ug/L	50 50	37.7	75	60-140	
Chloroform	ug/L	50	43.9	88	60-140	
Chloromethane	ug/L	50	50.0	100	60-140	
cis-1,2-Dichloroethene	ug/L	50	45.2	90	60-140	
cis-1,3-Dichloropropene	ug/L	50	52.1	104	60-140	
Dibromochloromethane	ug/L	50	50.8	102	60-140	
Dibromomethane	ug/L	50	45.8	92	60-140	
Dichlorodifluoromethane	ug/L	50	33.4	67	60-140	
Diisopropyl ether	ug/L	50	50.3	101	60-140	
thylbenzene	ug/L	50	44.5	89	60-140	
lexachloro-1,3-butadiene	ug/L	50	47.3	95	60-140	
sopropylbenzene (Cumene)	ug/L	50	47.6	95	60-140	
n&p-Xylene	ug/L	100	91.6	92	60-140	
Methyl-tert-butyl ether	ug/L	50	49.1	98	60-140	
Methylene Chloride	ug/L	50	52.0	104	60-140	
n-Butylbenzene	ug/L	50	47.5	95	60-140	
n-Propylbenzene	ug/L	50	47.0	94	60-140	
Naphthalene	ug/L	50	50.4	101	60-140	
o-Xylene	ug/L	50	46.3	93	60-140	
ec-Butylbenzene	ug/L	50	47.5	95	60-140	
Styrene	ug/L	50	50.8	102	60-140	
ert-Butylbenzene	ug/L	50	47.1	94	60-140	
Tetrachloroethene	ug/L	50	43.9	88	60-140	
oluene	ug/L	50	51.3	103	60-140	
rans-1,2-Dichloroethene	ug/L	50	44.3	89	60-140	
rans-1,3-Dichloropropene	ug/L	50	53.6	107	60-140	
richloroethene	ug/L	50	43.6	87	60-140	
richlorofluoromethane	ug/L	50	32.5	65	60-140	
/inyl chloride	ug/L	50	43.4	87	60-140	
1,2-Dichloroethane-d4 (S)	%			93	70-130	
I-Bromofluorobenzene (S)	%			99	70-130	
Toluene-d8 (S)	%			102	70-130	



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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

MATRIX SPIKE & MATRIX SPIR	KE DUPLICAT	E: 11124			1112445						
			MS	MSD					0.4 5		
Parameter	927 Units	183935010 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qua
,1,1,2-Tetrachloroethane	ug/L	ND	20	20	21.8	20.6	109	103	60-140		
,1,1-Trichloroethane	ug/L	ND	20	20	23.3	21.5	117	108	60-140	8	
,1,2,2-Tetrachloroethane	ug/L	ND	20	20	21.2	19.6	106	98	60-140	8	
,1,2-Trichloroethane	ug/L	ND	20	20	22.6	20.6	113	103	60-140	10	
,1-Dichloroethane	ug/L	ND	20	20	22.3	20.5	112	103	60-140	8	
,1-Dichloroethene	ug/L	ND	20	20	22.1	20.5	110	103	60-140	7	
1-Dichloropropene	ug/L	ND	20	20	24.3	21.7	121	109	60-140	11	
,2,3-Trichlorobenzene	ug/L	ND	20	20	19.5	18.4	98	92	60-140	6	
2,3-Trichloropropane	ug/L	ND	20	20	21.1	19.2	106	96	60-140	9	
2,4-Trichlorobenzene	ug/L	ND	20	20	18.9	17.7	94	88	60-140	7	
2,4-Trimethylbenzene	ug/L	ND	20	20	20.9	19.5	105	97	60-140	7	
2-Dibromo-3-chloropropane	ug/L	ND	20	20	22.1	20.6	110	103	60-140	7	
2-Dibromoethane (EDB)	ug/L	ND	20	20	21.6	19.6	108	98	60-140	10	
2-Dichlorobenzene	ug/L	ND	20	20	20.4	18.5	102	93	60-140	10	
2-Dichloroethane	ug/L	ND	20	20	21.9	19.7	109	98	60-140	11	
2-Dichloropropane	ug/L	1.0	20	20	23.0	21.3	110	102	60-140	8	
3,5-Trimethylbenzene	ug/L	ND	20	20	21.0	19.8	105	99	60-140	6	
3-Dichlorobenzene	ug/L	ND	20	20	19.5	18.1	97	91	60-140	7	
3-Dichloropropane	ug/L	ND	20	20	21.4	19.8	107	99	60-140	7	
4-Dichlorobenzene	ug/L	ND	20	20	19.5	18.0	98	90	60-140	8	
2-Dichloropropane	ug/L	ND	20	20	21.2	19.4	106	97	60-140	8	
Chlorotoluene	ug/L	ND	20	20	19.9	18.7	100	94	60-140	6	
-Chlorotoluene	ug/L	ND	20	20	20.6	19.2	103	96	60-140	7	
enzene	ug/L	ND	20	20	23.0	21.9	115	110	60-140	5	
romobenzene	ug/L	ND	20	20	20.2	18.5	101	93	60-140	9	
romochloromethane	ug/L	ND	20	20	23.0	21.4	115	107	60-140	7	
romodichloromethane	ug/L	ND	20	20	21.9	19.9	109	100	60-140	9	
romoform	ug/L	ND	20	20	19.6	18.1	98	91	60-140	8	
romomethane	ug/L ug/L	ND	20	20	19.5	19.1	97	95	60-140	2	
arbon tetrachloride	ug/L	ND	20	20	22.9	21.9	114	109	60-140	4	
hlorobenzene		ND	20	20	20.5	19.1	102	95	60-140	7	
hloroethane	ug/L	ND		20			97			9	
nioroetnane hloroform	ug/L	ND	20		19.5	17.9		89 104	60-140 60-140	9 6	
	ug/L	ND ND	20	20	22.0	20.7	110	104			
hloromethane	ug/L	ND	20 20	20 20	23.6 22.1	24.0 20.4	118 110	120	60-140 60-140	2 8	
s-1,2-Dichloroethene	ug/L	ND	20					102		8 7	
s-1,3-Dichloropropene	ug/L	ND ND		20	21.6	20.1	108	101	60-140	•	
ibromochloromethane	ug/L	ND ND	20	20	22.1	20.5	110	103	60-140	7	
ibromomethane	ug/L		20	20	21.1	19.4	106	97	60-140	8	
ichlorodifluoromethane	ug/L	ND	20	20	19.6	18.0	98	90	60-140	8	
iisopropyl ether	ug/L	ND	20	20	23.9	22.2	119	111	60-140	7	
thylbenzene	ug/L	ND	20	20	20.8	19.8	104	99	60-140	5	
exachloro-1,3-butadiene	ug/L	ND	20	20	20.7	20.8	103	104	60-140	0	
opropylbenzene (Cumene)	ug/L	ND	20	20	21.7	20.8	109	104	60-140	4	
&p-Xylene	ug/L	ND	40	40	42.9	40.4	107	101	60-140	6	
lethyl-tert-butyl ether	ug/L	ND	20	20	23.3	21.1	117	105	60-140	10	
lethylene Chloride	ug/L	ND	20	20	24.4	22.6	122	113	60-140	8	
-Butylbenzene	ug/L	ND	20	20	20.3	19.6	101	98	60-140	3	



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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

MATRIX SPIKE & MATRIX SP	INE DUPLICAT	E: 111244	MS	MSD	1112445						
	92	183935010	Spike	Spike	MS	MSD	MS	MSD	% Rec		
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	Qual
n-Propylbenzene	ug/L	ND	20	20	20.9	19.9	104	100	60-140	5	
Naphthalene	ug/L	ND	20	20	20.3	18.7	102	94	60-140	8	
o-Xylene	ug/L	ND	20	20	21.3	19.8	107	99	60-140	7	
sec-Butylbenzene	ug/L	ND	20	20	21.0	20.4	105	102	60-140	3	
Styrene	ug/L	ND	20	20	22.6	21.1	113	106	60-140	7	
ert-Butylbenzene	ug/L	ND	20	20	21.2	20.4	106	102	60-140	4	
Tetrachloroethene	ug/L	ND	20	20	20.4	19.2	102	96	60-140	6	
Toluene	ug/L	ND	20	20	22.8	21.2	114	106	60-140	7	
rans-1,2-Dichloroethene	ug/L	ND	20	20	22.4	21.1	112	105	60-140	6	
rans-1,3-Dichloropropene	ug/L	ND	20	20	22.9	21.3	114	106	60-140	7	
Trichloroethene	ug/L	ND	20	20	21.5	20.0	107	100	60-140	7	
Trichlorofluoromethane	ug/L	ND	20	20	21.3	19.1	106	95	60-140	11	
Vinyl chloride	ug/L	0.38J	20	20	22.1	21.4	109	105	60-140	3	
,2-Dichloroethane-d4 (S)	%						102	99	70-130		
1-Bromofluorobenzene (S)	%						99	99	70-130		
Toluene-d8 (S)	%						100	102	70-130		



### Pace Analytical Services, Inc. 205 East Meadow Road - Suite A

Eden, NC 27288 (336)623-8921

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13

### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

QC Batch: OEXT/25303 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 3546 Analysis Description: 8015 Solid GCSV

Associated Lab Samples: 92184284001

METHOD BLANK: 1111061 Matrix: Solid

Associated Lab Samples: 92184284001

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

LABORATORY CONTROL SAMPLE: 1111062

Spike LCS LCS % Rec Parameter Units Conc. Result % 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 MSD MS 92184266001 Spike Spike MS MSD MS MSD % Rec Parameter Units Result Conc. Conc. Result Result % Rec % Rec Limits **RPD** Qual

 Diesel Components
 mg/kg
 ND
 78.4
 78.4
 54.8
 62.2
 68
 77
 10-146

 n-Pentacosane (S)
 %
 77
 82
 41-119



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### **QUALITY CONTROL DATA**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

QC Batch: PMST/6124 Analysis Method: ASTM D2974-87

QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 92184284001

SAMPLE DUPLICATE: 1113495

92184319006 Dup
Parameter Units Result Repl Qualifiers

Percent Moisture % 17.1 15.5 10

SAMPLE DUPLICATE: 1113496

Date: 12/31/2013 03:27 PM

ParameterUnits92184658018 ResultDup ResultRPDQualifiersPercent Moisture%31.631.70



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### **QUALIFIERS**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

### **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**

Date: 12/31/2013 03:27 PM

PASI-C Pace Analytical Services - Charlotte



Pace Analytical Services, Inc. 2225 Riverside Dr. Asheville, NC 28804 (828)254-7176 Pace Analytical Services, Inc. 9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

### **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: RICH. CO. 045 WSB #34437.1.1

Pace Project No.: 92184284

Date: 12/31/2013 03:27 PM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92184284001	45-2 (2.5-5)	EPA 3546	OEXT/25303	EPA 8015 Modified	GCSV/16310
92184284001	45-2 (2.5-5)	EPA 5035A/5030B	GCV/7658	EPA 8015 Modified	GCV/7661
92184284002	45-2 (TW)	SM 6200B	MSV/25363		
92184284001	45-2 (2.5-5)	ASTM D2974-87	PMST/6124		

Pace Analytical

### Sample Condition Upon Receipt (SCUR)

Document Number: F-CHR-CS-03-rev.13 Page 1 of 2
Issuing Authority:
Pace Huntersville Quality Office

Client Name: Gramid Environme	ental	
Courier: Fed Ex UPS USPS Clie	ent Commercial Pace Other_	Optional
	no Seals intact: yes	Proj. Due Date: Proj. Name:
Packing Material: Bubble Wrap Bubble	e Bags	- Troj. Namo.
Thermometer Used: IR Gun T1102 (1301)	Type of Ice: (Wet) Blue None	Samples on ice, cooling process has begun
Temp Correction Factor T1102: No Corre	ection T1301: No Correction	/
Corrected Cooler Temp.: 2.3 °C Temp should be above freezing to 6°C	Biological Tissue is Frozen: Yes No Comments:	Date and Initials of person examining contents: OUD/DO/13
Chain of Custody Present:	⊠Yes □No □N/A 1.	
Chain of Custody Filled Out:	Øyes □No □N/A 2.	
Chain of Custody Relinquished:	Yes □No □N/A 3.	
Sampler Name & Signature on COC:	ØYes □No □N/A 4.	
Samples Arrived within Hold Time:	Yes □No □N/A 5.	
Short Hold Time Analysis (<72hr):	□Yes ☑No □N/A 6.	
Rush Turn Around Time Requested:	□Yes ☑No □N/A 7.	
Sufficient Volume:	Źyes □No □N/A 8.	
Correct Containers Used:	⊠Yes □No □N/A 9.	
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	√Yes □No □N/A 10.	
Filtered volume received for Dissolved tests	□Yes □No ÞŃ/A 11.	
Sample Labels match COC:	✓Yes □No □N/A 12.	
-Includes date/time/ID/Analysis Matrix:		
All containers needing preservation have been checked.	□Yes □No ☑N/A 13.	
All containers needing preservation are found to be in compliance with EPA recommendation.	□Yes □No ☑N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	ØYes □No	
Samples checked for dechlorination:	□Yes □No ☑N/A 14.	
Headspace in VOA Vials ( >6mm):	□Yes ☑No □N/A 15.	
Trip Blank Present:	□Yes □No □N/A 16.	
Trip Blank Custody Seals Present	□Yes □No □N/A	
Pace Trip Blank Lot # (if purchased):		
Client Notification/ Resolution:		Field Data Required? Y / N
Person Contacted:	Date/Time:	
Comments/ Resolution:		
SCURF Review: D	ate:    2 20 13	Place label here
200		OR
Note: Whenever there is a discrepancy affecting No samples, a copy of this form will be sent to the No Certification Office (i.e. out of hold, incorrect pres	orth Carolina compliance orth Carolina DEHNR servative, out of temp,	92184284
Note: Whenever there is a discrepancy affecting Notes amples, a copy of this form will be sent to the Notes.	ate: \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	92184284

Page 20 of 21

### CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical www.pacelabs.com

Section A Required Client Information:	Required Project Information:	on:		Invoice Information:	tion:					f L
Pompany: Environmenta	Report To. Tim	eathernam-	Pyramid	Attention:	CDOT				166/	365
V	Copy To: NCD	1		Company Name:	WCDO	<u> </u>	REGULATORY AGENCY	AGENCY		
Theone book NO 274	0			Address:			NPDES	GROUND WATER	ATER	DRINKING WATER
Email To:	Purchase Order No. NBS#	S#3443	1010	Pace Quote Reference:	#5#3#I	37.1.	TZ UST	RCRA	<b>1</b>	OTHER
\$36,335,3174 Fax:	Project Name Richmand	mend County Pa	045	Pace Project Manager:	Jan Brad	dey	Site Location	N. X		
Requested Due Date/TAT: Neval	Project Number 013	278/#344	87.1.1	Pace Profile #:			STATE:			
							Requested Analysis Filtered (Y/N)	d (Y/N)		
Section D Required Client Information	les DDE	COLLECTED	7 7 3		Preservatives	<b>1</b> N/A				
	Drinking Water DW Water WY Waster WH Waster WH Product P Product P Soil/Soild Soil/Soild Soil Soil/Soild Soil Soil Soil Soil Soil Soil Soil Soil	COMPOSITE COM START END	COMPOSITE END/GRAB	S		1 (C)		(IV/X)	(N/1)	* 6
Sample IDs MUST BE UNIQUE Tissue	9 A A P P		TA 9M3T 3J9W	SE CONTAINER	ogs S <sup>S</sup> Ogs OH OH OH	nalysis Test 035-( 1-025 2006 2006		adirold Jembis	sidual Chlorine	360
ルニカ	AM G	DATE TIME DATE	TIME	nU >	HC Ng Ng	£ > 5 × ∀1		98	100	Pace Project No./ Lab I.D.
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ıo								8	ALL 188	62
9										
7										
80 0		+	+							
10								2	2	
11										
12										
ADDITIONAL COMMENTS	RELINQUISHE	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED	DAY / AFFICIATION	DATE	TIME	SAMPL	SAMPLE CONDITIONS
	A. L. D.	Porce/Promid	12/20	07/1	Mark	af for	140	1120		
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		1.	\						-	
		SAMPLER NAME A	AND SIGNATURE					0.		oler
⊋21 of 2	ORIGINAL	PRINT N.	PRINT Name of SAMPLER:		D. D.	DATE Signed	1240	Temp in	Beviece A∖Y) eol	Custod; Sealed Co (Y/N)
	awa			X	\$ 13 B	(MM/DD/YY):	000	1		

### APPENDIX F

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63 Mon Tue Wed Th Fri Sat Sun Name: Eric Cross **Date:** 11/26/13 TASKS PERFORMED: E. Cros: On site: 8AM Mobilize to site. Performed site visits and owner interviews. Leave site: 3PM (additional processing performed in evening)

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63 Mon Tue Wed Th Fri Sat Sun Name: Eric Cross & Mika Trifunovic Date: 12/3/13 **TASKS PERFORMED:** E. Cross & M. Trifunovic: On site: 8AM Mobilize to site. Performed geophysical surveys. Leave site: 5:30PM (additional processing performed in evening)

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63 Mon Tue Wed Th Fri Sat Sun Name: Eric Cross & Mika Trifunovic Date: 12/4/13 **TASKS PERFORMED:** E. Cross & M. Trifunovic: On site: 8AM Mobilize to site. Performed geophysical surveys. Leave site: 5:30PM (additional processing performed in evening)

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63 Mon Tue Wed Th Fri Sat Sun Name: Eric Cross & Mika Trifunovic Date: 12/5/13 **TASKS PERFORMED:** E. Cross & M. Trifunovic: On site: 8AM Mobilize to site. Performed geophysical surveys. Leave site: 6:00PM (additional processing performed in evening)

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PARCELS 11, 27, 33, 42, 45, 49 and 63 PROJECT NO.: R-2501C **Date:** 12/6/13 Mon Tue Wed Th Fri Sat Sun Name: Eric Cross TASKS PERFORMED: E. Cross: On site: 8AM Mobilize to site. Performed geophysical surveys. Demobilize. Leave site: 5:00PM

FIELD PERSONNEL LOG	
<b>PROJECT NAME</b> : NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63	
Name: Eric Cross & Tim Leatherman Date: 12/9/13 Mon Tue Wed Th Fri Sat Su	un
TASKS PERFORMED:	
E. Cross: On site: 8AM Mobilize to site. Performed geophysical surveys & boring location selection. Demobilize. Leave site: 5:30PM	
T. Leatherman: On site: 9AM Mobilize to site. Assisted with geophysics, boring location selection and site research. Demobilize. Leave site: 4:00PM	
	_

### FIELD PERSONNEL LOG **PROJECT NAME**: NCDOT Richmond County ROW PARCELS 11, 27, 33, 42, 45, 49 and 63 PROJECT NO.: R-2501C Mon Tue Wed Th Fri Sat Sun Name: Tim Leatherman **Date:** 12/13/13 TASKS PERFORMED: T. Leatherman: On site: 8AM Mobilize to site. Geophysics (private locating) and site research. Demobilize. Leave site: 3:30PM

FIELD PERSONNEL LOG					
<b>PROJECT NAME</b> : NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63					
Name: Eric Cross &Tim Leatherman	<b>Date:</b> 12/16/13	Mon Tue Wed Th Fri Sat Sun			
TASKS PERFORMED:					
E. Cross & T. Leatherman: On site: 8AM Mobilize to site. Supervision of geoprol Leave site: 5:30PM (additional QED an					

FIELD PERSONNEL LOG  PROJECT NAME: NCDOT Richmond County ROW PROJECT NO.: R-2501C  PARCELS 11, 27, 33, 42, 45, 49 and 63					
TASKS PERFORMED:					
T. Leatherman: On site: 8AM Mobilize to site. Supervision Leave site: 4:00PM (addition		classifications, QED prep & analysis. rmed in evening)			

	FIELD PERSON	NNEL LOG		
<b>PROJECT NAME</b> : NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63				
Name: Tim Leatherman	<b>Date:</b> 12/18/13	Mon Tue Wed Th Fri Sat Sun		
TASKS PERFORMED:				
T. Leatherman: On site: 8AM Mobilize to site. Supervision of Leave site: 3:00PM (additional		g, classifications, QED prep & analysis. formed in evening)		

	FIELD PERSON	NNEL LOG		
<b>PROJECT NAME</b> : NCDOT Richmond County ROW PROJECT NO.: R-2501C PARCELS 11, 27, 33, 42, 45, 49 and 63				
Name: Tim Leatherman	<b>Date:</b> 12/19/13	Mon Tue Wed Th Fri Sat Sun		
TASKS PERFORMED:				
T. Leatherman: On site: 8AM Mobilize to site. QED prep & Leave site: 4:30PM	k analysis, photos, disp	pose of samples. Demobilize.		