# GEOENVIRONMENTAL PHASE II INVESTIGATION
## PARCEL 001 – HUNTER & CYNTHIA WILLIARD
## 425 MAIN STREET
## WALNUT COVE, STOKES COUNTY, NORTH CAROLINA
## STATE PROJECT: R-5768
## WBS ELEMENT: 44670.1.1
## APRIL 30, 2019

**Report prepared for:**

**Mr. Craig Haden**
**GeoEnvironmental Section**
**Geotechnical Engineering Unit**
**North Carolina Department of Transportation**
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**Raleigh, NC 27610**

**Report prepared by:**

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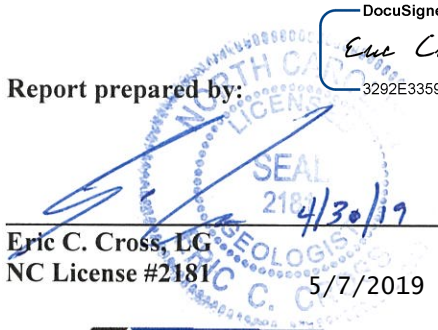
3292E33596454F4...

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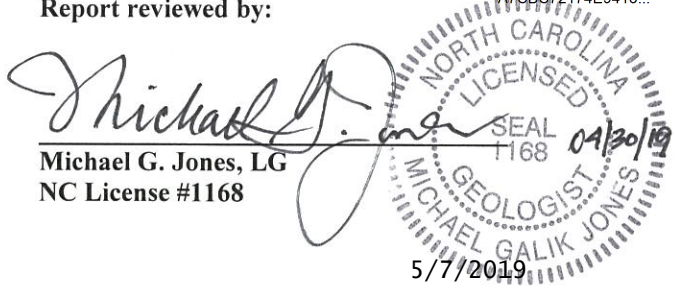


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C-257 –Geology
C-1251 – Engineering

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# *Acronyms*

BLS .....Below Land Surface
BTEX .....Benzene, Toluene, Ethylbenzene, & Xylenes
CADD .....Computer Aided Design and Drafting
COC .....Chain of Custody
CSA.....Comprehensive Site Assessment
DEQ .....Department of Environmental Quality
DRO .....Diesel Range Organics
DWM .....Division of Waste Management
EM.....Electromagnetic (as with EM-61)
EPA.....Environmental Protection Agency
GRO .....Gasoline Range Organics
GCLs .....Gross Contaminant Levels
GPR.....Ground Penetrating Radar
HASP .....Health & Safety Plan
MSCC .....Maximum Soil Contaminant Concentration
MTBE .....Methyl Tertiary Butyl Ether
µg/L.....Micrograms per Liter
mg/kg .....Milligrams per kilogram
NPDES.....National Pollutions Discharge Elimination System
NCAC .....North Carolina Administrative Code
NCDOT.....North Carolina Department of Transportation
OSHA.....Occupational Safety and Health Administration
OVA.....Organic Vapor Analyzer
PPM.....Parts Per Million
PID .....Photo-ionization Detector
PSA .....Preliminary Site Assessment
PVC.....Poly-vinyl Chloride
RFP .....Request for Proposal
ROW .....Right of Way
SVOCs .....Semi-Volatile Organic Compounds
TW .....Temporary Well
TPH.....Total Petroleum Hydrocarbons
UVF.....Ultraviolet Fluorescence (UVF) QED Analyzer
UST.....Underground Storage Tank
US EPA.....United States Environmental Protection Agency
VOCs.....Volatile Organic Compounds

**GEOENVIRONMENTAL PHASE II INVESTIGATION**
**PARCEL 001 – HUNTER & CYNTHIA WILLIARD**
**425 MAIN STREET**
**WALNUT COVE, STOKES COUNTY, NORTH CAROLINA**

# EXECUTIVE SUMMARY OF RESULTS

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this GeoEnvironmental Phase II Investigation (Phase II) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 001, owned by Hunter & Cynthia Williard. The property currently contains an abandoned former car wash structure surrounded by asphalt, grass and dirt surfaces at 425 Main Street, Walnut Cove, NC. This Phase II was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's February 28, 2019, technical proposal. This Phase II is a part of State Project R-5768.

The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs) and impacted soils between the existing edge of pavement and the proposed Right-Of-Way (ROW) and/or easements, whichever distance was greater. The Phase II 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.

The following statements summarize the results of the Phase II:

- **Site History:** Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed aerial photographs from 1993 – 2018 obtained from Google Earth. Historical information reviewed as part of the Phase II indicated that the property appears to have remained in the same condition with its current building since at least 1993. The 1993 and 2018 aerial photographs are included in **Appendix A**.

  On March 29, 2019, Pyramid emailed the Stokes County parcel address to Ms. Linda Estikowski at the NC Department of Environmental Quality (NC DEQ), with a request to investigate any environmental incidents associated with the parcel. Ms. Estikowski responded to the email and indicated that there were not any environmental incidents associated with the property.

  Pyramid Staff Professional Tim Leatherman performed a site investigation at the property. Mr. Leatherman did not observe any significant environmental risks on

the property at the time of the investigation. No vent pipes were observed that could indicate the presence of USTs.

- **Geophysical Survey**: The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of seven EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across EM anomalies associated with the building and suspected reinforced concrete to verify that the metallic interference associated with these features did not obscure any potential USTs. GPR did not record any evidence of significant buried structures. Collectively, the geophysical data did not record any evidence of USTs within the geophysical survey area at Parcel 1.

- **Limited Soil Assessment:** A total of seven soil borings were performed across the property. Soil samples were screened in the field using a Photo-Ionization Detector (PID) and select soil samples were analyzed for Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) using a QED Analyzer. The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with a PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer.

  None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

- **Limited Groundwater Assessment:** The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.

- **Contaminated Soil Volumes:** None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

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

# 1.0 INTRODUCTION

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this GeoEnvironmental Phase II Investigation (Phase II) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 001, owned by Hunter & Cynthia Williard. The property currently contains an abandoned former car wash structure surrounded by asphalt, grass and dirt surfaces at 425 Main Street, Walnut Cove, NC. This Phase II was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's February 28, 2019, technical proposal. This Phase II is a part of State Project R-5768.

The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs) and impacted soils between the existing edge of pavement and the proposed Right-Of-Way (ROW) and/or easements, whichever distance was greater. The Phase II 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. The location of the subject site is shown on **Figure 1**.

## 1.1 Background Information

Based on the NCDOT's February 18, 2019, *Request for Technical and Cost Proposal (RFP),* the Phase II was conducted between the existing edge of pavement and the proposed ROW and/or easement lines (whichever distance was greater), 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 Phase II included the following:

- Research the properties for past uses and possible releases.
- Conduct a preliminary geophysical site assessment and limited soil assessment across the entire parcel 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.
- If groundwater is likely to be encountered by subsequent excavation required by construction, then Pyramid will attempt to obtain a groundwater sample from the parcel.

## 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. Pyramid's geophysical staff provided additional private utility locating services to mark the on-site private, buried utilities.

# 2.0 SITE HISTORY

The NCDOT GeoEnvironmental Planning Report and Phase I Reports included with the RFP documents provided to Pyramid on February 18, 2019, did not include any specific comments regarding this parcel.

Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed aerial photographs from 1993 – 2018 obtained from Google Earth. Historical information reviewed as part of the Phase II indicated that the property appears to have remained in the same condition with its current building since at least 1993. The 1993 and 2018 aerial photographs are included in **Appendix A**.

On March 29, 2019, Pyramid emailed the Stokes County parcel address to Ms. Linda Estikowski at the NC Department of Environmental Quality (NC DEQ), with a request to investigate any environmental incidents associated with the parcel. Ms. Estikowski responded to the email and indicated that there were not any environmental incidents associated with the property.

Pyramid Staff Professional Tim Leatherman performed a site investigation at the property. Mr. Leatherman did not observe any significant environmental risks on the property at the time of the investigation. No vent pipes were observed that could indicate the presence of USTs.

# 3.0 GEOPHYSICAL INVESTIGATION

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

Geophysical Surveys for Underground Storage Tanks
on NCDOT Projects

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

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of seven EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across EM anomalies associated with the building and suspected reinforced concrete to verify that the metallic interference associated with these features did not obscure any potential USTs. GPR did not record any evidence of significant buried structures. Collectively, the geophysical data did not record any evidence of USTs within the geophysical survey area at Parcel 1.

The full details of the geophysical investigation are documented in Pyramid's Geophysical Investigation Report, dated March 26, 2019, which is included as **Appendix B**.

# 4.0 SOIL SAMPLING ACTIVITIES & RESULTS

## 4.1 Soil Assessment Field Activities

On April 23, 2019, Pyramid mobilized to the site, drilled soil borings and collected the proposed soil samples for the Phase II. Seven (7) soil borings (1-1 through 1-7) were advanced on the subject property. The soil borings were completed using a truck-mounted Geoprobe drill rig. The selected locations were chosen to avoid public utilities along the adjacent roads and private utilities associated with the business while remaining in the proposed ROW and/or easement, or within other areas of concern such as proposed drainage features and areas designated for soil removal 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. In general, the soil sample with the highest PID reading was selected from each boring for QED Ultra-Violet Fluorescence (UVF) laboratory analysis. If field screening detected multiple elevated readings, then additional soil samples from each boring were selectively chosen for UVF analysis. 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. Petroleum odor was detected in borings 1-1, 1-2, 1-5 and 1-6 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 RED Lab. The DEQ & NCDOT now accept this instrument as an analytical method to provide total petroleum hydrocarbon

(TPH) results for soil analysis for Phase II projects. Pyramid preserved the samples for UVF analysis in methanol-filled containers provided by RED Lab. The samples were shipped to RED Lab for analysis following the soil collection. 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).

## 4.2 Soil Sample Analytical Results

*QED Results*

The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with an PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer. None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels. The soil sample QED results are summarized in **Table 2**. A copy of the QED analysis report is included in **Appendix D**.

## 4.3 Temporary Monitoring Well Installation

The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

As requested by the NCDOT, Pyramid has completed a Phase II at Parcel 001 (Hunter & Cynthia Williard) located at 425 Main Street, Walnut Cove, NC. The following is a summary of the assessment activities and results.

## 5.1 Geophysical Investigation

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of seven EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across EM anomalies associated with the building and suspected reinforced concrete to verify that the metallic interference associated with these features did not obscure any potential USTs. GPR did not record any evidence of significant buried structures. Collectively, the geophysical data did not record any evidence of USTs within the geophysical survey area at Parcel 1.

## 5.2 Limited Soil Assessment

The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with an PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer. None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

## 5.3 Limited Groundwater Assessment

The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.

## 5.4 Recommendations

*Petroleum-Impacted Soils*

No evidence of petroleum-impacted soils (DRO/GRO > DEQ Action Levels) was observed during this investigation. Therefore, no recommendations for the treatment, handling, or disposal of such materials are warranted.

It should be noted that, if deeper soils are deemed unsuitable or 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 DEQ Division of Waste Management (DWM) 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 Phase II was performed.

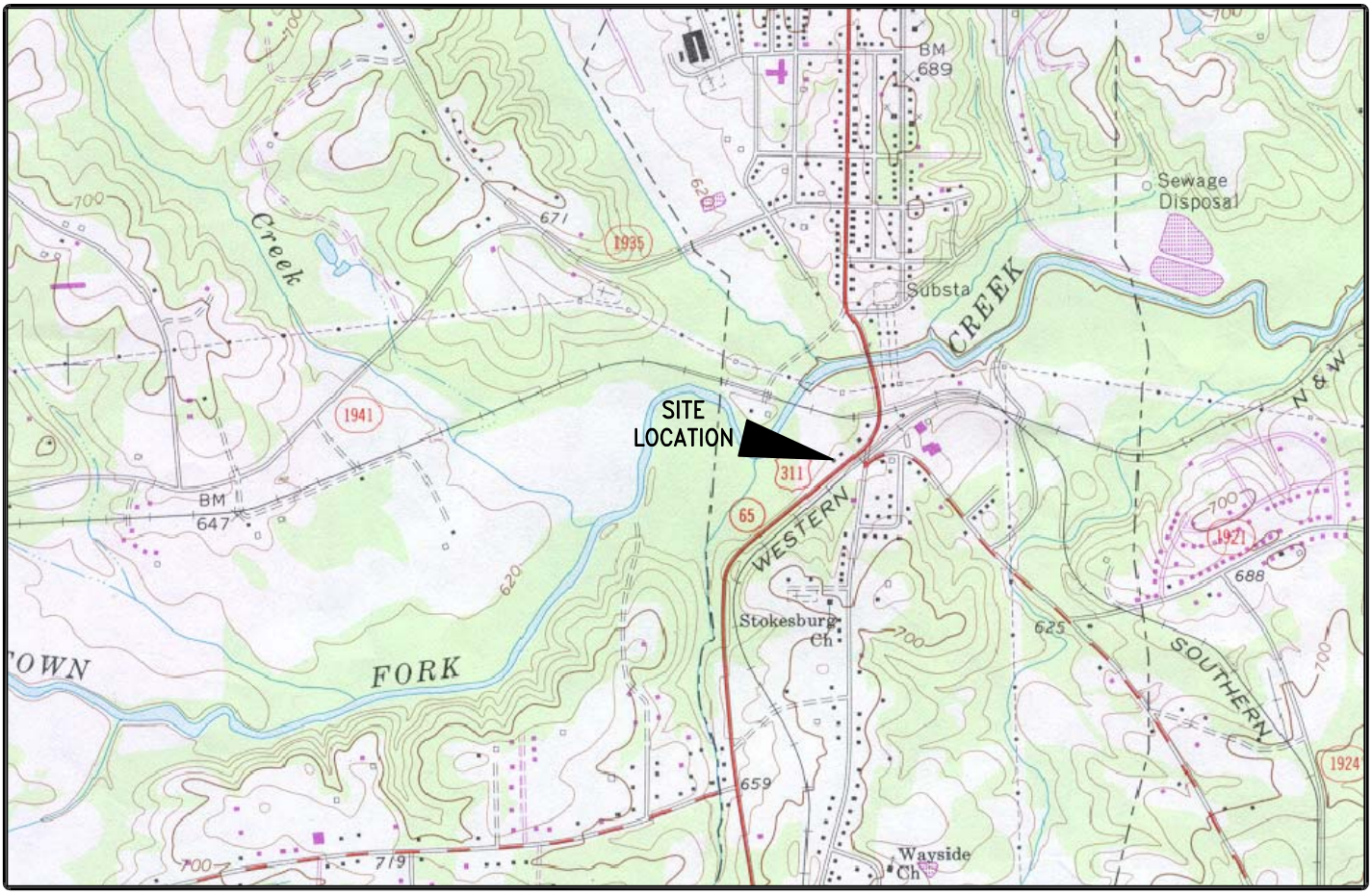
# 7.0 CLOSURE

This report was prepared for, and is available solely for use by, the 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: 425 S. MAIN STREET LOCATION: WALNUT COVE, NORTH CAROLINA




## USGS IDENTIFICATION

| | |
|---|---|
| USGS 7.5 MINUTE MAP | WALNUNT COVE, N.C. |
| ORIGINAL DATE: | 1971 |
| PHOTOREVISION DATE: | 1986 |
| PRIMARY HIGHWAY, HARD SURFACE | |
| SECONDARY HIGHWAY, HARD SURFACE | |
| LIGHT-DUTY ROAD HARD OR IMPROVED SURFACE | |
| UNIMPROVED ROAD | |
| STATE ROAD | |
| U.S. ROUTE | |
| INTERSTATE ROUTE | |

## SCALES

MILES: 1/2 0 1

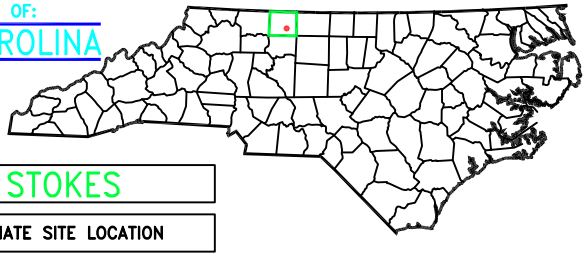
FEET: 1000 0 2000 4000 6000

1" = 2000'

NOTES: ▶ TOPOGRAPHICAL CONTOUR INTERVAL = 20 FEET
▶ PHOTOREVISIONS DENOTED IN PURPLE

MAGNETIC NORTH

COUNTY MAP OF: NORTH CAROLINA



COUNTY: STOKES

APPROXIMATE SITE LOCATION

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT: NCDOT PROJECT R-5768
PROPERTY NAME: 425 S. MAIN ST., PARCEL 1
CITY: WALNUT COVE STATE: NORTH CAROLINA
TITLE: TOPOGRAPHIC MAP

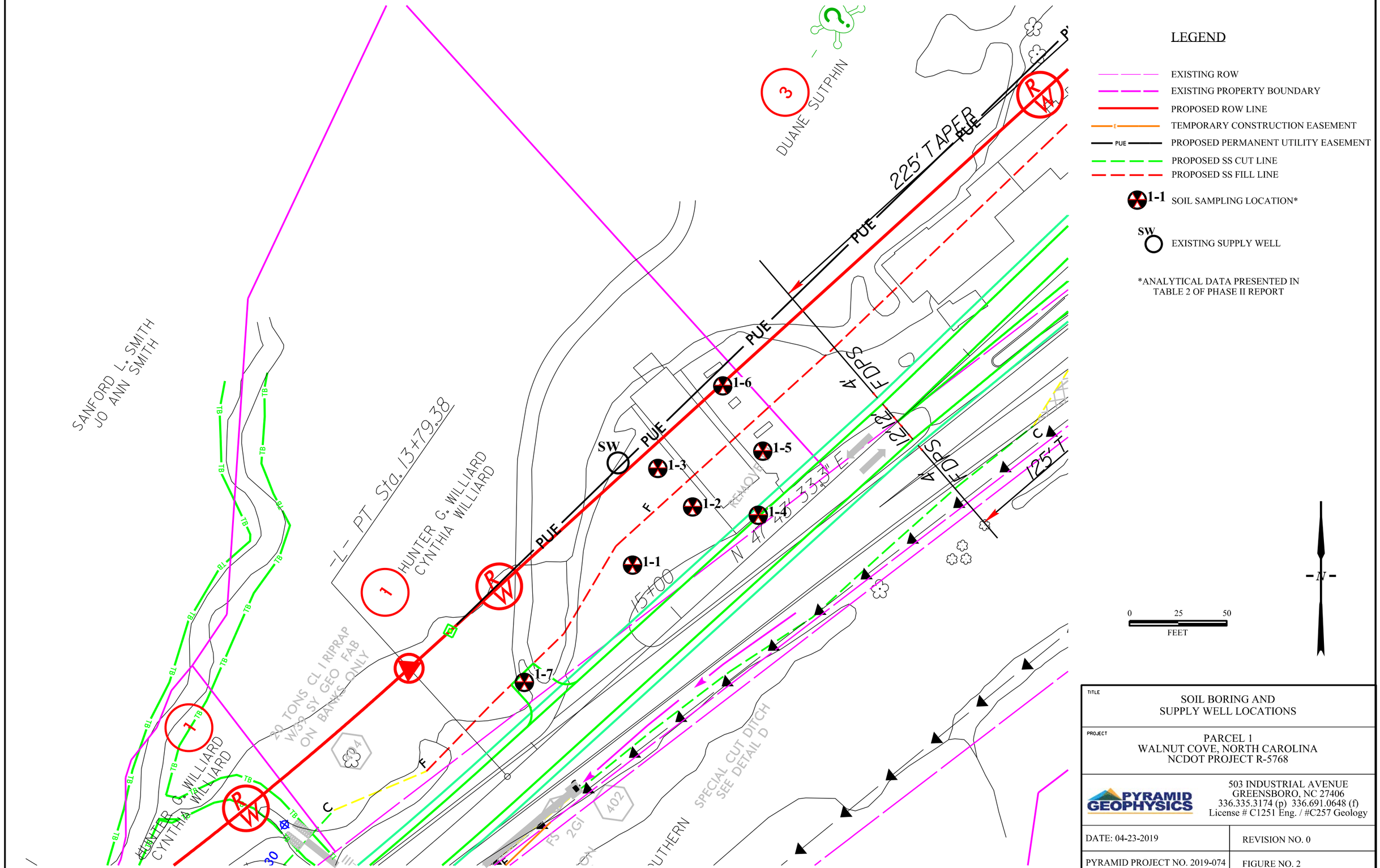
SCALE: 1"=2000'
DATE: 4/4/19
DRAWING NAME: USGSTOPO

DRAWN BY: KAM
CHECK BY: EC
JOB NO.: 2019-074
TYPE: PSA
FIGURE NUMBER: 1

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 AND SUPPLY WELL LOCATIONS |
| PROJECT | PARCEL 1<br>WALNUT COVE, NORTH CAROLINA<br>NCDOT PROJECT R-5768 |
| PYRAMID GEOPHYSICS | 503 INDUSTRIAL AVENUE<br>GREENSBORO, NC 27406<br>336.335.3174 (p) 336.691.0648 (f)<br>License # C1251 Eng. / #C257 Geology |
| DATE: 04-23-2019 | REVISION NO. 0 |
| PYRAMID PROJECT NO. 2019-074 | FIGURE NO. 2 |

# TABLES

# TABLE 1
## Summary of Soil Field Screening Results
### NCDOT Project R-5768
### Parcel 001 - Stokes County PSAs
### Hunter & Cynthia Willard - 425 S. Main Street
### Walnut Cove, Stokes County, North Carolina

| SOIL BORING 4/23/2019 | SAMPLE ID | DEPTH (feet bgs) | PID READINGS (PPM) |
|---|---|---|---|
| 1-1 | 1-1-0-2 | 0 to 2 | 160.0 |
| | 1-1-2-4 | 2 to 4 | 400.0 |
| | 1-1-4-6 | 4 to 6 | 395.0 |
| | 1-1-6-8 | 6 to 8 | 150.0 |
| | 1-1-8-10 | 8 to 10 | 3.0 |
| 1-2 | 1-2-0-2 | 0 to 2 | 86.0 |
| | 1-2-2-4 | 2 to 4 | 40.0 |
| | 1-2-4-6 | 4 to 6 | 36.0 |
| | 1-2-6-8 | 6 to 8 | 50.0 |
| 1-3 | 1-3-0-2 | 0 to 2 | 18.0 |
| | 1-3-2-4 | 2 to 4 | 3.4 |
| | 1-3-4-6 | 4 to 6 | 2.0 |
| | 1-3-6-8 | 6 to 8 | 3.1 |
| 1-4 | 1-4-0-2 | 0 to 2 | 200.0 |
| | 1-4-2-4 | 2 to 4 | 100.0 |
| 1-5 | 1-5-0-2 | 0 to 2 | 220.0 |
| | 1-5-2-4 | 2 to 4 | 125.0 |
| | 1-5-4-6 | 4 to 6 | 5.0 |
| | 1-5-6-8 | 6 to 8 | 70.0 |
| 1-6 | 1-6-0-2 | 0 to 2 | 270.0 |
| | 1-6-2-4 | 2 to 4 | 395.0 |
| | 1-6-4-6 | 4 to 6 | 50.0 |
| | 1-6-6-7 | 6 to 7 | 35.0 |
| 1-7 | 1-7-1-2 | 1 to 2 | 10.0 |
| | 1-7-2-3 | 2 to 3 | 11.0 |
| | 1-7-3-4 | 3 to 4 | 5.0 |

**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 QED Analytical Results for GRO/DRO

**NCDOT State Project R-5768**

**Parcel 001 Hunter & Cynthia Willard - 425 S. Main Street**

**Walnut Cove, Stokes County, North Carolina**

| | | | | QROS - QED Analysis | | |
|---|---|---|---|---|---|---|
| **SAMPLE ID** | **DATE** | **DEPTH (feet)** | **PID (ppm)** | **GRO (mg/kg) (C5-C10)** | **DRO (mg/kg) (C10-C35)** | **TPH (mg/kg) (C5-C35)** |
| 1-1-2-4 | 4/23/2019 | 2-4 | 400.0 | <0.67 | 13 | 13 |
| 1-1-4-6 | 4/23/2019 | 4-6 | 395.0 | <0.73 | 10.3 | 10.3 |
| 1-2-0-2 | 4/23/2019 | 0-2 | 86.0 | 3.7 | 2.8 | 6.5 |
| 1-3-0-2 | 4/23/2019 | 0-2 | 18.0 | 11.2 | 1.9 | 13.1 |
| 1-3-2-4 | 4/23/2019 | 2-4 | 3.4 | <0.33 | 0.6 | 0.6 |
| 1-4-0-2 | 4/23/2019 | 0-2 | 200.0 | <0.3 | <0.3 | 0.21 |
| 1-5-0-2 | 4/23/2019 | 0-2 | 220.0 | <0.69 | 8.2 | 8.2 |
| 1-6-2-4 | 4/23/2019 | 2-4 | 395.0 | <0.26 | 0.63 | 0.63 |
| 1-7-2-3 | 4/23/2019 | 2-3 | 11.0 | <0.67 | 0.67 | 0.67 |
| | | | | | | |
| **NC Initial Action Level - UST Section for 5035/5030-GRO; 3550-DRO** | | | | 50 | 100 | NA |

PID= photo-ionizaton 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

* Bold values indicate concentrations above initial action levels

# APPENDIX A


Parcel 1
1993 Aerial
Stokesburg Rd
65
311
Google Earth
Image U.S. Geological Survey
N
200 ft


Parcel 1
2018 Aerial
Stokesburg Rd
65
311
Google Earth
© 2018 Google
N
200 ft

# APPENDIX B

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2019-074)

# GEOPHYSICAL SURVEY

## METALLIC UST INVESTIGATION:
## PARCEL 1
## NCDOT PROJECT R-5768 (44670.1.1)

**425 MAIN STREET, WALNUT COVE, NC**

**APRIL 10, 2019**

**Report prepared for:** Craig Haden
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**GEOPHYSICAL INVESTIGATION REPORT**
**Parcel 1 – 425 Main Street**
**Walnut Cove, Stokes County, North Carolina**

## Table of Contents



## Figures

## LIST OF ACRONYMS

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

## EXECUTIVE SUMMARY

**Project Description:** Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT) at Parcel 1, located at 425 Main Street, in Walnut Cove, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-5768). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on April 3, 2019, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

**Geophysical Results:** The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of seven EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across EM anomalies associated with the building and suspected reinforced concrete to verify that the metallic interference associated with these features did not obscure any potential USTs. GPR did not record any evidence of significant buried structures. Collectively, the geophysical data did not record any evidence of USTs within the geophysical survey area at Parcel 1.

## INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT) at Parcel 1, located at 425 Main Street, in Walnut Cove, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-5768). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on April 3, 2019, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a former car wash surrounded by asphalt and grass/dirt surfaces. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61-MK2 (EM61) metal detector integrated with a Geode External GPS/GLONASS receiver. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

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

generally parallel survey lines, spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 15.0 software programs.

GPR data were acquired across select EM anomalies on April 3, 2019, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

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

Geophysical Surveys for Underground Storage Tanks
on NCDOT Projects

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

## DISCUSSION OF RESULTS

### *Discussion of EM Results*

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

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

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

| Metallic Anomaly # | Cause of Anomaly | Investigated with GPR |
|---|---|---|
| 1 | Surface Metal | |
| 2 | Supply Well | |
| 3 | Building/Surface Debris/Reinforced Concrete | ☑ |
| 4 | Bollards | |
| 5 | Water Meter | |
| 6 | Metal Poles | |
| 7 | Signs | |

All of the EM anomalies were directly attributed to visible cultural features at the ground surface, including metal debris, a supply well, a building, reinforced concrete, bollards, a water meter, metal poles, and signs. EM Anomaly 3 was investigated with GPR to confirm that these surface features did not obscure any potential USTs and that there was reinforcement in the concrete slab.

*Discussion of GPR Results*

**Figure 3** presents the locations of the formal GPR transects performed at the property, as well as the transect images. A total of five formal GPR transects were performed at the site. GPR Transects 1-5 were performed across EM Anomaly 3. These transects confirmed the presence of reinforcement in the concrete slab. No evidence of any buried structures such as USTs was observed.

Collectively, the geophysical data did not record any evidence of metallic USTs within the survey area at Parcel 1. **Figure 4** provides an overlay of the geophysical metal detection results onto the NCDOT MicroStation engineering plans for reference.

## SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 1 in Walnut Cove, 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.
- All of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- GPR was performed across EM anomalies associated with the building and suspected reinforced concrete to verify that the metallic interference associated with these features did not obscure any potential USTs. GPR did not record any evidence of significant buried structures.
- Collectively, the geophysical data did not record any evidence of USTs within the geophysical survey area at Parcel 1.

## LIMITATIONS

Geophysical surveys have been performed and this report was 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 the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.

# APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA


View of Survey Area
(Facing Approximately Southwest)

View of Survey Area
(Facing Approximately Southwest)

N

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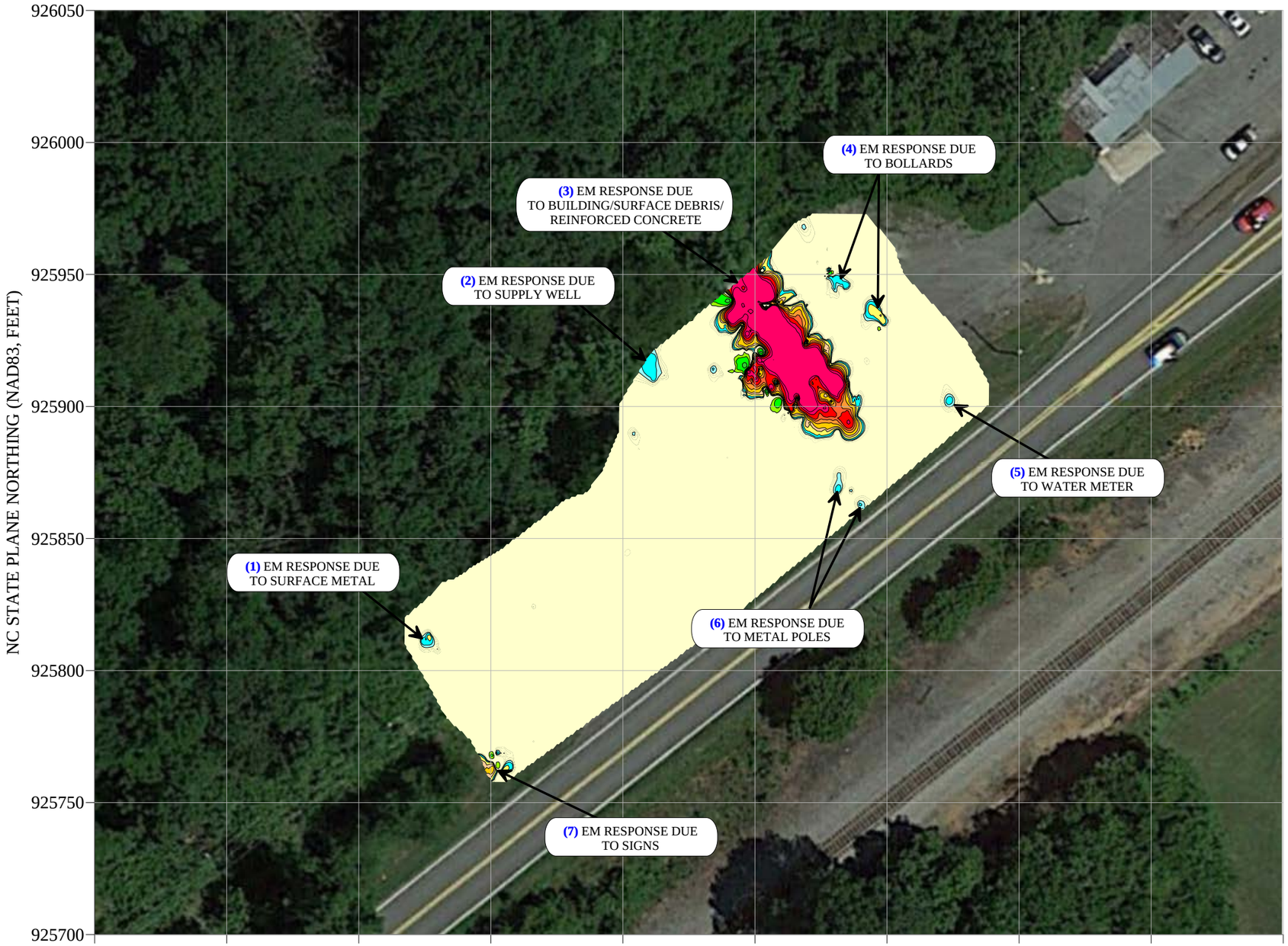
| | | | |
|---|---|---|---|
| PROJECT: PARCEL 1<br>WALNUT COVE, NORTH CAROLINA<br>NCDOT PROJECT R-5768 | TITLE: PARCEL 1 - GEOPHYSICAL SURVEY<br>BOUNDARIES AND SITE PHOTOGRAPHS | DATE: 4/4/2019<br>PYRAMID PROJECT #: 2019-074 | CLIENT: NCDOT<br>**FIGURE 1** |

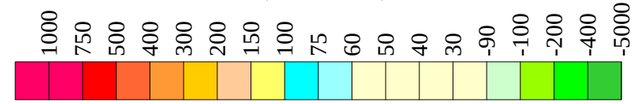
# EM61 METAL DETECTION RESULTS




**NO EVIDENCE OF METALLIC USTs WAS OBSERVED.**

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on April 3, 2019, using a Geonics EM61 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on April 3, 2019.

EM61 Metal Detection Response (millivolts)

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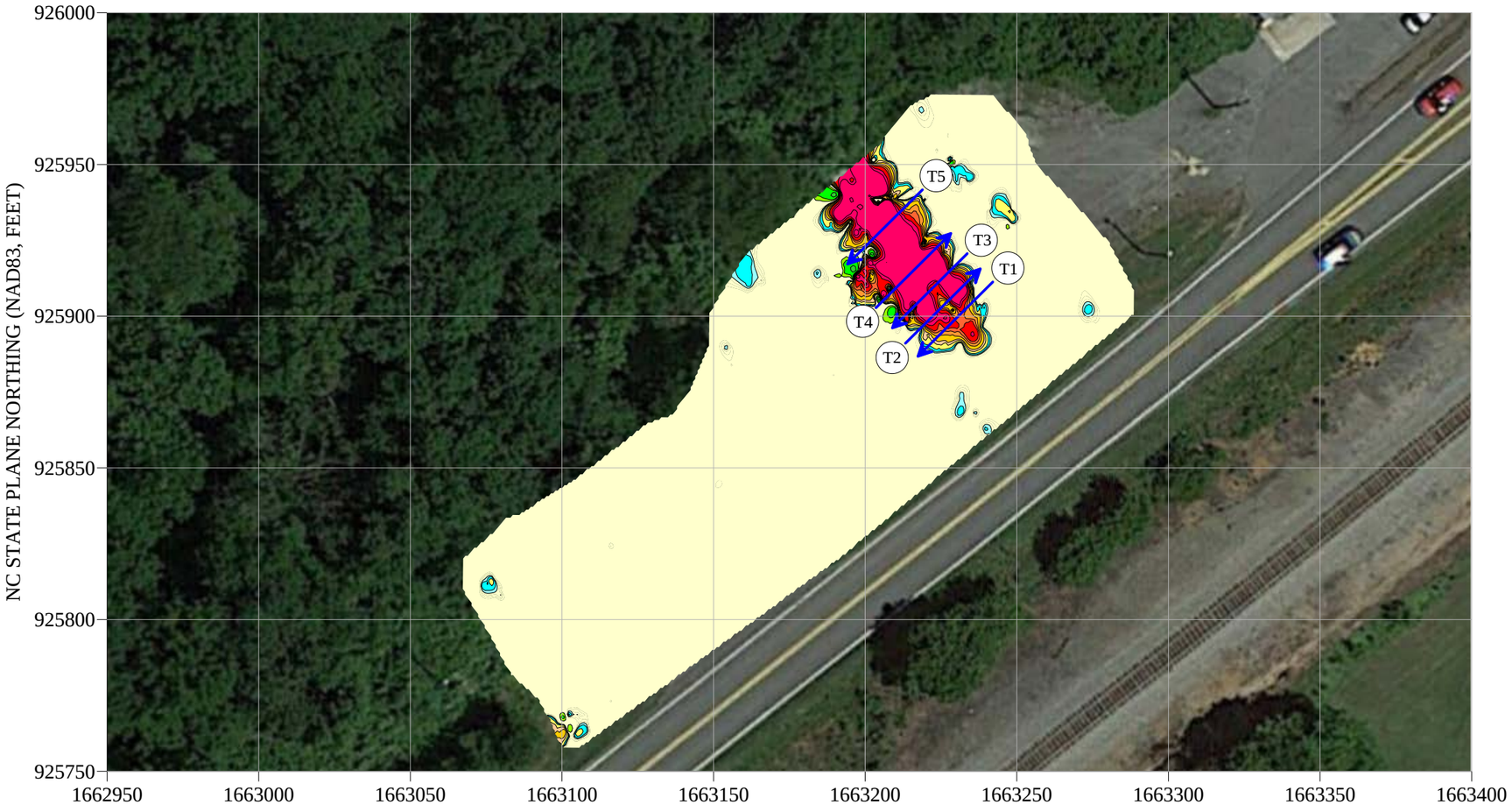
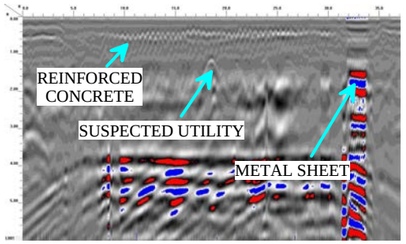
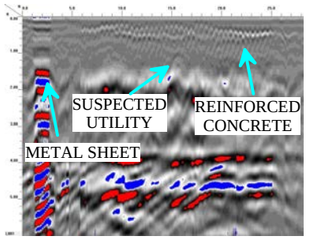
| | | | |
|---|---|---|---|
| PROJECT: PARCEL 1<br>WALNUT COVE, NORTH CAROLINA<br>NCDOT PROJECT R-5768 | TITLE: PARCEL 1 - EM61 METAL DETECTION CONTOUR MAP | DATE: 4/4/2019 | CLIENT: NCDOT |
| | | PYRAMID PROJECT #: 2019-074 | **FIGURE 2** |

# GPR TRANSECT LOCATIONS

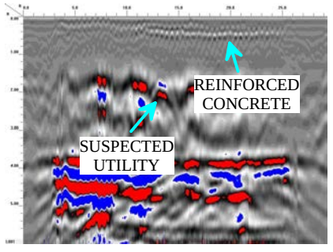


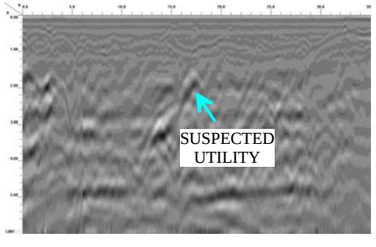

GPR TRANSECT 3 (T3)



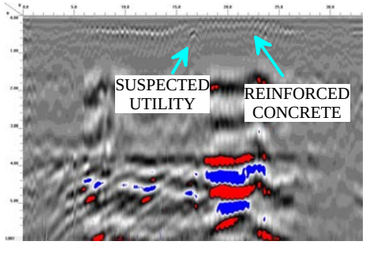

GPR TRANSECT 4 (T4)




GPR TRANSECT 5 (T5)




GPR TRANSECT 1 (T1)




GPR TRANSECT 2 (T2)

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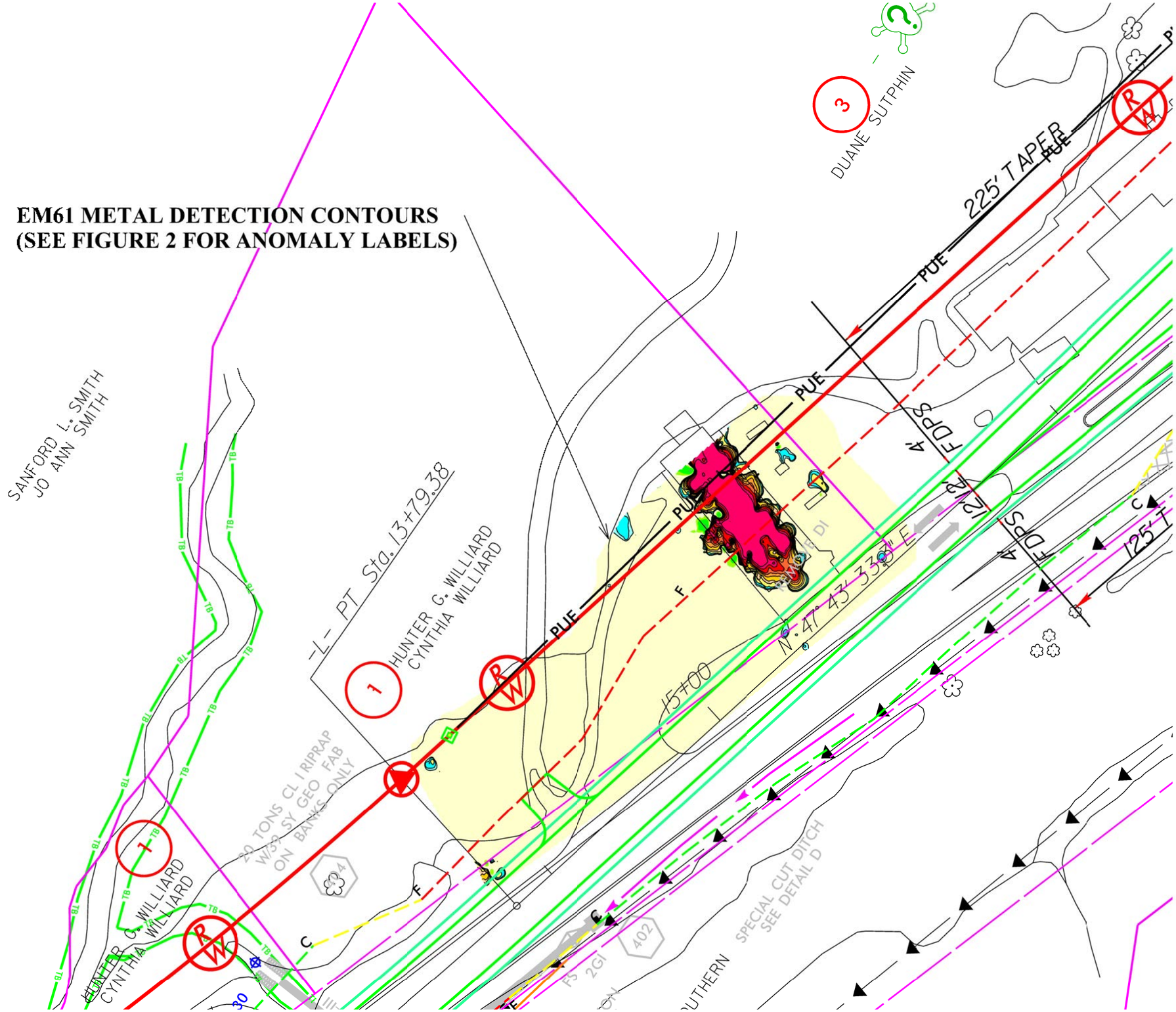
|---|---|---|---|---|
| PROJECT | PARCEL 1<br>WALNUT COVE, NORTH CAROLINA<br>NCDOT PROJECT U-5768 | TITLE | PARCEL 1 - GPR TRANSECT LOCATIONS AND IMAGES | DATE 4/4/2019 |
| | | | | CLIENT NCDOT |
| | | | | PYRAMID PROJECT #: 2019-074 |
| | | | | **FIGURE 3** |

# EM61 METAL DETECTION CONTOURS
# (SEE FIGURE 2 FOR ANOMALY LABELS)




## LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PUE — PROPOSED PERMANENT UTILITY EASEMENT
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE

MILLIVOLTS (mV)

1000 750 500 400 300 200 150 100 75 60 50 40 30 -90 -100 -200 -400 -5000

0 25 50
FEET

N

TITLE
OVERLAY OF METAL DETECTION RESULTS
ON NCDOT ENGINEERING PLANS

PROJECT
PARCEL 1
WALNUT COVE, NORTH CAROLINA
NCDOT PROJECT R-5768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License # C1251 Eng. / #C257 Geology


DATE: 04-03-2019 | REVISION NO. 0

PYRAMID PROJECT NO. 2019-074 | FIGURE NO. 4

# APPENDIX C

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-1 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, SW portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **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 |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | Brownish gray, sandy-silty-clay (CL), moist, possible oily odor | PID= 160 PPM |
| 2-4 | Brownish gray, sandy-silty-clay (CL), moist, possible oily odor | PID= 400 PPM |
| 4-6 | Brown to tan, sandy-silty-clay (CL), firm to hard, moist, no odor | PID= 395 PPM |
| 6-8 | Brown to tan, sandy-silty-clay (CL), firm to hard, moist, no odor | PID= 150 PPM |
| 8-10 | Brown to tan, sandy-silty-clay (CL), firm to hard, moist, no odor | PID= 3.0 PPM |
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| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-2 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, Center portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Geoprobe | **SAMPLE METHOD:** | Macro-core |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 8 feet | **CASING DEPTH:** | N/A |

| **DEPTH (ft.)** | **VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.** | **OVA RESULTS PERCENT RECOVERY BLOW COUNTS** |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | Brownish gray, clayey-sandy-silt (ML), moist, firm, slight oily odor | PID= 86 PPM |
| 2-4 | Brown, sandy-clayey-silt (ML), firm, moist, no odor | PID= 40 PPM |
| 4-6 | Brown, sandy-clayey-silt (ML), firm, moist, no odor | PID= 36 PPM |
| 6-8 | Brown, saprolite, silty-sand (SM), moist, no odor | PID= 50 PPM |
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| | Geoprobe refusal at 8 feet. | |
| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-3 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, Center portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Geoprobe | **SAMPLE METHOD:** | Macro-core |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 8 feet | **CASING DEPTH:** | N/A |

| DEPTH (ft.) | VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC. | OVA RESULTS PERCENT RECOVERY BLOW COUNTS |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | Brownish gray, clayey-sandy-silt (ML), moist, no odor | PID= 18 PPM |
| 2-4 | Brown, sandy-clayey-silt (ML), firm, moist, no odor | PID= 3.4 PPM |
| 4-6 | Brown, sandy-clayey-silt (ML), firm, moist, no odor | PID= 2.0 PPM |
| 6-8 | Brown, saprolite, silty-sandy-clay (CL), firm to hard, moist, no odor | PID= 3.1 PPM |
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| | Geoprobe refusal at 8 feet. | |
| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-4 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, South portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Geoprobe | **SAMPLE METHOD:** | Macro-core |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 4 feet | **CASING DEPTH:** | N/A |

| DEPTH (ft.) | VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC. | OVA RESULTS PERCENT RECOVERY BLOW COUNTS |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | Brown, sandy-clayey-silt (ML), moist, no odor | PID= 200 PPM |
| 2-4 | Brown, sandy-clayey-silt (ML), moist, no odor | PID= 100 PPM |
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| | Geoprobe refusal at 8 feet. | |
| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-5 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, NW portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Geoprobe | **SAMPLE METHOD:** | Macro-core |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 8 feet | **CASING DEPTH:** | N/A |

| DEPTH (ft.) | VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC. | OVA RESULTS PERCENT RECOVERY BLOW COUNTS |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | Gray, sandy-clayey-silt (ML), moist, possible oily odor | PID= 220 PPM |
| 2-4 | Brown, sandy-silty-clay (CL), firm, moist, no odor | PID= 125 PPM |
| 4-6 | Brown, sandy-silty-clay (CL), firm, moist, no odor | PID= 5.0 PPM |
| 6-8 | Brown, sandy-silty-clay (CL), firm, moist, no odor | PID= 70 PPM |
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| | Geoprobe refusal at 8 feet. | |
| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-6 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, NW portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Geoprobe | **SAMPLE METHOD:** | Macro-core |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 7 feet | **CASING DEPTH:** | N/A |

| DEPTH (ft.) | VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC. | OVA RESULTS PERCENT RECOVERY BLOW COUNTS |
|---|---|---|
| | Surface - Asphalt | Core Sample Depths |
| 0-2 | brownish gray to gray, sandy-clayey-silt (ML), moist, possible oily odor | PID= 270 PPM |
| 2-4 | brownish gray to gray, sandy-clayey-silt (ML), moist, possible oily odor | PID= 395 PPM |
| 4-6 | Brown, sandy-clayey-silt (ML), moist, no odor | PID= 50 PPM |
| 6-7 | Brown, sandy-clayey-silt (ML), moist, no odor | PID= 35 PPM |
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| | Geoprobe refusal at 7 feet. | |
| | No water in boring. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# Pyramid Environmental & Engineering, P.C.

## FIELD DRILLING RECORD

| | | | |
|---|---|---|---|
| **PROJECT NAME: PROJECT NUMBER:** | NC DOT R-5768, Parcel 001, Walnut Cove, NC (2019-074) | **BORING/WELL NO:** | 1-7 |
| **SITE LOCATION:** | Stokes County, NC | **BORING/WELL LOCATION:** | Parcel 001, SW portion |
| **START DATE:** | 04/23/19 | **COMPLETED:** | 04/23/19 |
| **GEOLOGIST:** | T. Leatherman | **DRILLER:** | Draper Aden |
| **DRILL METHOD:** | Hand-Auger | **SAMPLE METHOD:** | Hand-Auger Bucket |
| **BORING DIA:** | 2-inch | **CASING DIA:** | N/A |
| **TOTAL DEPTH:** | 4 feet | **CASING DEPTH:** | N/A |

| **DEPTH (ft.)** | **VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.** | **OVA RESULTS PERCENT RECOVERY BLOW COUNTS** |
|---|---|---|
| | Surface - grass and dirt | Core Sample Depths |
| 0-2 | Dark brown to black, silty-sand with some rocks (SM), naturally organic | PID= 11 PPM |
| | rich soil, moist, no odor | |
| 2-4 | Brown, silty-sand (SM), moist, no odor | PID= 5.0 PPM |
| | | |
| | Hand-auger refusal at 4 feet. | |
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## 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 _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

# APPENDIX D

QED REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS QROS

# Hydrocarbon Analysis Results

**Client:** PYRAMID ENVIRONMENTAL
**Address:** 503 INDUSTRIAL AVENUE
GREENSBORO NC 27406

**Contact:** TIM LEATHERMAN

**Project:** STOKES PARCEL 1 2019-074

**Samples taken** Tuesday, April 23, 2019
**Samples extracted** Tuesday, April 23, 2019
**Samples analysed** Thursday, April 25, 2019

**Operator** DAVIS MARTINEC

F03640

| Matrix | Sample ID | Dilution used | BTEX (C6 - C9) | GRO (C5 - C10) | DRO (C10 - C35) | TPH (C5 - C35) | Total Aromatics (C10-C35) | 16 EPA PAHs | BaP | Ratios | | | HC Fingerprint Match |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | % light | % mid | % heavy | |
| s | 1-1-2-4 | 26.9 | <0.67 | <0.67 | 13 | 13 | 7.3 | 0.27 | <0.027 | 0 | 78 | 22 | Deg Fuel 89.9%,(FCM) |
| s | 1-1-4-6 | 29.4 | <0.73 | <0.73 | 10.3 | 10.3 | 4.5 | 0.44 | <0.029 | 0 | 75.8 | 24.2 | Road Tar 73.2%,(FCM) |
| s | 1-2-0-2 | 22.5 | <0.56 | 3.7 | 2.8 | 6.5 | 2.5 | <0.18 | <0.023 | 80.5 | 14.6 | 4.9 | Deg.Fuel 82.6%,(FCM) |
| s | 1-3-0-2 | 26.9 | <0.67 | 11.2 | 1.9 | 13.1 | 0.92 | <0.22 | <0.027 | 95.1 | 3.5 | 1.4 | Deg.PHC 53.4%,(FCM) |
| s | 1-3-2-4 | 13.4 | <0.33 | <0.33 | 0.6 | 0.6 | 0.16 | <0.11 | <0.013 | 0 | 60.8 | 39.2 | Deg Fuel 71.8%,(FCM) |
| s | 1-4-0-2 | 11.9 | <0.3 | <0.3 | <0.3 | 0.21 | 0.21 | <0.1 | <0.012 | 0 | 46.4 | 53.6 | Residual HC |
| s | 1-5-0-2 | 27.6 | <0.69 | <0.69 | 8.2 | 8.2 | 4.1 | <0.22 | <0.028 | 0 | 77 | 23 | Deg.PHC 75%,(FCM) |
| s | 1-6-2-4 | 10.3 | <0.26 | <0.26 | 0.63 | 0.63 | 0.34 | <0.08 | <0.01 | 0 | 83.6 | 16.4 | Deg Fuel 68.4%,(FCM) |
| s | 1-7-2-3 | 26.9 | <0.67 | <0.67 | 0.67 | 0.67 | 0.38 | <0.22 | <0.027 | 0 | 63.8 | 36.2 | Residual HC |
| | | | | | | | | | | | | | |

Initial Calibrator QC check OK

Final FCM QC Check OK 97.6 %

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

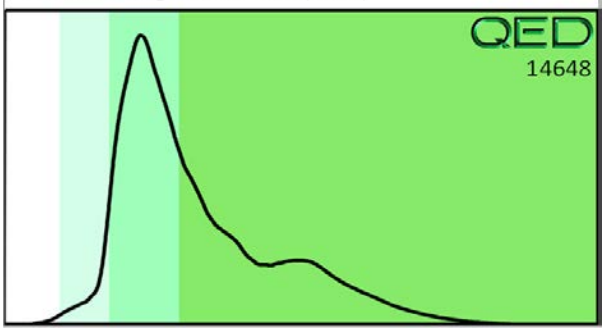
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

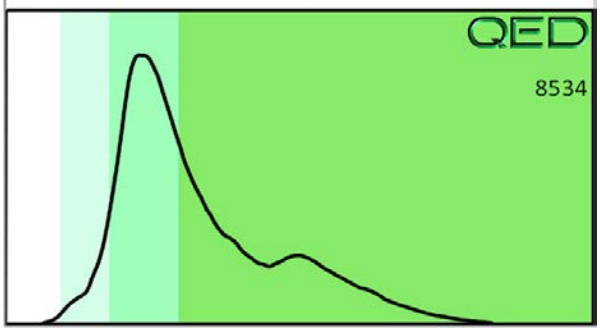
QED Hydrocarbon Fingerprints

Project: STOKES PARCEL 1 2019-074 ##################

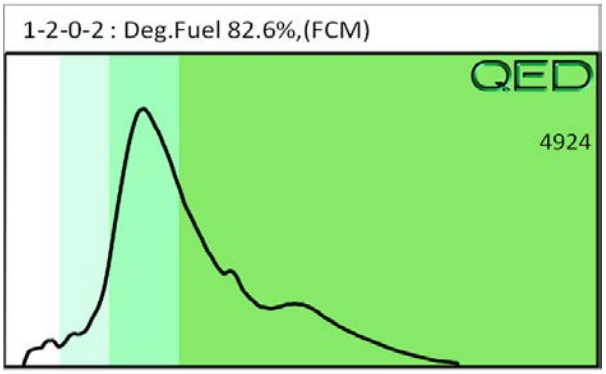
1-1-2-4 : Deg Fuel 89.9%,(FCM)



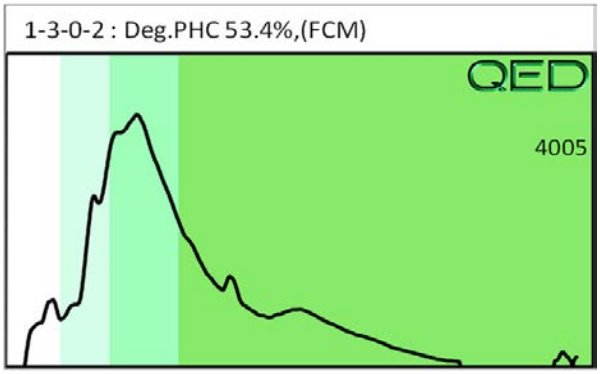

1-1-4-6 : Road Tar 73.2%,(FCM)



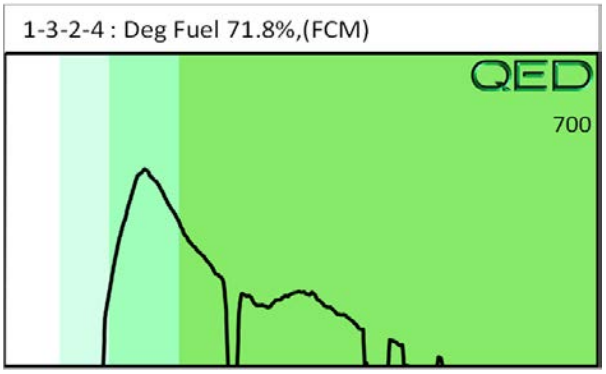

1-2-0-2 : Deg.Fuel 82.6%,(FCM)



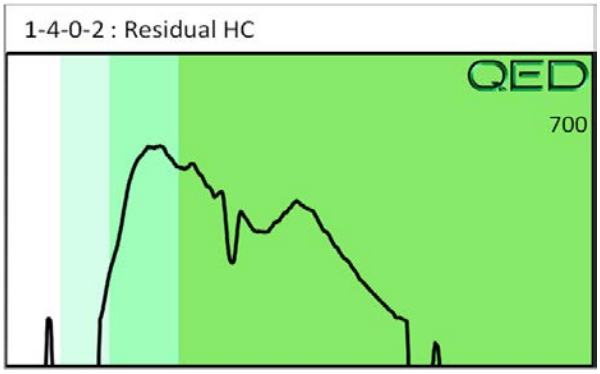

1-3-0-2 : Deg.PHC 53.4%,(FCM)



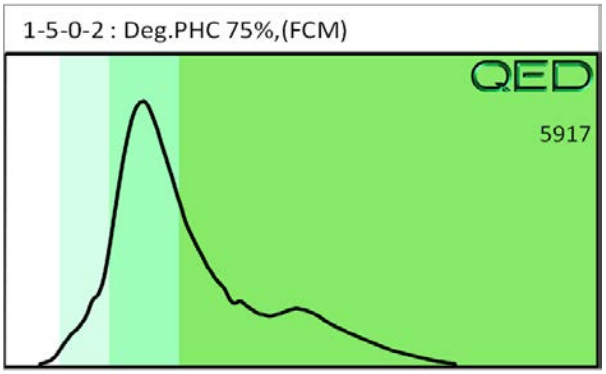

1-3-2-4 : Deg Fuel 71.8%,(FCM)



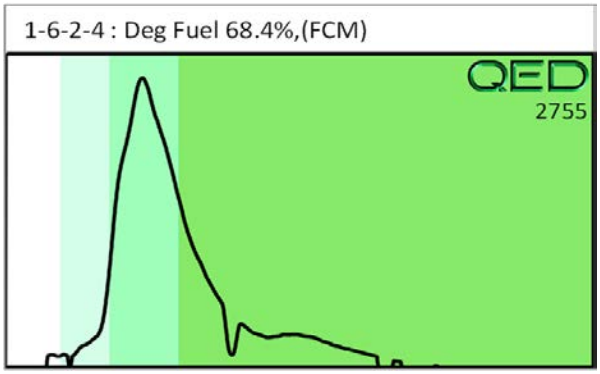

1-4-0-2 : Residual HC



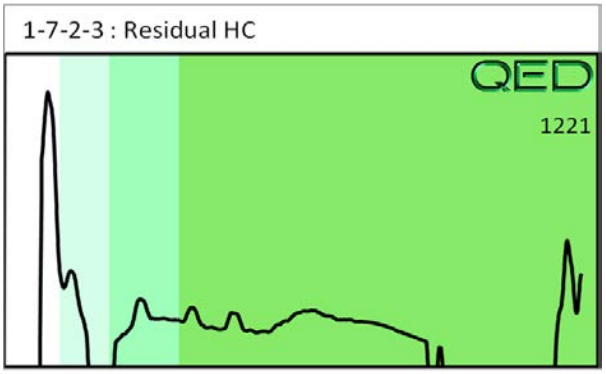

1-5-0-2 : Deg.PHC 75%,(FCM)




1-6-2-4 : Deg Fuel 68.4%,(FCM)




1-7-2-3 : Residual HC



# APPENDIX E

**FIELD PERSONNEL LOG**

**PROJECT NAME**: NCDOT R-5768 Phase II **PROJECT NO.:** 2019-074

**Name:** Leatherman, Heenan **Dates:** 4/3/19 & 4/4/19

**TASKS PERFORMED: Site reconnaissance, geophysical surveys, utility locating**

*T. Leatherman, J. Heenan*
Mobilize to site. Site, recon, geophysics, utility locating.
Average daily time: ~8:00 AM - 5:00PM

**FIELD PERSONNEL LOG**

**PROJECT NAME**: NCDOT R-5768 Phase II **PROJECT NO.:** 2019-074

**Name:** Leatherman **Dates:** 4/23/19 & 4/24/19

**TASKS PERFORMED: Soil Sampling**

*T. Leatherman*
Mobilize to site. soil sampling supervision, collection and analysis prep
Average daily time: ~8:00 AM - 5:00PM