

# PRELIMINARY SITE ASSESSMENT

SR 1100 (BRAWLEY SCHOOL ROAD) IMPROVEMENTS  
TIP NO. R-3833C, WBS NO. 34554.2.4

NCDOT PARCEL NO. 76

OWNER: GEORGE HOWARD & LORRA LEE HOLSHOUSER  
2869 CHARLOTTE HIGHWAY  
MOORESVILLE, IREDELL COUNTY, NORTH CAROLINA



PREPARED FOR:  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
C/O STANTEC  
801 JONES FRANKLIN ROAD SUITE 300  
RALEIGH NORTH CAROLINA 27606-3394

PREPARED BY:  
FALCON ENGINEERING, INC.  
1210 TRINITY ROAD, SUITE 110  
CARY, NC 27513

PROJECT NUMBER: G18063.02  
OCTOBER 27, 2019





October 27, 2019

Mr. A. Dean Sarvis PE  
Stantec  
801 Jones Franklin Road, Suite 300  
Raleigh, North Carolina 27606-3394

Re: **Preliminary Site Assessment**  
SR 1100 (Brawley School Road) Improvements  
TIP No. R-3833C, WBS No. 34554.2.4  
Parcel No. 76  
Owner: George Howard & Lorra Lee Holshouser  
2869 Charlotte Highway  
Mooresville, Iredell County, North Carolina

Dear Mr. Sarvis:

Falcon is pleased to present the following Preliminary Site Assessment in support of the above-mentioned Project. Specifically, Falcon sampled soil in proximity to the project limits on this parcel in general accordance with the approved scope of work. Soils requiring remediation or special handling during construction were not identified. However, one suspected septic tank within the survey area was identified at Parcel No. 76

Falcon recommends if drums, USTs, above ground storage tanks (ASTs), petroleum odors or sheen are observed during any excavation associated with any property involved in the project that all work in the vicinity stop until further assessment takes place. Further assessment can include but is not limited to; sampling the soil and groundwater, excavation, and proper handling and disposal of contaminated soils and groundwater.

Please review this report and advise us if you have any questions or concerns. We appreciate this opportunity to provide services to you and look forward to partnering with you on future projects. If you have any questions, please give Falcon a call at (919) 871-0800.

Sincerely,

**FALCON ENGINEERING, INC.**

A handwritten signature in blue ink that reads "Christopher J. Burkhardt".

Christopher J. Burkhardt  
Environmental Services Manager

A handwritten signature in blue ink that reads "Jeremy R. Hamm".

Jeremy R. Hamm, PE  
Geotechnical Services Manager

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## **SECTION 1: INTRODUCTION**

### **1.1 DESCRIPTION**

Falcon Engineering, Inc. (Falcon) has completed a Preliminary Site Assessment of NCDOT TIP No. R-3833C Parcel No. 76. Parcel No. 76 is addressed as 2869 Charlotte Highway, Mooresville, Iredell County, North Carolina. NCDOT is proposing to improve SR 1100 (Brawley School Road) from SR 1116 (Falbert Road) to 1,000' east of US 21, including improvements to a number of intersecting roads and driveways throughout this corridor. The limits of the assessment are between the existing edge of NCDOT maintained pavement (within the existing NCDOT ROW) where accessible, and the proposed NCDOT ROW and/or easement (whichever boundary represents the largest area). Boring locations were placed in the vicinity of proposed excavations for drainage features, utilities, and roadway/ditch cuts to determine if soils requiring remediation or special handling were present where excavation is planned to take place.

### **1.2 SCOPE OF WORK**

Falcon's scope of work included coordination of; public and private utility location near the proposed borings, geophysical surveys, collecting soil samples with a geoprobe, and laboratory analysis. Samples were analyzed for petroleum via UVF technology.

## **SECTION 2: HISTORY**

### **2.1 PARCEL USAGE**

Falcon performed a Phase I Environmental Site Assessment (ESA) for R-3833C under Project No. G18063.01 dated March 2019. The ESA identified this parcel as a Recognized Environmental Condition (REC) based on the parcel's history as Warren S Auto Service. The facility is listed in City Directories at this address in 2000; however, the date of construction for the building is 1955. This commercial building is currently vacant. Garage doors lead inside the building indicating auto repair work might have taken place inside. Boards covered the windows blocking interior views. This facility is considered a REC based on its history and the potential for an unreported release.

### **2.2 FACILITY IDENTIFICATION NUMBER**

A Facility Identification Number was not identified for this parcel.

### **2.3 GROUNDWATER INCIDENT NUMBER**

A Groundwater Incident Number was not identified for this parcel.

## **SECTION 3: SITE OBSERVATIONS**

### **3.1 GROUNDWATER MONITORING WELLS**

Groundwater monitoring wells (MWs) were not observed on this parcel.

### **3.2 ACTIVE USTS**

Active USTs were not observed within the project limits or registered at this parcel.

### **3.3 FEATURES APPARENT BEYOND ROW/EASEMENT**

USTs, monitoring wells, remediation systems, or hydraulic lifts were not observed within the project limits. However, access to the building was not available. Windows with unobstructed views of the interior were not observed. Therefore; USTs and hydraulic lifts on this parcel cannot be ruled out.

## SECTION 4: METHODOLOGY

### 4.1 GEOPHYSICS

Pyramid Geophysical Services (Pyramid) was subcontracted to perform a geophysical survey of the assessment area. The assessment area consists of the property frontage between the existing edge of NCDOT maintained pavement (within the existing NCDOT ROW) where accessible, and the proposed NCDOT ROW and/or easement (whichever boundary represents the largest area). The survey was used to locate private utility lines, as well as possible indications of USTs, and/or their pits.

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 georeferenced and can be overlain on aerial photographs and CADD drawings.

GPR data was acquired across select EM anomalies (where identified), using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Pyramid marked their findings on the surface with paint. 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 to obtain adequate coverage. A copy of the full Geophysical Report is included in the Attachments.

### 4.2 BORINGS

Regional Probing was subcontracted to advance soil borings using direct push technology. Regional Probing used a truck mounted Geoprobe® 5410 unit mounted on an off-road modified Ford F350 Diesel 4x4. The unit has auger-capabilities and is equipped with a GH-42 soil-probing hammer, with 21,700 pounds of down force and 28,900 pounds of retraction force. The unit has an on-board tank for decontaminating the geoprobe rods before advancing the probe at each sample location.

### 4.3 SAMPLE PROTOCOL

Prior to initiating sample collection Falcon contacted NC One Call and requested public utility locations be marked around the proposed sample locations. Sampling was in general accordance with the NC Department of Environmental Quality (DEQ) Division of Waste Management's (DWM) "Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement for UST Releases" (March 1, 2007 Version Change 9 – February 1, 2019) guidance document. Sampling strategy was derived based upon the project scope and objectives as outlined above. Red Lab, LLC was selected to perform the UVF laboratory analytical analysis. Appropriate sterile containers were received by Falcon from Red Lab prior to beginning the fieldwork. The containers were labeled appropriately.



A Minirae 3000 photoionization detector (PID) was used to field screen samples for volatile organics to determine if a release had occurred. The instrument was calibrated per manufacturer instructions prior to use. Falcon staff bagged composite soil samples of each boring in approximately two-foot sections. Representative samples were placed in a sealed plastic bag for approximately 10 minutes to allow soil hydrocarbons to reach equilibrium within the headspace prior to scanning with the PID. One sample per boring was collected from the depth of the proposed cut or from the section above the depth of cut with the highest PID reading.

To avoid cross contamination, a new unused pair of non-powdered nitrile gloves was worn while extracting each sample. Samples were placed in the appropriate laboratory provided containers. The labels on each container were then completed so that each provided the date and time of sampling, method of analysis, sample collector, preservative used and sampling location identification. Samples were placed in an ice filled cooler and transported to the lab. Appropriate chain-of-custody procedures, including the completion of necessary forms, were followed.

## SECTION 5: RESULTS

### 5.1 GEOPHYSICS

The geophysical investigation was performed on August 11 and 12, 2019 to investigate for the presence of unknown, metallic underground storage tanks (USTs) beneath the surface. The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of six EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. EM and GPR surveys identified a suspected septic tank just west of the building. The suspected septic tank (Suspected Septic Tank #1) measured approximately 9 feet long by 6.5 feet wide. Collectively, the geophysical data recorded evidence of one suspected septic tank within the survey area at Parcel No. 76.

### 5.2 SAMPLE DATA

Falcon and our subcontractor advanced three borings (B-19, B-20, and B-21) to the proposed excavation depth of the drainage features, utilities, or roadway/ditch cut being assessed. Groundwater was not observed. Please see the Boring Location Plan in the attachments for a visual depiction of the boring locations. The coordinates (latitude and longitude) that correspond to the boring locations are shown below in Table No. 1 Boring Coordinates.

TABLE NO. 1 BORING COORDINATES

Boring	Latitude	Longitude
B-19	35.5765764	-80.8413032
B-20	35.5765401	-80.8414673
B-21	35.5764401	-80.8415278

The PID screening results are presented in Table No. 2 PID Readings. Borings were field screened with a PID for evidence of volatile organics in sections as indicated in Table No. 2. Falcon selected soil samples based on the field screening results and the needs of the project. Red Lab analyzed the selected samples and their full analytical report is attached. The results of the laboratory analysis are summarized in Table No. 3 Summary of UVF Soil Sampling Results.

Petroleum hydrocarbons above State Action Levels were not detected in the samples.

TABLE NO. 2 PID READINGS

Boring	Depth BGS*	PID**
B-19	0-2	0.0
	2-4	<b>3.3</b>
B-20	0-2	0.0
	2-4	<b>0.0</b>
B-21	0-2	0.1
	2-4	<b>0.0</b>

\*BGS = Depth below ground surface in feet

\*\*PID readings are in parts per million

Samples shown in **bold** were selected for analysis

TABLE NO. 3 SUMMARY OF UVF SOIL SAMPLING RESULTS

Sample ID	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	
B-19	<0.33	1.2	0.33	1.53	0.3	<0.11	<0.013	91.6	5.5	2.9	Deg.PHC 77.1%,(FCM)
B-20	<0.45	<0.45	0.45	0.45	0.29	<0.14	<0.018	0	18.7	81.3	Deg Fuel 54.3%,(FCM)
B-21	<0.44	<0.44	0.78	0.78	0.48	<0.14	<0.018	0	69.3	30.7	Deg Fuel 71.9%,(FCM)

Results reported in mg/kg (milligrams per kilogram)

### 5.3 SAMPLE OBSERVATIONS

Obvious visual indications of a release (stained soils, odors, or oily sheen) were not observed. Table No. 4 Soil Observations lists visual soil observations of color and texture.

TABLE NO. 4 SOIL OBSERVATIONS

Sample ID	Depth	Color	Soil Type
B-19	0-2	Brown Red	Slightly Sandy Silt (A-4)
	2-4	Brown Red	Slightly Sandy Silt (A-4)
B-20	0-2	Brown Tan	Slightly Sandy Silt (A-4)
	2-4	Red Brown	Clayey Silt (A-5)
B-21	0-2	Red	Slightly Sandy Silt (A-4)
	2-4	Brown Red	Slightly Sandy Silt (A-4)

Depth is in feet below ground surface

#### 5.4 QUANTITIES CALCULATIONS

Soils requiring quantity calculations were not identified.

## SECTION 6: CONCLUSIONS

### 6.1 INTERPRETATION OF RESULTS

This Preliminary Site Assessment was performed to evaluate the soils in proximity to the project limits on this parcel for the presence of petroleum hydrocarbons. The findings are as follows:

- Soil sampling completed on the parcel did not identify contaminants in the soil sampled at levels requiring remediation.

### 6.2 GEOPHYSICS

Collectively, the geophysical data recorded evidence of one suspected septic tank within the survey area at Parcel No. 76.

### 6.3 SAMPLING

Sampling results did not identify contaminants in the soil which require remediation in the areas sampled. Based on past project experience, Falcon does not anticipate soil remediation or special handling and disposal will be required during construction on this parcel.

### 6.4 QUANTITIES

Soils requiring quantities calculations were not identified.

## **SECTION 7: RECOMMENDATIONS**

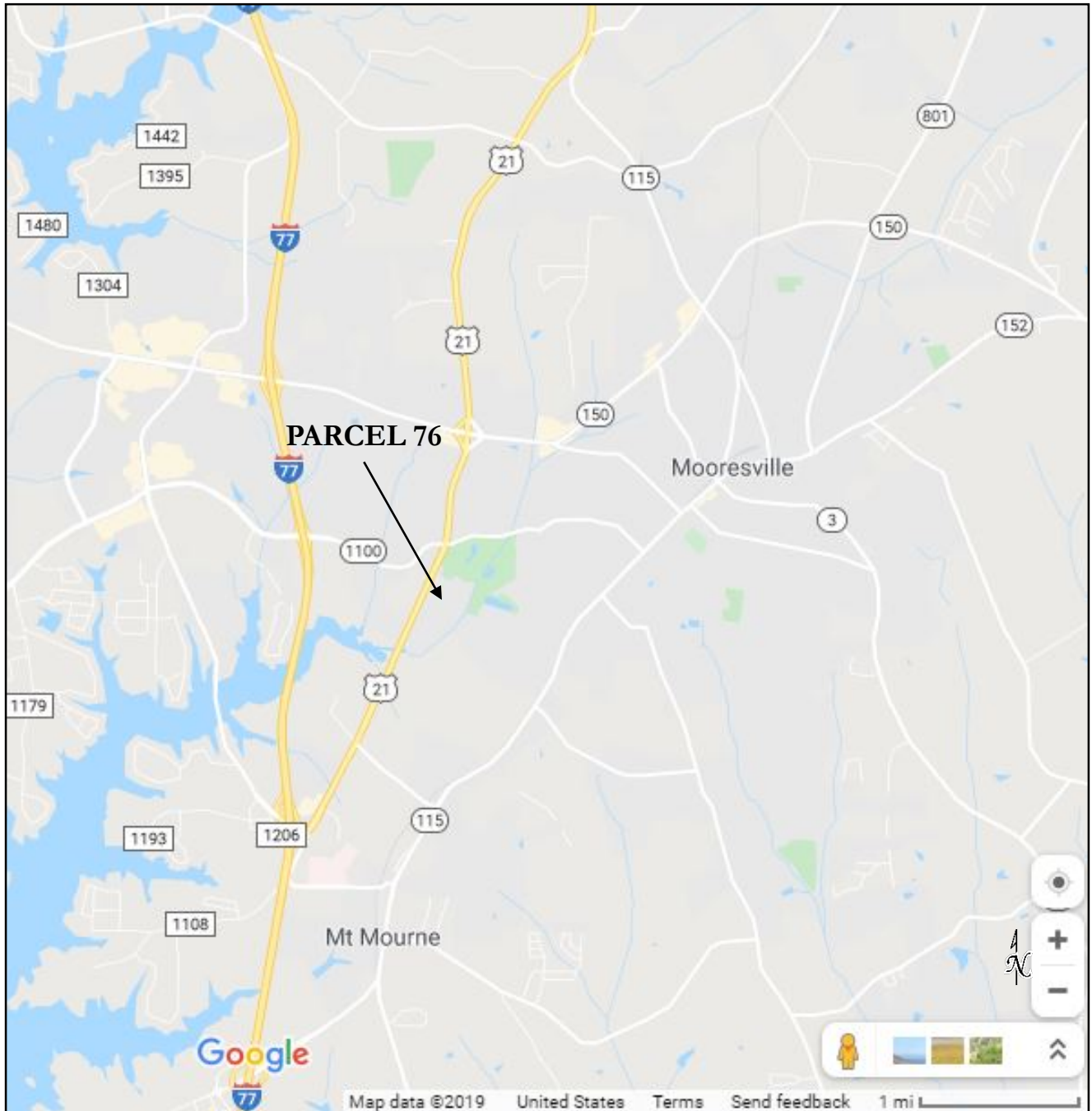
### **7.1 ADDITIONAL SAMPLING**

Contaminants above the Industrial / Commercial Soil Cleanup Levels were not identified; therefore, additional assessment is not warranted at this time. Falcon recommends if drums, USTs, above ground storage tanks (ASTs), petroleum odors or sheen are observed during any excavation associated with any property involved in the project that all work in the vicinity stop until further assessment takes place. Further assessment can include but is not limited to; sampling the soil and groundwater, excavation, and proper handling and disposal of contaminated soils and groundwater.

### **7.2 SPECIAL HANDLING OF IMPACTED SOIL**

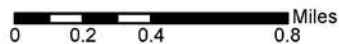
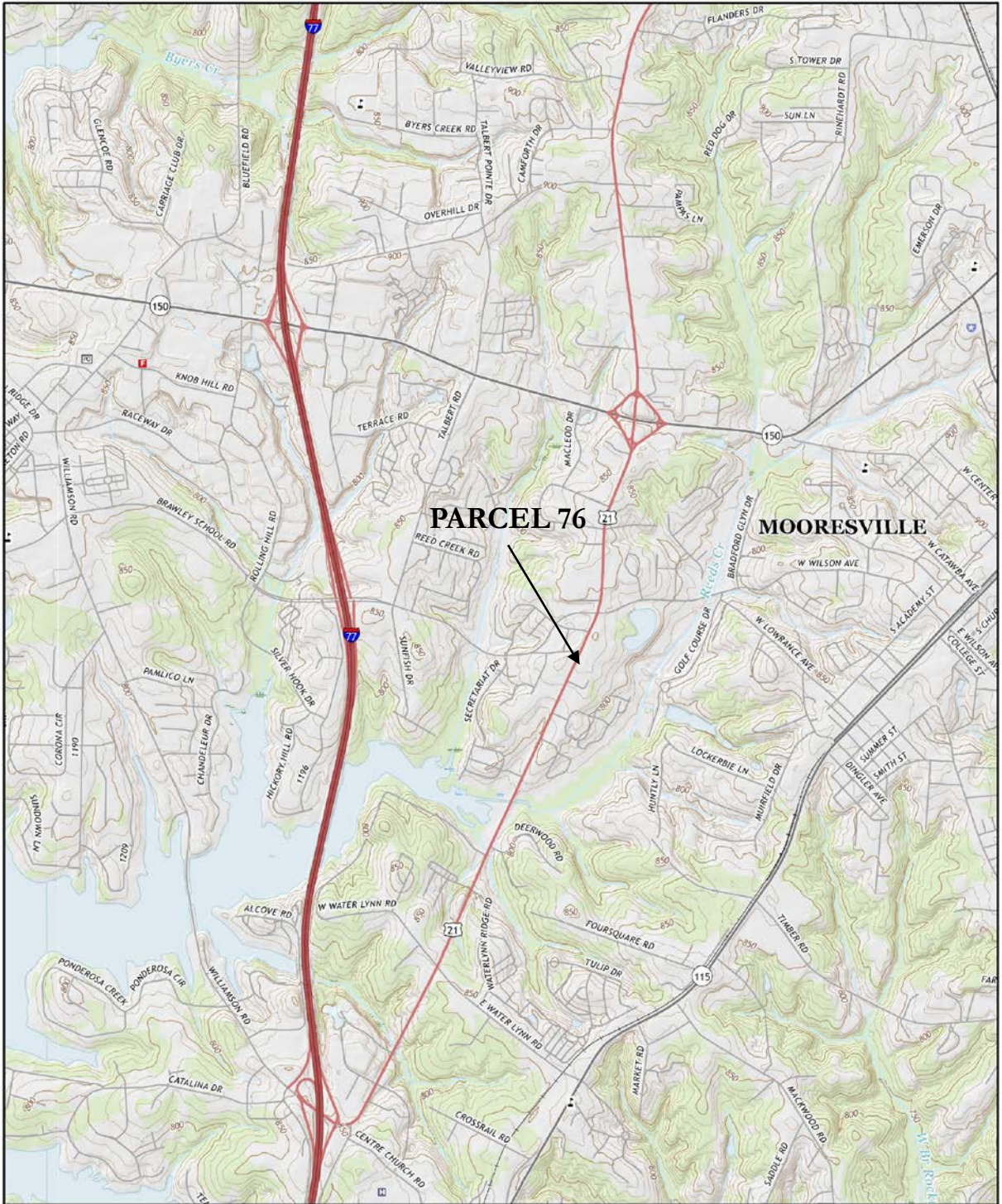
Soils requiring special handling were not identified. If suspect contaminated soils are encountered during construction Falcon and the NCDOT GeoEnvironmental Group should be contacted for proper handling instructions.

NCDOT R-3833C (SR 1100 Improvements)  
Preliminary Site Assessment  
Parcel 76 Vicinity Map



Project No.: G18063.02  
Date: October 2019  
Source: Google Maps

# NCDOT R-3833C (SR 1100 Improvements) Preliminary Site Assessment Parcel 76 Topographic Map

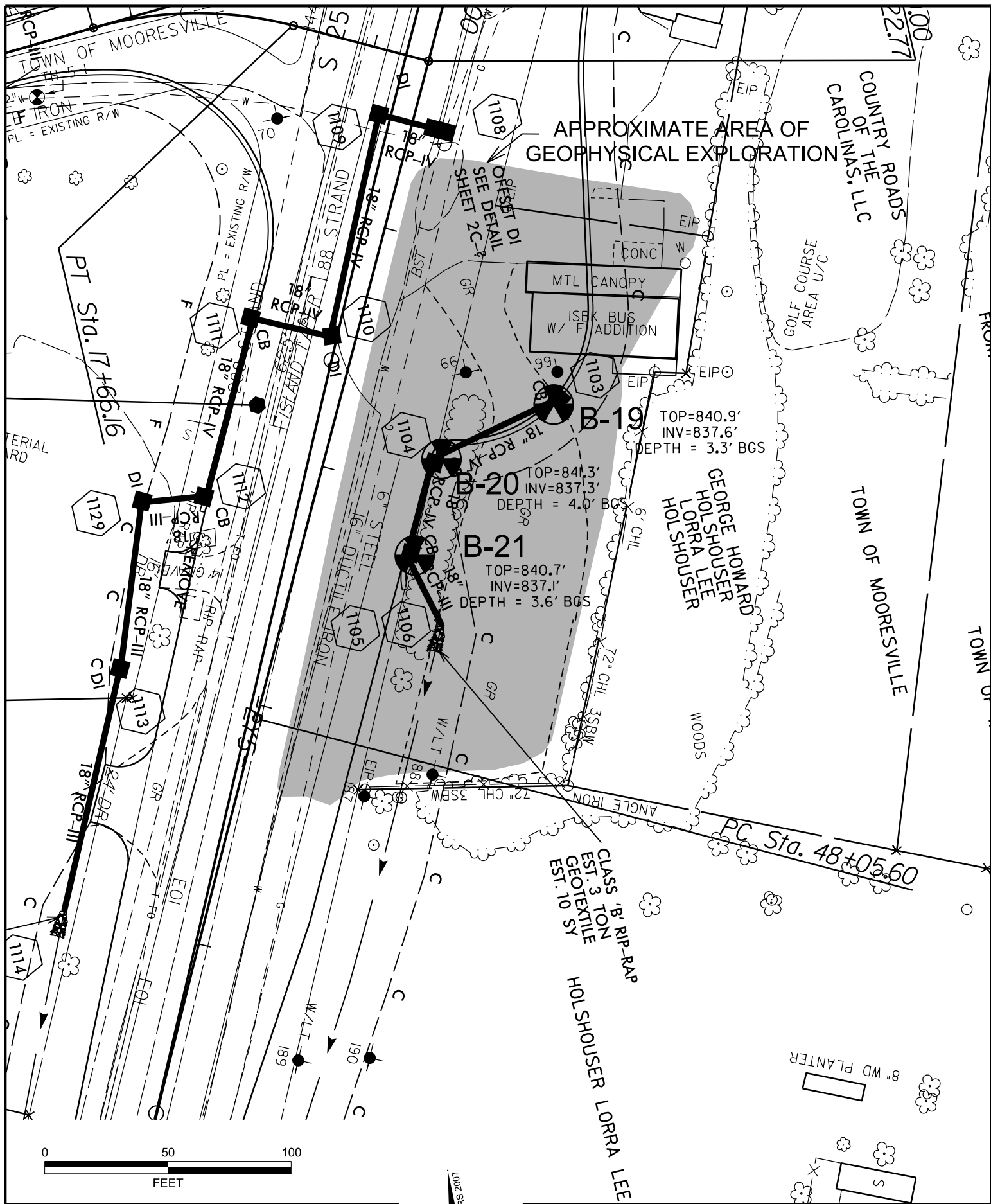


Project No.: G18063.02  
Date: October 2019  
Source: "Mooresville, NC" 2016 USGS Topographic Map









**NOTES:**  
 • BGS = BELOW GROUND SURFACE

**FALCON ENGINEERING**  
 FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NC 27607  
 PHONE: 919.871.0800

**BORING LOCATION PLAN**  
 BRAWLEY SCHOOL ROAD  
 PARCEL 76  
 GEORGE HOWARD & LORRA LEE HOLSHOUSER  
 IREDELL / NORTH CAROLINA  
 WBS NO.: 34554.2.4 | TIP NO.: R-3833C  
 FALCON PROJECT NO. G18063.02

NCDOT R-3833C (SR 1100 Improvements)  
Preliminary Site Assessment  
Parcel 76 Site Photographs



Photograph No. 1: General view of Boring B-19.



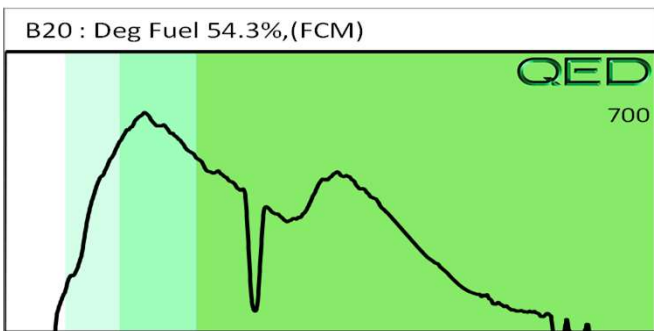
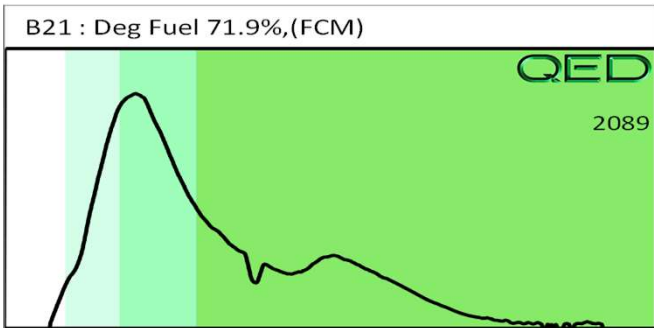
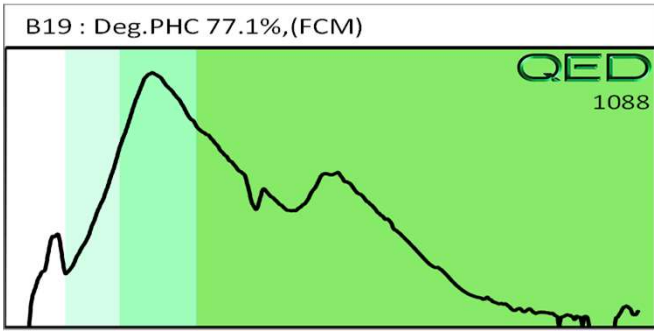
Photograph No. 2: General view of Boring B-20.

NCDOT R-3833C (SR 1100 Improvements)  
Preliminary Site Assessment  
Parcel 76 Site Photographs



Photograph No. 3: General view of Boring B-21.







PYRAMID GEOPHYSICAL SERVICES  
(PROJECT 2019-260)

# GEOPHYSICAL SURVEY

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## METALLIC UST INVESTIGATION: PARCEL 76 NCDOT PROJECT R-3833C

2869 CHARLOTTE HIGHWAY, MOORESVILLE, NC

September 6, 2019

Report prepared for: Christopher J. Burkhardt, PWS  
Falcon Engineers  
1210 Trinity Rd. #110  
Raleigh, NC 27607

Prepared by: \_\_\_\_\_

Eric C. Cross, P.G.  
NC License #2181

Reviewed by: \_\_\_\_\_

Douglas A. Canavello, P.G.  
NC License #1066

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406

P: 336.335.3174 F: 336.691.0648

C257: GEOLOGY C1251: ENGINEERING

**GEOPHYSICAL INVESTIGATION REPORT**  
**Parcel 76 - 2869 Charlotte Highway**  
**Mooreville, Iredell County, North Carolina**

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## 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

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**Project Description:** Pyramid Environmental conducted a geophysical investigation for Falcon Engineers at Parcel 76, located at 2869 Charlotte Highway in Mooresville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-3833C). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 11-12, 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 six EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. EM and GPR surveys identified a suspected septic tank just west of the building. The suspected septic tank (Suspected Septic Tank #1) was approximately 9 feet long by 6.5 feet wide. Collectively, the geophysical data recorded evidence of one suspected septic tank within the survey area at Parcel 76.

## INTRODUCTION

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Pyramid Environmental conducted a geophysical investigation for Falcon Engineers at Parcel 76, located at 2869 Charlotte Highway in Mooresville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-3833C). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 11-12, 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 vacant building surrounded by concrete, grass, and asphalt surfaces. As per discussions with the property owner, there is possibly a septic tank just west of the building. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

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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 August 12, 2019, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 controller equipped with a 350 MHz HS 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
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> 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.	<b>Possible UST</b> 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**

<b>Metallic Anomaly #</b>	<b>Cause of Anomaly</b>	<b>Investigated with GPR</b>
1	Utilities	
2	Known Buried Utility	
3	<b>Suspected Septic Tank</b>	✓
4	Building	
5	Metal Debris on the Surface	
6	Fence	

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including utilities, a building, metal debris on the surface, and a fence. EM Anomaly 2 was associated with a known buried utility. This was consistent with site plans provided by the NCDOT, the NC 811 markings on the site, and the other parcels surveyed for this project. As such, the utility was confirmed with reconnaissance GPR only. No formal transects were saved and the utility will not be discussed in the GPR results section. EM Anomaly 3 was associated with a suspected septic tank and was further investigated with GPR.

*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 two formal GPR transects were performed at the site.

GPR Transects 1-2 were performed across the suspected septic tank (EM Anomaly 3), just west of the building. These transects showed lateral reflectors, consistent with what is typically observed with septic tanks. The suspected septic tank (Suspected Septic Tank #1) was approximately 9 feet long by 6.5 feet wide. **Figure 4** provides the location and size of the suspected septic tank overlain on an aerial, along with ground-level photographs.

Collectively, the geophysical data recorded evidence of one suspected septic tank within the survey area at Parcel 76. **Figure 5** provides an overlay of the metal detection results

and the location of the suspected septic tank on the NCDOT MicroStation engineering plans for reference.

## **SUMMARY & CONCLUSIONS**

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Pyramid's evaluation of the EM61 and GPR data collected at Parcel 76 in Mooresville, North Carolina, provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- EM and GPR surveys identified a suspected septic tank just west of the building. The suspected septic tank (Suspected Septic Tank #1) was approximately 9 feet long by 6.5 feet wide.
- Collectively, the geophysical data recorded evidence of one suspected septic tank within the survey area at Parcel 76.

## **LIMITATIONS**

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Geophysical surveys have been performed and this report was prepared for Falcon Engineers 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 South)



View of Survey Area  
(Facing Approximately South)



503 INDUSTRIAL AVENUE  
GREENSBORO, NC 27406  
(336) 335-3174 (p) (336) 691-0648 (f)  
License # C1251 Eng. / License # C257 Geology

PROJECT  
**PARCEL 76**  
MOORESVILLE, NORTH CAROLINA  
NCDOT PROJECT R-3833C

TITLE  
**PARCEL 76 - GEOPHYSICAL**  
SURVEY BOUNDARIES AND SITE PHOTOGRAPHS

DATE  
9/3/2019  
PYRAMID  
PROJECT #:  
2019-260

CLIENT  
FALCON ENGINEERS  
**FIGURE 1**

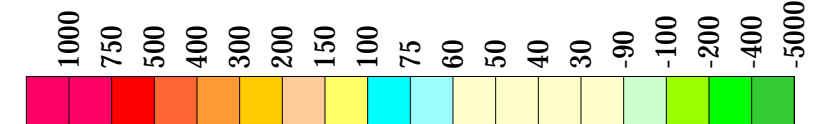
# EM61 METAL DETECTION RESULTS



## EVIDENCE OF ONE SUSPECTED SEPTIC TANK WAS OBSERVED.

The contour plot shows the bottom coil results of the EM61 instrument in millivolts (mV). The bottom coil presents a higher-amplitude response to any metal identified by the instrument. Differential data (difference between top and bottom coils) were not used for this parcel due to overhead electrical interference. The EM data were collected on August 11, 2019, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 controller equipped with a 350 MHz HS antenna on August 12, 2019.

### EM61 Metal Detection Response (millivolts)



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PROJECT  
**PARCEL 76**  
MOORESVILLE, NORTH CAROLINA  
NCDOT PROJECT R-3833C

TITLE  
**PARCEL 76 -**  
EM61 METAL DETECTION CONTOUR MAP

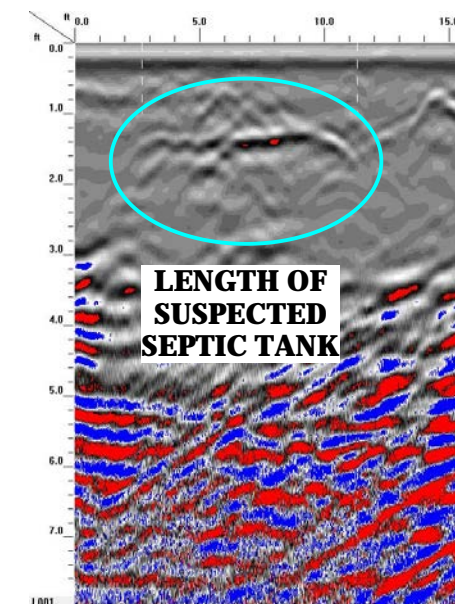
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2019-260

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**FIGURE 2**

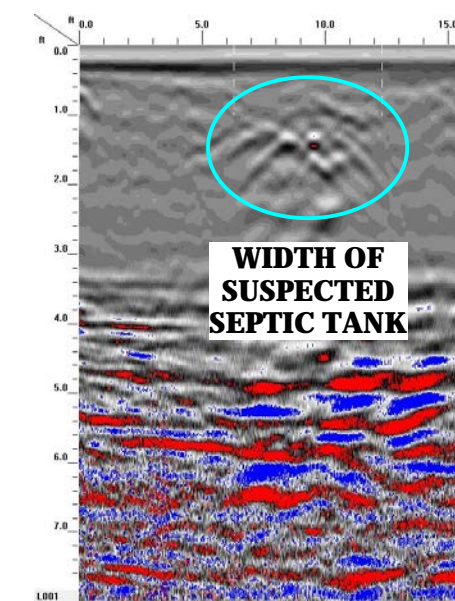




# LOCATIONS OF GPR TRANSECTS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



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PARCEL 76  
MOORESVILLE, NORTH CAROLINA  
NCDOT PROJECT R-3833C

TITLE  
PARCEL 76 -  
GPR TRANSECT LOCATIONS AND IMAGES

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**FIGURE 3**

## LOCATION OF ONE SUSPECTED SEPTIC TANK



View of One Suspected Septic Tank Facing Approximately East



View of One Suspected Septic Tank Facing Approximately North



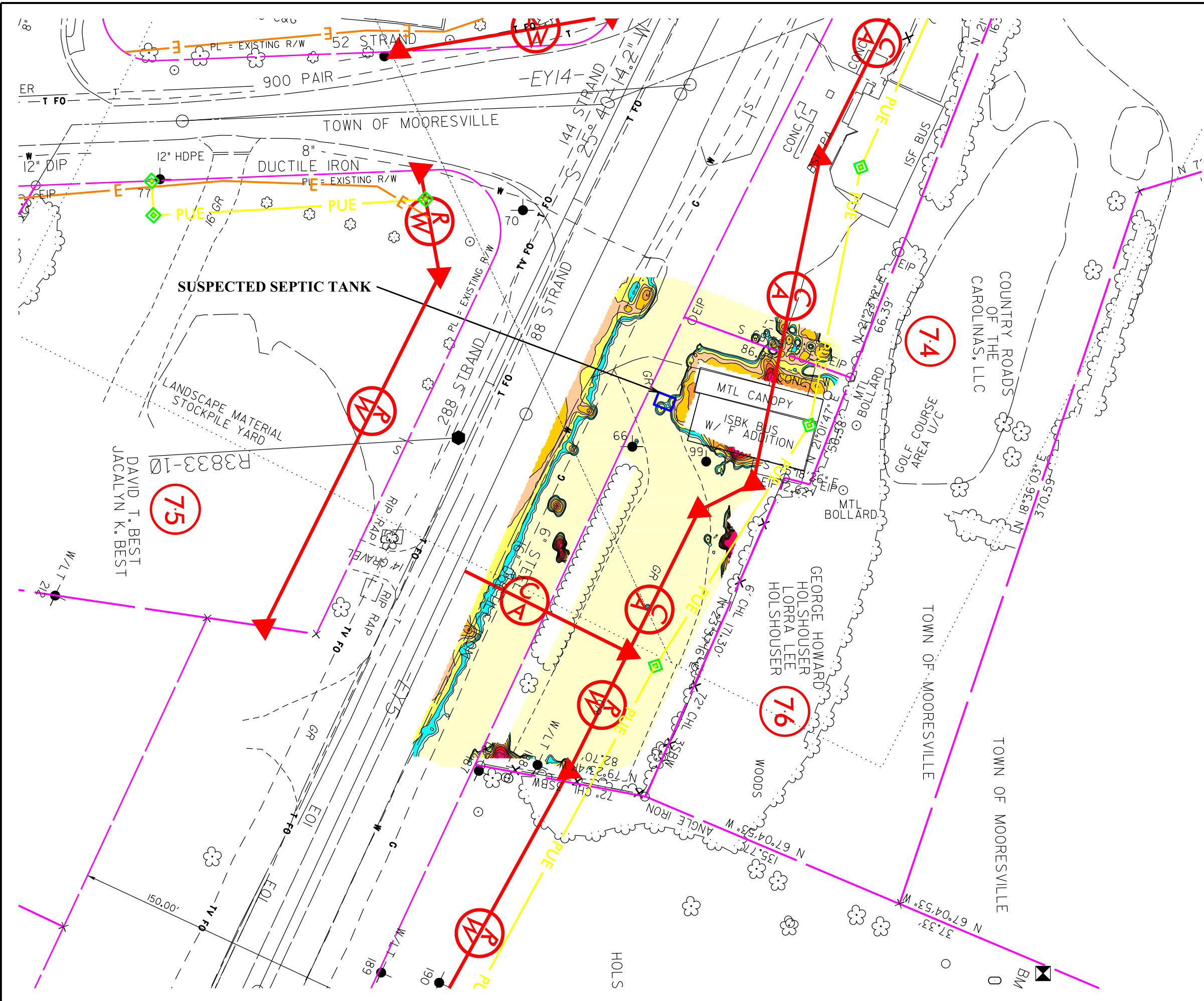
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PROJECT  
**PARCEL 76**  
MOORESVILLE, NORTH CAROLINA  
NCDOT PROJECT R-3833C

TITLE  
**PARCEL 76 - LOCATION AND SIZE OF  
ONE SUSPECTED SEPTIC TANK**

DATE  
9/3/2019  
PYRAMID PROJECT #:  
2019-260

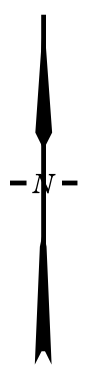
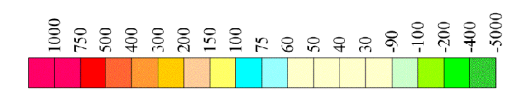
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**FIGURE 4**



**LEGEND**

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PUE
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- SUSPECTED SEPTIC TANK

MILLIVOLTS (mV)



<p>TITLE  <b>OVERLAY OF METAL DETECTION RESULTS AND ONE SUSPECTED SEPTIC TANK ON NCDOT ENGINEERING PLANS</b></p>	
<p>PROJECT  <b>PARCEL 76          MOORESVILLE, NORTH CAROLINA          NCDOT PROJECT R-3833C</b></p>	
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<p>DATE: 09-06-2019</p>	<p>REVISION NO. 0</p>
<p>PYRAMID PROJECT NO. 2019-260</p>	<p>FIGURE NO. 5</p>