


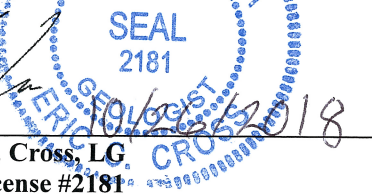
Pyramid Environmental & Engineering, P.C. Project # 2018-242
Preliminary Site Assessment (PSA) – Parcel 010 – BROCONS, LLC (& JASPERI, LLC)

PRELIMINARY SITE ASSESSMENT
PARCEL 010 – BROCONS, LLC (& JASPERI, LLC)
1237 MEBANE OAKS ROAD
MEBANE, ALAMANCE COUNTY, NORTH CAROLINA
STATE PROJECT: I-5711
WBS ELEMENT: 50401.1.FS1
OCTOBER 22, 2018

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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	.....	Milligram per kilogram
NPDES	.....	National Pollution Discharge Elimination System
NCAC	.....	North Carolina Administrative Code
NC DOT	.....	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

**PRELIMINARY SITE ASSESSMENT
PARCEL 010 – BROCONS, LLC (& JASPERI, LLC)
1237 MEBANE OAKS ROAD
MEBANE, ALAMANCE 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 010, owned by BROCONS, LLC (& JASPERI, LLC). The property currently contains an active gas station surrounded by asphalt and grass medians at 1237 Mebane Oaks Road, Mebane, NC. This PSA was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's August 9, 2018, technical proposal. This PSA is a part of State Project I-5711.

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 PSA was conducted with particular attention to the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features.

The following statements summarize the results of the PSA:

- **Site History:** Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed historical aerial photographs obtained from Google Earth dating back to 1993. Aerial photographs ranging from 1993 to 2017 are included in **Appendix A**. Historical information reviewed as part of the PSA indicated that the property contained a small building of unknown use as early as 1993. The current Sheetz gas station was constructed between 2005 and 2006. Visual observations and the NCDOT documents indicate that five known USTs are currently operating at the facility. Records review provided the following Facility ID information for the property: Facility ID 00-0-0000036822.

On August 31, 2018, Pyramid emailed the Alamance County parcel address (1237 Mebane Oaks Road, Mebane, NC) to Ms. Mindy Leopard, Hydrogeologist with the Department of Environmental Quality (DEQ), UST Section, with a request to investigate any environmental incidents associated with the parcel. Ms. Leopard responded to the email and indicated that there were not any environmental incidents associated with the property.

On September 10, 2018, Pyramid Project Manager Eric Cross performed a site investigation at the property. Mr. Cross did not observe any significant environmental risks on the property at the time of the investigation. The five known USTs were observed to be outside of the NCDOT proposed ROW and/or easements.

- **Geophysical Survey:** The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of ten EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed between vehicles that resulted in metallic interference during the survey. These GPR transects did not record any evidence of buried structures, such as USTs. Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area.
- **Limited Soil Assessment:** A total of eight soil borings were performed across the property. Soil samples were screened in the field using an organic vapor analyzer (OVA) 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 an OVA 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 8 feet of the soil column that was sampled during this PSA. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities, based on shallow excavations and a water table depth greater than 8 feet below the ground surface. Therefore, it was not necessary to collect a groundwater sample.
- **Contaminated Soil Volumes:** 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 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 Preliminary Site Assessment (PSA) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 010, owned by BROCONS, LLC (& JASPERI, LLC). The property currently contains an active gas station surrounded by asphalt and grass medians at 1237 Mebane Oaks Road, Mebane, NC. This PSA was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's August 9, 2018, technical proposal. This PSA is a part of State Project I-5711.

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 PSA was conducted with particular attention to the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features. The location of the subject site is shown on **Figure 1**.

1.1 Background Information

Based on the NCDOT's August 1, 2018, *Request for Technical and Cost Proposal (RFP)*, the PSA 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 PSA 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 Pre-Scope comments for Parcel 010 in the RFP documents provided to Pyramid on August 1, 2018, provided the following background information related to the site:

“Currently convenience store/gas station. Five tanks currently in use.”

Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed historical aerial photographs obtained from Google Earth dating back to 1993. Aerial photographs ranging from 1993 to 2017 are included in **Appendix A**. Historical information reviewed as part of the PSA indicated that the property contained a small building of unknown use as early as 1993. The current Sheetz gas station was constructed between 2005 and 2006. Visual observations and the NCDOT documents indicate that five known USTs are currently operating at the facility. Records review provided the following Facility ID information for the property: Facility ID 00-0-0000036822.

On August 31, 2018, Pyramid emailed the Alamance County parcel address (1237 Mebane Oaks Road, Mebane, NC) to Ms. Mindy Lepard, Hydrogeologist with the Department of Environmental Quality (DEQ), UST Section, with a request to investigate any environmental incidents associated with the parcel. Ms. Lepard responded to the email and indicated that there were not any environmental incidents associated with the property.

On September 10, 2018, Pyramid Project Manager Eric Cross performed a site investigation at the property. Mr. Cross did not observe any significant environmental risks on the property at the time of the investigation. The five known USTs were observed to be outside of the NCDOT proposed ROW and/or easements.

3.0 GEOPHYSICAL INVESTIGATION

Pyramid’s classifications of USTs for the purposes of this PSA 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 ten EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed between vehicles that resulted in metallic interference during the survey. These GPR transects did not record any evidence of buried structures, such as USTs. Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area.

The full details of the geophysical investigation are documented in Pyramid's Geophysical Investigation Report, dated September 17, 2018, which is included as **Appendix B**.

4.0 SOIL SAMPLING ACTIVITIES & RESULTS

4.1 Soil Assessment Field Activities

On October 2, 2018, Pyramid mobilized to the site, drilled soil borings and collected the proposed soil samples for the PSA. Eight (8) soil borings (10-1 through 10-8) 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 an Organic Vapor Analyzer

(OVA) approximately every 2 feet, depending on the soil recovery. In general, the soil sample with the highest OVA 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 OVA screening results are included in **Appendix C**. The OVA 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 not detected in any of the boring samples 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 PSA projects. Pyramid preserved the samples for UVF analysis in methanol-filled containers provided by RED Lab, an approved laboratory for performing the UVF screening. The samples were analyzed in the field in real-time when possible by a Pyramid employee who has been certified by RED Lab to perform the QED 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).

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 OVA 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 8 feet of the soil column that was sampled during this PSA. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities, based on shallow excavations and a water table depth greater than 8 feet below the ground surface. Therefore, it was not necessary to collect a groundwater sample.

5.0 CONCLUSIONS AND RECOMMENDATIONS

As requested by the NCDOT, Pyramid has completed a PSA at Parcel 010 (BROCONS, LLC (& JASPERI, LLC)) located at 1237 Mebane Oaks Road, Mebane, 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 ten EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed between vehicles that resulted in metallic interference during the survey. These GPR transects did not record any evidence of buried structures, such as USTs. Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area.

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 OVA 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 8 feet of the soil column that was sampled during this PSA. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities, based on shallow excavations and a water table depth greater than 8 feet below the ground surface. 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 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 PSA 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

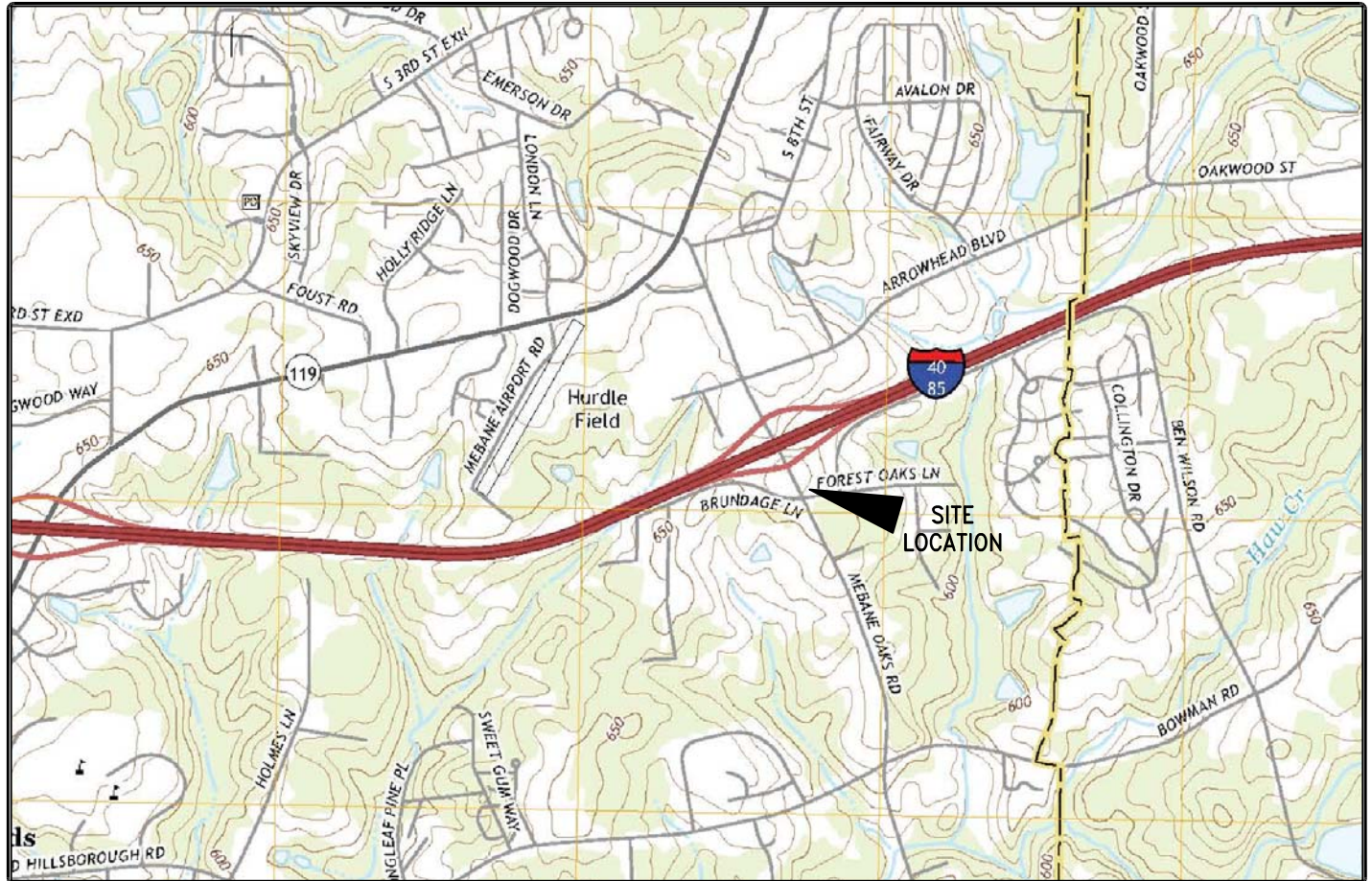
USGS TOPOGRAPHIC MAP

SITE:

PARCEL 010

LOCATION:

MEBANE, NORTH CAROLINA



USGS IDENTIFICATION

SCALES

USGS 7.5 MINUTE MAP

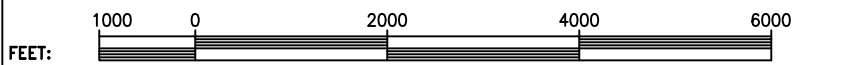
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ORIGINAL DATE:

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PHOTOREVISION DATE:

2016



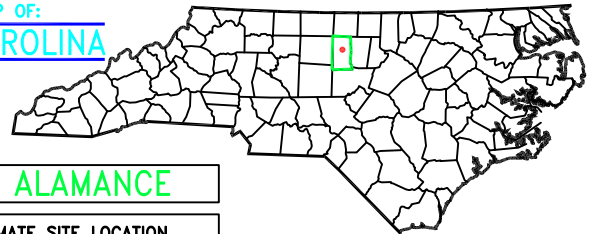
1" = 2000'

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

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



COUNTY MAP OF:
NORTH CAROLINA



COUNTY: **ALAMANCE**

APPROXIMATE SITE LOCATION

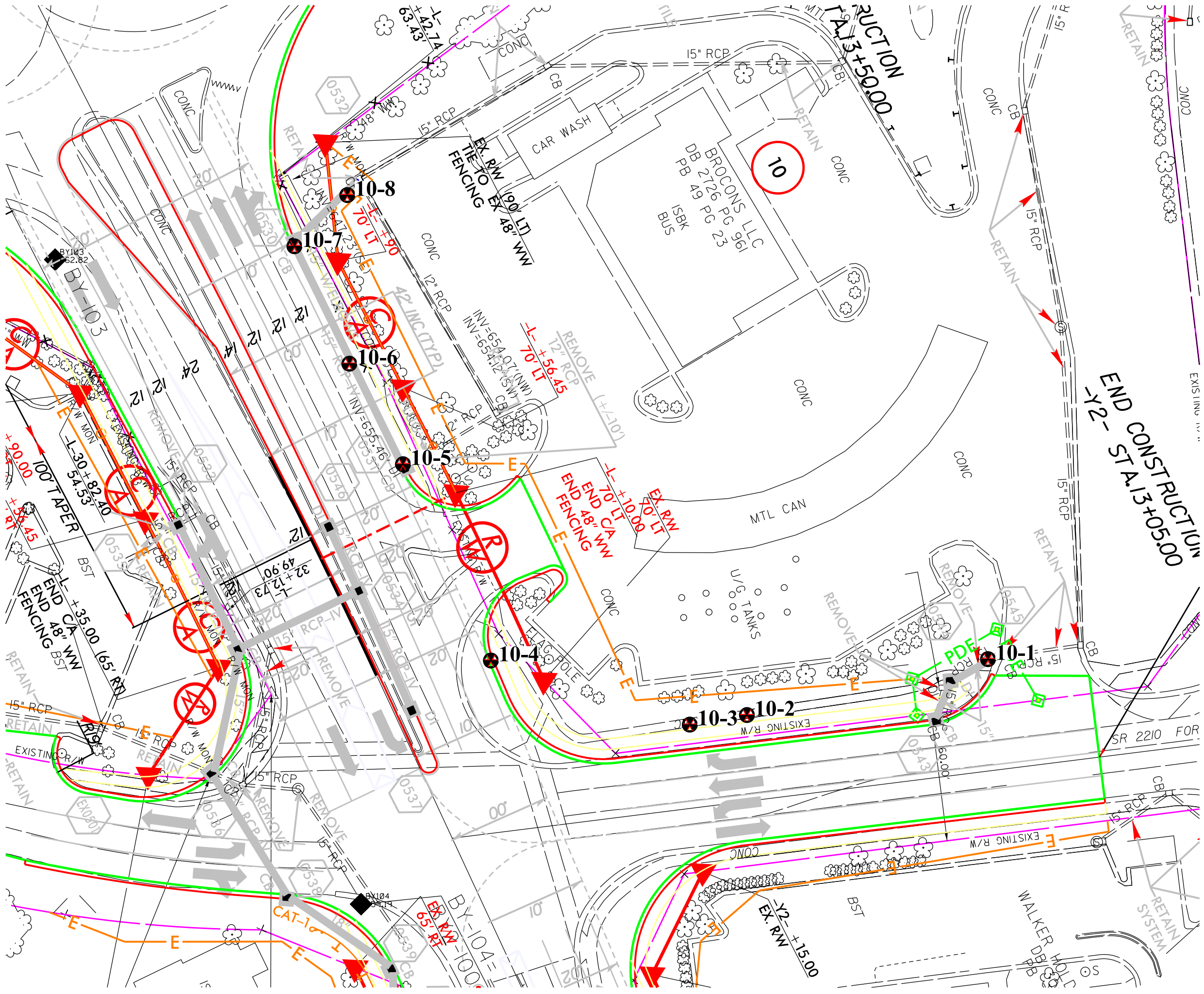


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 CITY: MEBANE STATE: NORTH CAROLINA
 TITLE: TOPOGRAPHIC MAP

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 DATE: 10/10/18
 DRAWING NAME: USGSTOPO

DRAWN BY: KAM
 CHECK BY: TDL
 JOB NO.: 2018-242
 TYPE: PSA
 FIGURE NUMBER: 1

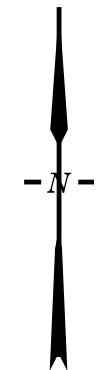
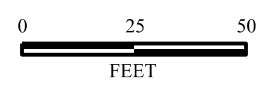
NOTES
 TOPOGRAPHIC MAP USED IN THIS GRAPHIC IS MAPPED, EDITED, AND PUBLISHED BY THE UNITED STATES GEOLOGIC SURVEY, DEPARTMENT OF THE INTERIOR, RESTON VIRGINIA.
 THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS.



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- E TEMPORARY CONSTRUCTION EASEMENT
- PDE PROPOSED PERMANENT DRAINAGE
- PUE PROPOSED PERMANENT UTILITY
- - - PROPOSED SS CUT LINE
- - - PROPOSED SS FILL LINE
- PROPOSED DRAINAGE PIPING
- SOIL BORING LOCATIONS

Analytical results are presented in Table 2 of PSA Report



TITLE	LOCATIONS OF SOIL BORINGS
PROJECT	PARCEL 10 MEBANE, NORTH CAROLINA NCDOT PROJECT I-5711
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology
DATE: 10-10-2018	REVISION NO. 0
PYRAMID PROJECT NO. 2018-242	FIGURE NO. 2

TABLES

TABLE 1
Summary of Soil Field Screening Results
NCDOT Project I-5711
Parcel 010 - Sheetz
1237 Mebane Oaks Road
Mebane, Alamance County, North Carolina

SOIL BORING 10/2/2018	SAMPLE ID	DEPTH (feet bgs)	PID READINGS (PPM)
10-1	10-1(0-2)	0 to 2	2.9
	10-1(2-4)	2 to 4	4.0
	10-1(4-6)	4 to 6	3.9
	10-1(6-8)	6 to 8	3.7
10-2	10-2(0-2)	0 to 2	2.7
	10-2(2-4)	2 to 4	3.4
	10-2(4-6)	4 to 6	1.0
	10-2(6-8)	6 to 8	1.7
10-3	10-3(0-2)	0 to 2	3.2
	10-3(2-4)	2 to 4	2.8
	10-3(4-6)	4 to 6	4.2
	10-3(6-8)	6 to 8	3.2
10-4	10-4(0-2)	0 to 2	2.7
	10-4(2-4)	2 to 4	4.4
	10-4(4-6)	4 to 6	3.5
	10-4(6-8)	6 to 8	3.1
10-5	10-5(0-2)	0 to 2	2.2
	10-5(2-4)	2 to 4	4.4
10-6	10-6(0-2)	0 to 2	4.1
	10-6(2-4)	2 to 4	4.4
	10-6(4-6)	4 to 6	2.5
	10-6(6-8)	6 to 8	3.9
10-7	10-7(0-2)	0 to 2	3.0
	10-7(2-4)	2 to 4	3.9
	10-7(4-6)	4 to 6	3.4
	10-7(6-8)	6 to 8	2.1
10-8	10-8(0-2)	0 to 2	3.1
	10-8(2-4)	2 to 4	4.7
	10-8(4-6)	4 to 6	5.0
	10-8(6-8)	6 to 8	4.5

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 QED Analytical Results for GRO/DRO
 NCDOT State Project I-5711
 Parcel 10 (Sheetz) - 1237 Mebane Oaks Road
 Mebane, Alamance County, North Carolina

SAMPLE ID	DATE	DEPTH (feet)	PID (ppm)	QROS - QED Analysis		
				GRO (mg/kg) (C5-C10)	DRO (mg/kg) (C10-C35)	TPH (mg/kg) (C5-C35)
10-1(2-4)	10/2/2018	2-4	4.0	<0.35	0.35	0.35
10-2(2-4)	10/2/2018	2-4	3.4	<0.5	<0.5	<0.5
10-3(4-6)	10/2/2018	4-6	4.2	<0.64	<0.64	<0.64
10-4(2-4)	10/2/2018	2-4	4.4	<0.66	0.66	0.66
10-5(0-2)	10/2/2018	0-2	2.2	<0.35	0.35	0.35
10-6(2-4)	10/2/2018	2-4	4.4	<0.56	<0.56	<0.56
10-7(2-4)	10/2/2018	2-4	3.9	<0.36	<0.36	<0.36
10-7(4-6)	10/2/2018	4-6	3.4	<0.6	<0.6	<0.6
10-8(2-4)	10/2/2018	2-4	4.7	<0.62	<0.62	<0.62
10-8(4-6)	10/2/2018	4-6	5.0	0.98	<0.56	0.98
NC Initial Action Level - UST Section for 5035/5030-GRO; 3550-DRO				50	100	NA

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

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

TPH= Total Petroleum
 Hydrocarbons (GRO + DRO)

NA= Not Applicable

* Bold values indicate concentrations above initial action levels

APPENDIX A

1993 Aerial Photograph
Parcel 10

Legend
★ Parcel 10



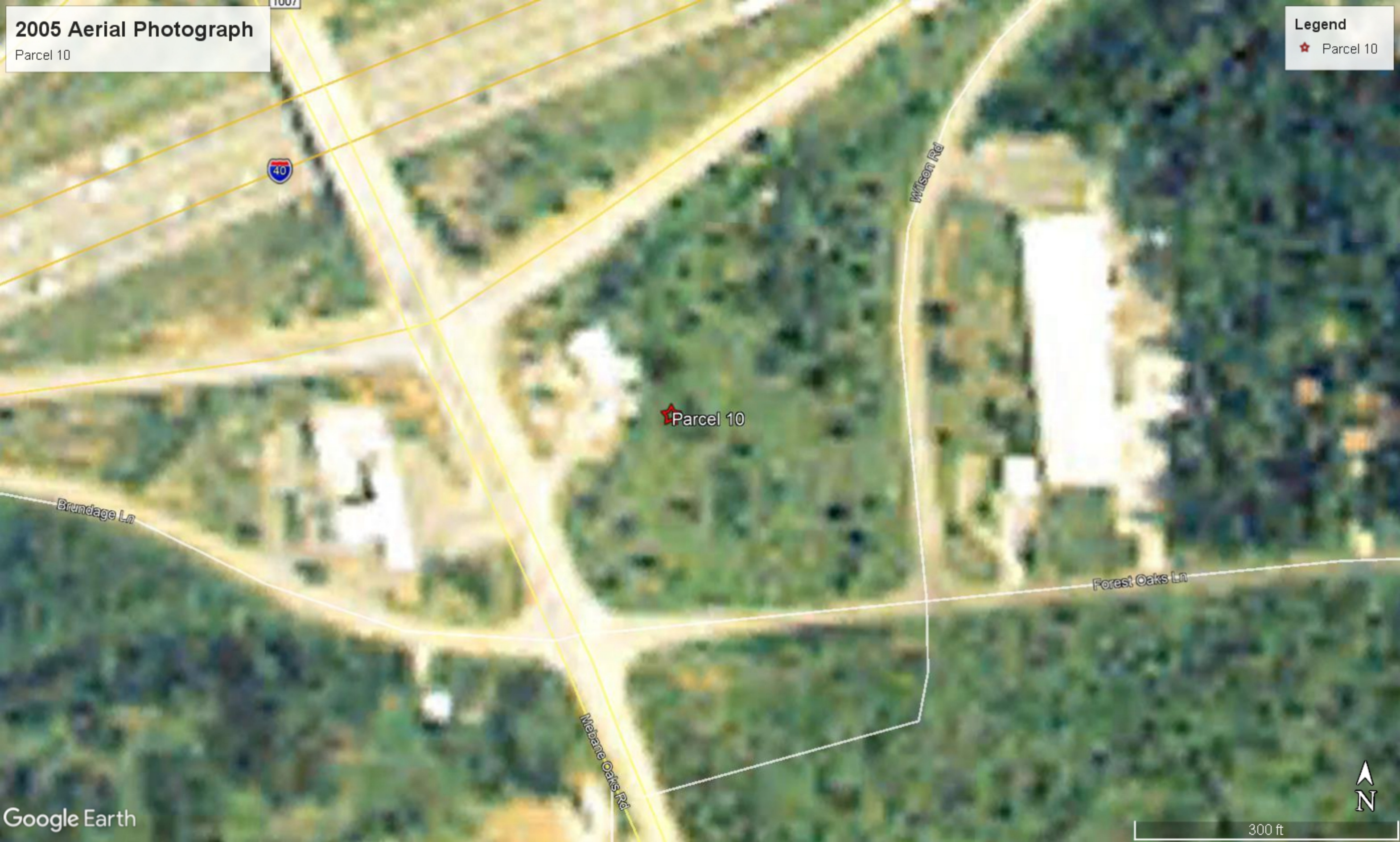
1998 Aerial Photograph
Parcel 10

Legend
★ Parcel 10



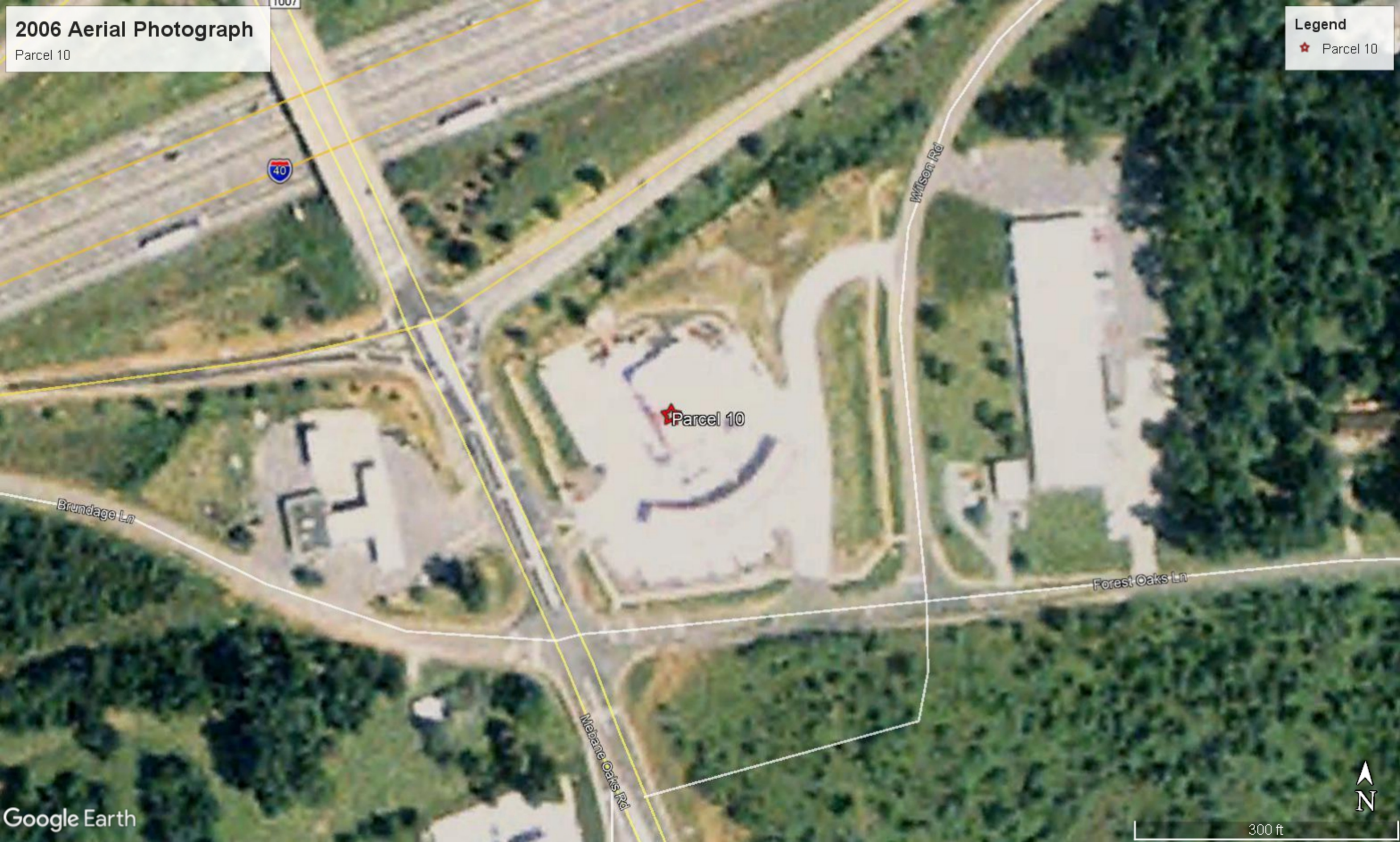
2005 Aerial Photograph
Parcel 10

Legend
★ Parcel 10



2006 Aerial Photograph
Parcel 10

Legend
★ Parcel 10



Brundage Ln

Mebane Oaks Rd

Wilson Rd

Forest Oaks Ln

★ Parcel 10





APPENDIX B




PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-242)


GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCEL 10 NCDOT PROJECT I-5711 (50401.1.FS1)

1237 MEBANE OAKS ROAD, MEBANE, NC
SEPTEMBER 17, 2018

Report prepared for: Gordon Box
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GEOPHYSICAL INVESTIGATION REPORT
Parcel 10 – 1237 Mebane Oaks Road
Mebane, Alamance County, North Carolina

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- Figure 1 – Parcel 10 - Geophysical Survey Boundaries and Site Photographs
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- Figure 4 – Overlay of Geophysical Survey Boundaries on NCDOT Engineering Plans

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 10, located at 1237 Mebane Oaks Road, in Mebane, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project I-5711). 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 September 10-11, 2018, 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 ten EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed between vehicles that resulted in metallic interference during the survey. These GPR transects did not record any evidence of buried structures, such as USTs. Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT) at Parcel 10, located at 1237 Mebane Oaks Road, in Mebane, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project I-5711). 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 September 10-11, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included an active gas station surrounded by concrete, asphalt, and grass surfaces. The known, active tanks supplying fuel to the gas station pumps were located outside of the geophysical survey area. 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 September 11, 2018, 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	Sign	
2	Vehicles	
3	Drop Inlet	
4	Signs	
5	Vehicles	☑
6	Utilities	
7	Utilities	
8	Manhole	
9	Utilities	
10	Drop Inlets	

All of the EM anomalies were directly attributed to visible cultural features at the ground surface, including signs, vehicles, drop inlets, and a manhole. GPR scans were performed around the area of interference caused by the vehicles associated with Anomaly 5 to verify that no buried structures were present at this location.

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 six GPR transects were performed at the site. GPR Transect 1-6 were performed across EM Anomaly 5. These transects recorded no evidence of buried structures, such as USTs.

Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area. **Figure 4** provides an overlay of the geophysical survey area onto the NCDOT MicroStation engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 10 in Mebane, 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 between vehicles that resulted in metallic interference during the survey. These transects did not record any evidence of buried structures, such as USTs.
- Collectively, the geophysical data did not record evidence of unknown metallic USTs at Parcel 10. Known, active tanks were located outside of the survey area.

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 South)

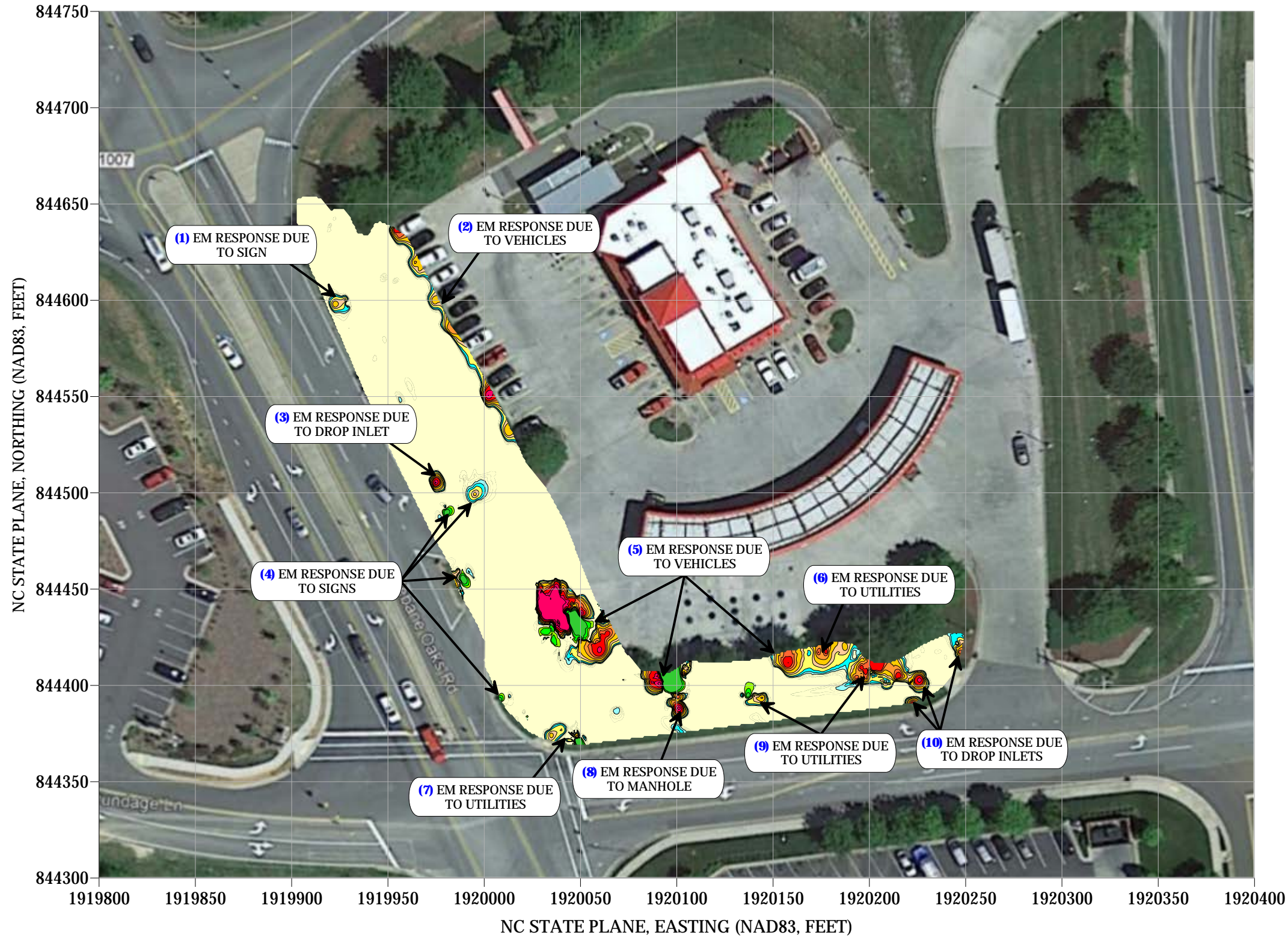


View of Survey Area
(Facing Approximately East)



<p>503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology</p>	<p>PROJECT</p> <p>PARCEL 10 MEBANE, NORTH CAROLINA NCDOT PROJECT I-5711</p>	<p>TITLE</p> <p>PARCEL 10 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS</p>	<p>DATE</p> <p>9/10/2018</p>	<p>CLIENT</p> <p>NCDOT</p>
			<p>PYRAMID PROJECT #:</p> <p>2018-242</p>	<p>FIGURE 1</p>

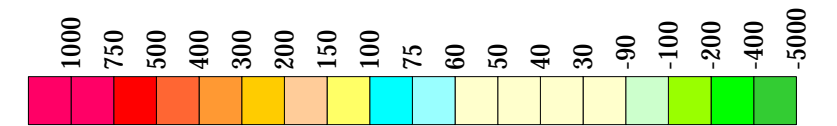
EM61 METAL DETECTION RESULTS



NO EVIDENCE OF UNKNOWN METALLIC USTs 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 September 10, 2018, 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 September 11, 2018.

EM61 Metal Detection Response (millivolts)



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PROJECT
PARCEL 10
MEBANE, NORTH CAROLINA
NCDOT PROJECT I-5711

TITLE
PARCEL 10 - EM61 METAL DETECTION
CONTOUR MAP

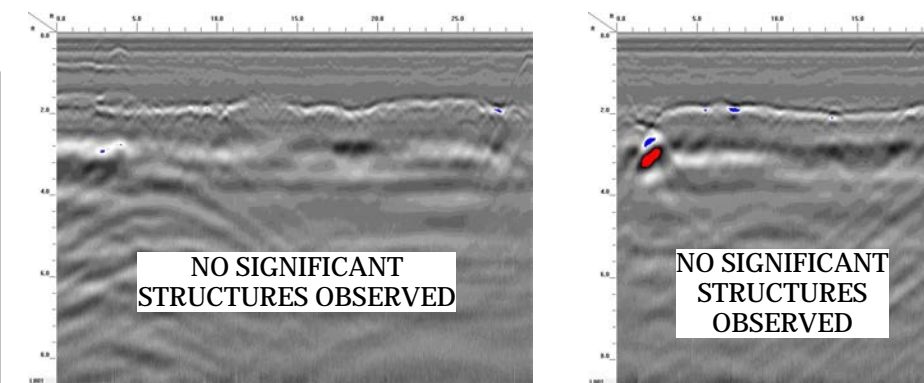
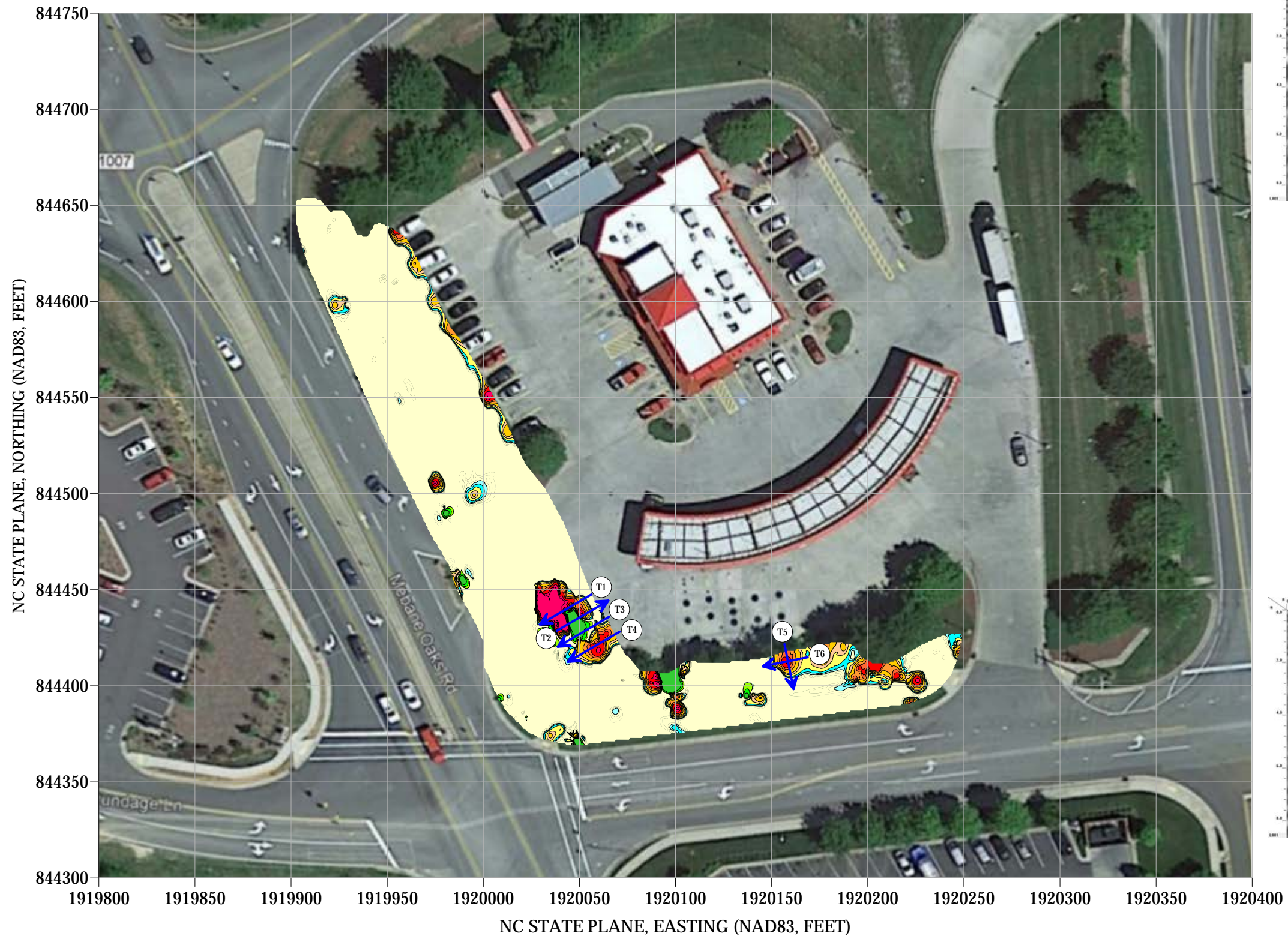
DATE 9/10/2018

PYRAMID PROJECT #: 2018-242

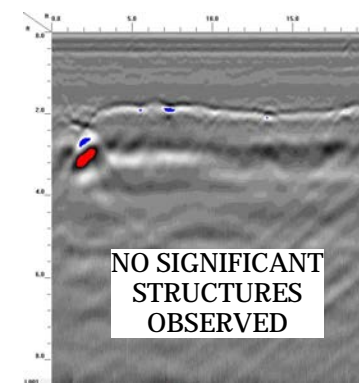
CLIENT NCDOT

FIGURE 2

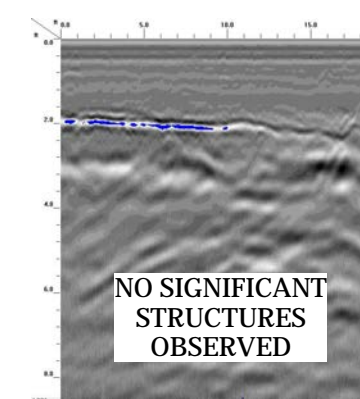
LOCATIONS OF GPR TRANSECTS



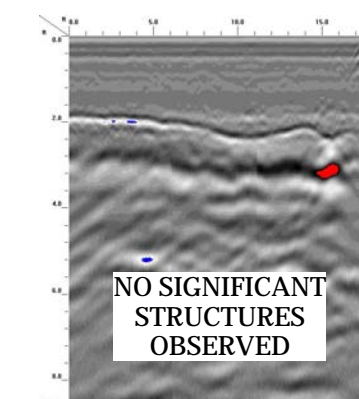
GPR TRANSECT 1 (T1)



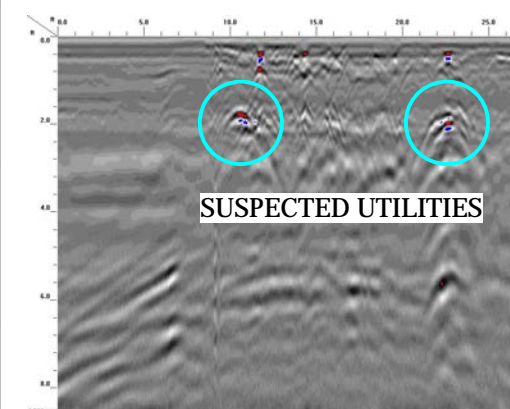
GPR TRANSECT 2 (T2)



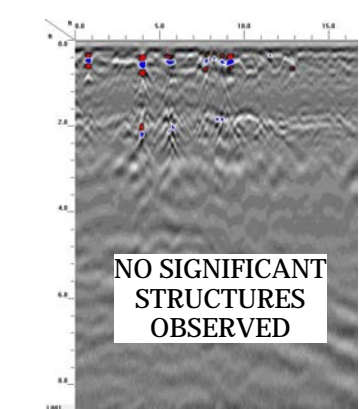
GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)



GPR TRANSECT 5 (T5)

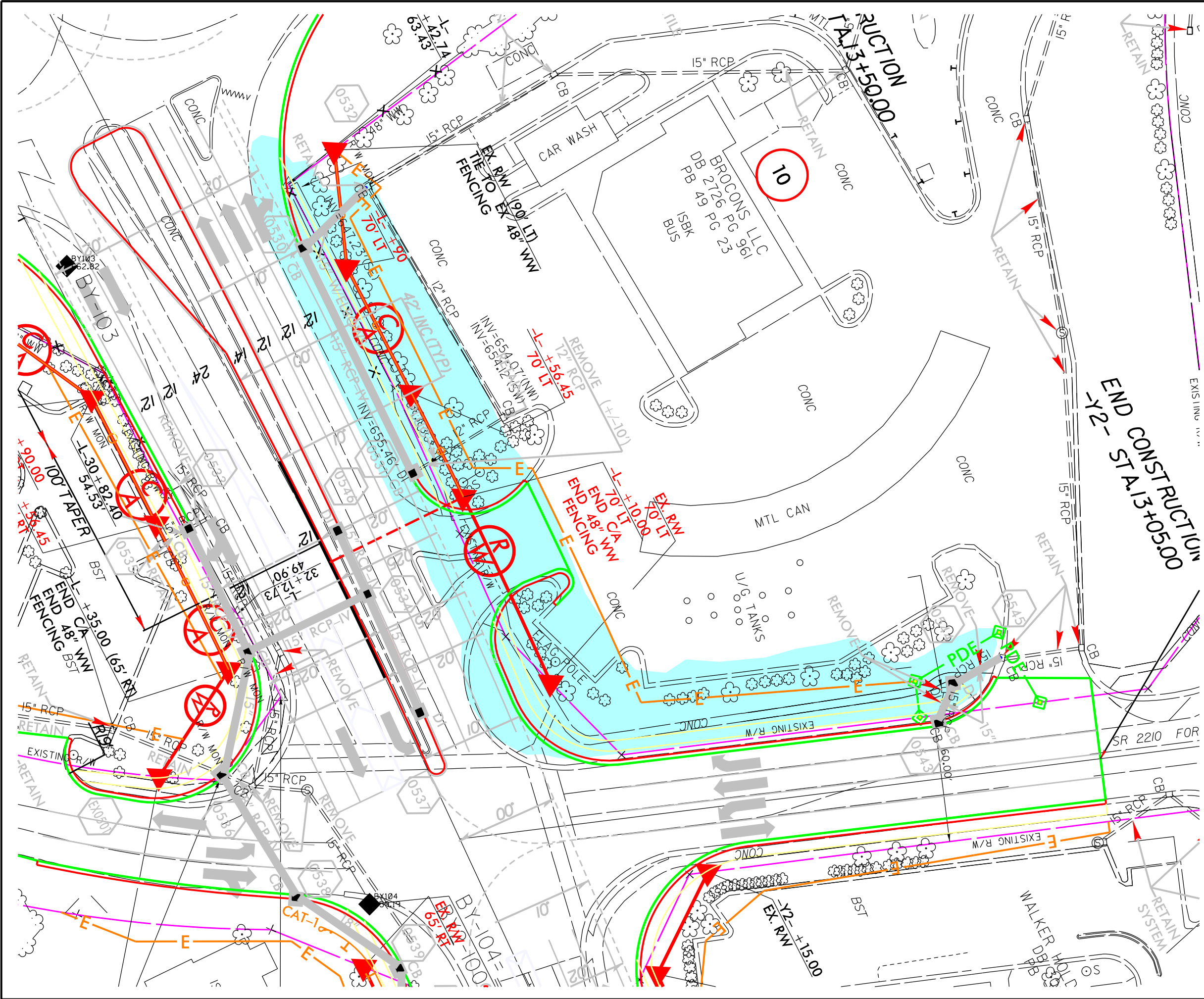


GPR TRANSECT 6 (T6)

*EXTENSIVE GPR SCANS WERE CONDUCTED OVER THE ENTIRE SITE. TRANSECT LINES ON THE MAP ABOVE INDICATE LOCATIONS WHERE DATA WERE SAVED. THESE LOCATIONS WERE CHOSEN TO HIGHLIGHT STRUCTURES IDENTIFIED IN THE SUBSURFACE OR TRANSECTS THAT ARE REPRESENTATIVE OF GENERAL SUBSURFACE CONDITIONS.

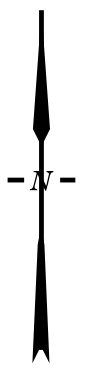


<p>503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology</p>	<p>PROJECT</p> <p style="text-align: center;">PARCEL 10 MEBANE, NORTH CAROLINA NCDOT PROJECT I-5711</p>	<p>TITLE</p> <p style="text-align: center;">PARCEL 10 - GPR TRANSECT LOCATIONS AND IMAGES</p>	DATE	9/11/2018	CLIENT	NCDOT
			PYRAMID PROJECT #:	2018-242	FIGURE 3	



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- E TEMPORARY CONSTRUCTION EASEMENT
- PDE PROPOSED PERMANENT DRAINAGE
- PUE PROPOSED PERMANENT UTILITY
- - - PROPOSED SS CUT LINE
- - - PROPOSED SS FILL LINE
- PROPOSED DRAINAGE PIPING
- GEOPHYSICAL SURVEY AREA



TITLE OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES ON NCDOT ENGINEERING PLANS	
PROJECT PARCEL 10 MEBANE, NORTH CAROLINA NCDOT PROJECT I-5711	
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DATE: 09-18-2018	REVISION NO. 0
PYRAMID PROJECT NO. 2018-242	FIGURE NO. 4

APPENDIX C

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT I-5711, Parcel 010, Mebane, NC (2018-242)	BORING/WELL NO:	10-6
SITE LOCATION:	Alamance County, NC	BORING/WELL LOCATION:	Parcel 010, NW portion
START DATE:	10/02/18	COMPLETED:	10/02/18
GEOLOGIST:	M. Trifunovic / T. Leatherman	DRILLER:	Solutions-IES
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
----------------	---	--

		Core Sample Depths
0-2	Reddish-brown, silty-clay (ML), moist, no odor	PID= 4.1 PPM
2-4	Reddish-brown, silty-clay (ML), moist, no odor	PID= 4.4 PPM
4-6	Reddish-brown, silty-clay (ML), moist, no odor	PID= 2.5 PPM
6-8	Reddish-brown, silty-clay (ML), moist, no odor	PID= 3.9 PPM
	Water table not encountered	

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



Hydrocarbon Analysis Results

Client: NCDOT Alamance Mebane Parcel 010
Address: Sheetz Mebane Oaks Road
 Mebane, NC

Samples taken Ten
Samples extracted Ten
Samples analysed Ten

Contact: **Operator** Tim Leatherman

Project: NCDOT Alamance Mebane Parcel 010

H09382

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
										C5 - C10	C10 - C18	C18	
s	10-1(2-4)	14.1	<0.35	<0.35	0.35	0.35	0.41	<0.11	<0.014	0	49.9	50.1	Deg.PHC 50.1%,(FCM),(BO),(P)
s	10-2(2-4)	19.8	<0.5	<0.5	<0.5	<0.5	<0.1	<0.16	<0.02	0	0	0	PHC not detected,(BO)
s	10-3(4-6)	25.7	<0.64	<0.64	<0.64	<0.64	<0.13	<0.21	<0.026	0	0	0	Residual HC,(BO)
s	10-8(2-4)	24.8	<0.62	<0.62	<0.62	<0.62	<0.12	<0.2	<0.025	0	0	0	PHC not detected,(BO)
s	10-8(4-6)	22.2	<0.56	0.98	<0.56	0.98	<0.11	<0.18	<0.022	100	0	0	Residual HC,(BO)
s	10-4(2-4)	26.5	<0.66	<0.66	0.66	0.66	0.35	<0.21	<0.027	0	26.3	73.7	Residual HC,(BO),(P)
s	10-5(0-2)	13.9	<0.35	<0.35	0.35	0.35	0.2	<0.11	<0.014	0	59.9	40.1	V.Deg.PHC 75%,(FCM),(BO),(P)
s	10-6(2-4)	22.4	<0.56	<0.56	<0.56	<0.56	<0.11	<0.18	<0.022	0	0	0	PHC not detected
s	10-7(2-4)	14.3	#DIV/0!	<0.36	<0.36	<0.36	<0.07	<0.11	<0.014	0	0	0	#DIV/0!
s	10-7(4-6)	24.1	<0.6	<0.6	<0.6	<0.6	<0.12	<0.19	<0.024	0	0	0	PHC not detected

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

97.1 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modified Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

