GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT

GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
5511 Wilkinson Boulevard
Gaston County, North Carolina

NCDOT TIP No. U-6146, WBS No. 48392.1.1:
Replace Bridge No. 82 on US 29 & US 74
over South Fork Catawba River, Gaston County

on behalf of

North Carolina Department of Transportation
Geotechnical Engineering Unit – GeoEnvironmental Engineering
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

December 2021

by

Rummel, Klepper & Kahl, LLP
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Raleigh, NC 27615

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1.0 Introduction

RK&K has prepared this GeoEnvironmental Phase II Investigation Report to document assessment activities performed on Parcel #21. (The assessment area is hereafter referred to as the "Project Study Area.") The Project Study Area consists of the right of way and/or limits of disturbance for NCDOT TIP No. U-6146, WBS No. 48392.1.1: Replace Bridge No. 82 on US 29 & US 74 over South Fork Catawba River, Gaston County. The Project Study Area is on Gaston County Tax Office Parcel Number 185596. Parcel #21 is currently unoccupied. There is a general retail building onsite with signage "Magnolias Mini Market." Parcel #21 is located at 5511 Wilkinson Boulevard, near the intersection of Wilkinson Boulevard and Cramerton Village Drive in McAdenville, North Carolina. (See **Figure 1, Site Location Map**.)

Based on information provided in the GeoEnvironmental Phase I Report, dated February 27, 2019, prepared by NCDOT, the parcel was reported to have a building with features and location indicating that it appeared to be a former gas station. The business at the time of the investigation had been the Big Al's Trading Post, a general store. There was no other evidence of underground storage tanks (USTs) on this site. No monitoring wells could be located onsite, and the parcel did not appear on the UST Section incident database. As such, the purpose of the investigation was to evaluate whether unknown USTs or contaminated soil are present in the Project Study Area that may result in increased project costs and future liability if acquired by the NCDOT.

1.1 Site Description

Parcel #21 has a listed owner of Wilkinson Blvd Investments LLC. The parcel has a listed street address of 5511 Wilkinson Boulevard, McAdenville, NC 28101. The parcel consists of a single wooden-framed structure and surrounding concrete pavement. The building is signed as Magnolias Mini Market, an inactive Latino retail food store. The parcel is bounded by Wilkinson Boulevard to the south; a private residence at 5505 Wilkinson Boulevard to the west; a utility right-of-way for a major natural gas line running north-south, and immediately beyond that, a vacant retail property at 5515 Wilkinson Boulevard to the east; and a large undeveloped forestland to the north. Photographs of the Project Study Area are provided in **Appendix A, Site Photographs**.

1.2 Scope of Work

NCDOT requested that RK&K conduct a GeoEnvironmental Phase II Investigation within the proposed right-of-way and/or permanent utility easement for Parcel #21. The purpose of the investigation was to locate and estimate the size and contents of underground storage tanks, determine whether contaminated soils are present, analyze soils for potential releases using UVF analysis, quantify the impacted soils, and prepare a report presenting the field activities, findings, and recommendations. These services were conducted in accordance with RK&K's *Technical and Cost Proposal for GeoEnvironmental Phase II Investigations* (October 1, 2021) and NCDOT's *Notice to Proceed – Contract Number 7000020469 – Purchase Order Number 6300067051* (October 5, 2021).

2.0 History

2.1 Parcel Usage

The parcel consists of a former Magnolias Mini Market, a small retail store. The February 2019 GeoEnvironmental Phase I Report included information that there was no evidence that USTs had been used at this site other than its appearance that was similar to a typical gas station, with a concrete island in front of the retail building.

2.2 Review of Background Information

RK&K conducted historical research to determine whether additional environmental listings were identified for Parcel #21. The following are the results of the additional research:

- Based on a review of online aerial photographs, the site has been developed in a similar configuration to present day since at least February 1993.

- RK&K searched the online databases maintained by the North Carolina Department of Environmental Quality (NCDEQ) for Underground Storage Tank Incidents, and Petroleum Contaminated Soil Remediation Permits. The site was not listed.

- RK&K also searched the NCDEQ Underground Storage Tank Section databases: Regional Aboveground Storage Tanks and AST Incidents, in which this property was listed. As updated on November 8, 2021, the databases indicated that there was an incident, numbered 95777 for the site MO-88784. The incident was a dumpster spill affecting both 5511 and 5515 Wilkinson Boulevard on March 15, 2020, reported to NCDEQ on May 11, 2020, with the case currently open. The databases indicate that an undescribed product leaked from a dumpster onto the property line between 5511 and 5511A Wilkinson Boulevard, “on a paper street” [sic]. This database record is summarized in **Appendix B, NCDEQ Database Information**.

3.0 Virtual Site Reconnaissance

3.1 USTs

Based on review of the NCDEQ UST and AST databases, there are no USTs or ASTs currently or previously located at the site.

3.2 Other Features

The Project Study Area consisted of a section of the parcel within the NCDOT right-of-way or extending between the existing edge of pavement and the Permanent Utility Easement (PUE) line. There were no other features of concern observed in portions of the parcel beyond the Project Study Area. (See **Figure 2, Site Plan**.)

4.0 Methods

4.1 Property Contacts

As part of the scope of work, RK&K made NCDOT and property owners aware of the planned schedule for field activities and mobilization, and carried photo IDs to the sites. The listed property owner was contacted about the work schedule for the field work and the type of work being performed. The owner's onsite representative, Bob Ross, requested that borings planned for the concrete pad to the west and north of the building be moved to the grassy lawn area adjacent to the planned boring locations. Other than this boring position request, Mr. Ross did not express concern or special conditions associated with the work being performed.

RK&K submitted an 811 ticket prior to initiation of the field activities, to identify underground utilities located in the public right of way in the vicinity of the proposed boring locations.

4.2 Health and Safety

Prior to commencing the field work, RK&K personnel developed a Site-Specific Health and Safety Plan (HASP) covering activities to be performed. The site-specific HASP was discussed with all RK&K onsite personnel and subcontractors involved with the project at a safety meeting.

4.3 Geophysical Investigation

Pyramid Environmental & Engineering, P.C. (Pyramid) conducted a geophysical investigation for Parcel #21 on October 22, 2021 to determine if unknown, metallic underground storage tanks (USTs) or other anomalies were present beneath the survey area. The geophysical investigations searched for USTs and, if identified, estimated the approximate size and depth of USTs. Pyramid also located private utilities and marked the metallic underground utilities/conduits (power, water, phone, cable, and/or gas lines, etc.) with paint or pin flags. Pyramid located private utilities after the 811 location of public utilities. Pyramid's investigation findings are discussed in Section 5.1 and their Geophysical Survey Report is included in **Appendix C, Geophysical Survey Report**.

4.4 Soil Assessment

The scope of work for the soil assessment was to evaluate the presence of soil contamination within the area of interest – between the existing edge of pavement and the PUE, to evaluate whether known impact is present in this area or migrating from off-site.

Carolina Soil Investigations, LLC (CSI) advanced five soil borings via Geoprobe® Systems drilling technology until groundwater was encountered, refusal, or 10 feet below ground surface (bgs) in the following locations. (See **Figure 2, Site Plan**.) The boring locations were based on anticipated locations of UST basins and fuel dispenser islands, the findings of the geophysical investigation, location of public and private utilities, and any impacts identified during drilling activities. CSI employed a track-mounted Geoprobe 6712DT drill machine.

- Two borings on the ends of the suspected fuel dispenser island along the roadway;
- One boring in the middle of the suspected fuel dispenser island; and

- Two borings on the west side of the building in the suspected location of the UST basin.

The sampling point locations were recorded using an iPad Air connected to an Eos Positioning Systems, Inc. Arrow 100 GNSS receiver unit.

The locations of two borings were moved in the field before sampling began. At the request of the owner's representative, Bob Ross, borings B-1 and B-2 were moved to the west by approximately 20 feet, in order to be 5 feet off of the concrete pad. Mr. Ross indicated that a 5-foot wide strip of grass west of the concrete pad is within the 5511 Wilkinson Boulevard property parcel. (See **Figure 2, Site Plan**.)

Soils were determined to be primarily a tan to brown, fine sandy or clayey silt, saprolitic with trace mica. Groundwater was not encountered in any of the borings at the termination depths of 10 feet bgs. Surficial artificial fill was noted in borings B-3, B-4 and B-5, to 1.5 to 2.5 feet bgs. The Geoprobe Boring Logs are included in **Appendix D, Geoprobe Boring Logs**.

RK&K provided an OSHA 40-hour trained geologist to monitor the sampling, and to conduct ambient air monitoring during drilling activities and sample screening. The geologist visually inspected the recovered soil for the presence of contaminant impact (e.g., odor, color) and performed headspace readings on the samples to identify the presence of volatile organics.

Field screening using a photoionization detector (PID) was conducted at continuous intervals along the 5-foot collected Geoprobe samples. Soil samples were placed into a medium Ziploc® bag for PID headspace analysis. Field headspace screenings were conducted using an Ion Science PhoCheck 1000 PID equipped with a 10.6 eV Krypton ionization lamp. Before use that day, the PID was calibrated according to manufacturer specifications to 100 parts per million (ppm) isobutylene. Soil vapors were allowed to equilibrate inside the Ziploc® bag for 5 to 10 minutes. The boring logs list the maximum PID headspace readings from each headspace sample – from 0.0 to 0.3 ppm. The field crew did not detect any odor or see any visible signs of gross contamination in any of the samples. The depth ranges and PID readings for each soil sample collected for analysis are included in **Table 1, Soil Sample Summary and Screening Results**.

The RK&K geologist also reviewed the site for observable evidence of USTs or environmental conditions of concern. No evidence was noted. The concrete island alongside US Route 29 & US Route 74 appeared to be a single slab of concrete surface, with no cuts or patches that would indicate the former presence of fuel dispensers or fuel lines.

Since no indications of petroleum or gross contamination were noted during the field operations, all sampling points were backfilled with the remaining soil collected at each location. The unused soil cores were reinserted into the borehole where they had originated, compacted and capped with Halliburton Holeplug bentonite, and if at a paved surface, covered with an asphalt patch.

4.5 Soil Analysis

One soil sample from each boring was collected, with an additional sample collected from B-2, for a total of six soil samples analyzed. The samples were analyzed onsite by RED Lab, LLC utilizing ultraviolet fluorescence (UVF) methodology with a QED Hydrocarbon Analyzer from QROS, Ltd., to provide real-time analytical results of total petroleum hydrocarbons (TPH);

gasoline-range organics (GRO); diesel-range organics (DRO); benzene, toluene, ethylbenzene, and total xylenes (BTEX); total aromatic hydrocarbons; total of the EPA 16 Priority-Pollutant polycyclic aromatic hydrocarbons (PAHs); and benzo(a)pyrene (BaP).

5.0 Results

5.1 Geophysical Investigation

The geophysical investigation performed by Pyramid consisted of an electromagnetic (EM) induction-metal detection survey and a ground penetrating radar (GPR) survey. Evidence of buried utilities and minor suspected buried metallic debris was observed. No evidence of any significant buried structures such as USTs was observed. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel #21. See **Appendix C, Geophysical Survey Report** for Pyramid's complete report.

A total of eight EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a pole, a chain, a building, utilities, and a sign. GPR was performed across three EM anomalies to investigate whether the EM responses were a result of a significant buried structure such as a UST.

A total of four formal GPR transects were performed at the site. The first GPR transect recorded evidence of a larger hyperbolic reflector consistent with a utility. The second and third GPR transects recorded smaller hyperbolic reflectors indicative of suspected buried metallic debris. The fourth GPR transect recorded evidence of a linear feature consistent with a suspected utility. None of the small, buried metallic features detected were considered to indicate contaminant or other environmental concerns that would impact the Project Study Area.

5.2 Soil Sampling Data

A summary of the soil sample analytical results is presented in **Table 2, Soil Sample Analytical Summary**. The QED Hydrocarbon Fingerprint Graphs provided by RED Lab are included in **Appendix E**.

The analytical data show:

- There were no detections for BTEX or GRO in any soil sample analysis.
- Detections for DRO (and the calculated detection for TPH – an addition of the GRO and DRO analyses) ranged from 0.9 mg/kg in soil sample B-5, 1.0 to 2.0 feet, to non-detect in soil sample B-2, 8.0 to 9.0 feet.
- Detections for total aromatics ranged from 0.4 mg/kg in soil sample B-5, 1.0 to 2.0 feet and B-4, 1.5 to 2.5 feet, to non-detect in soil sample B-2, 8.0 to 9.0 feet.
- Detections for the total 16 Priority-Pollutant PAHs ranged from 0.023 mg/kg in soil sample B-5, 1.0 to 2.0 feet, to non-detect in soil sample B-2, 8.0 to 9.0 feet.
- BaP was detected in only one soil sample – B-5, 1.0 to 2.0 feet, at 0.001 mg/kg.

5.3 Sample Observations

Soils were observed for any obvious evidence of contamination. No visual or olfactory evidence of contamination was detected in any of the soil samples from the borings.

5.4 Quantity Calculations

RK&K identified no quantifiable soil impact in the Project Study Area.

6.0 Conclusions

Based on results of the EM and GPR surveys, soil assessment and field observations, RK&K has reached the following conclusions:

- Six soil sample analyses from five Geoprobe borings detected concentrations of DRO, total aromatics, total EPA 16 Priority-Pollutant PAHs, and BaP. None of these analytes were detected at concentrations that would be considered an environmental or human-health risk.
- The geophysical investigation performed by Pyramid found evidence of buried utilities and minor suspected buried metallic debris, but no evidence of any significant buried structures such as USTs.
- The site is listed on the NCDEQ Regional Aboveground Storage Tanks and AST Incidents databases. These indicated that there was an incident, numbered 95777 for the site MO-88784. The incident was a dumpster spill affecting both 5511 and 5515 Wilkinson Boulevard on March 15, 2020, reported to NCDEQ on May 11, 2020, with the case currently open. The databases indicate that an undescribed product leaked from a dumpster onto the property line between 5511 and 5511A Wilkinson Boulevard. Given the design and use of the property, and historical photographs of the site when it was being used as Big Al's Trading Post, this incident likely occurred near the northeast corner of the site's building, away from the Project Study Area. The record was determined not to document a significant incident of concern impacting the Project Study Area.
- Groundwater was not encountered in the soil borings to depths of 10 feet bgs.

7.0 Recommendations

Based on results of this GeoEnvironmental Phase II Investigation, RK&K recommends that no additional sampling for the Project Study Area is necessary, and special handling of excavated soils is not anticipated for the planned replacement project for Bridge No. 82 on US 29 & US 74 over South Fork Catawba River.

8.0 Limitations

RK&K's work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of its profession practicing in the same locality, under similar conditions and at the date the services are provided. RK&K's conclusions, opinions and recommendations have been based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. RK&K makes no guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided. None of the work performed shall constitute or be represented as a legal opinion of any kind or nature, but shall be a representation of findings of fact from the results of the assessment.

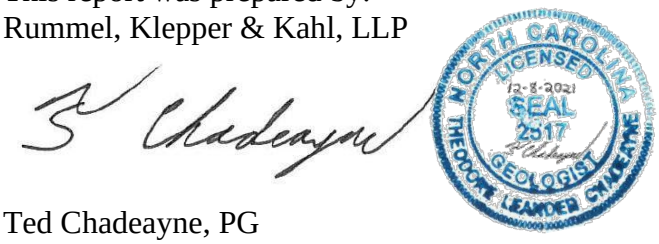
The absence of recognized environmental conditions or contamination recognition in this report cannot be interpreted as a warranty, expressed or implied, that no contamination exists at the Project Study Area. Accordingly, this report does not purport to describe all environmental risks affecting the property, nor will any additional investigation determine as a matter of certainty that all environmental risks affecting the property have been identified.

9.0 Qualifications and Signatures

9.1 Environmental Professional Statement

We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professionals as defined in §312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all-appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

This report was prepared by:
Rummel, Klepper & Kahl, LLP



Ted Chadeayne, PG

Senior Project Geologist

Reviewed by:

Mark Pierce, PE

Project Manager

TABLES

Table 1: Soil Sample Summary and Screening Results

Table 2: Soil Sample Analytical Summary

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT

GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
NCDOT STIP No. U-6146 and NCDOT WBS No. 48392.1.1

Table 1 - Soil Sample Summary and Screening Results

Boring	Sample Depth Ranges (feet)	Headspace Readings (ppm)
B-1	2.0 to 3.0	0.3
B-2	2.7 to 3.7	0.1
	8.0 to 9.0	0.1
B-3	1.5 to 2.5	0.3
B-4	1.5 to 2.5	0.0
B-5	1.0 to 2.0	0.2

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT
GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
NCDOT TIP No. U-6146, WBS No. 48392.1.1
Table 2 - Soil Sample Analytical Summary

	Parameter	BTEX	Total Petroleum Hydrocarbons			Aromatic Hydrocarbons		
			Gasoline-Range Organics (C5 to C10)	Diesel-Range Organics (C10 to C35)	Total Petroleum Hydrocarbons (C5 to C35)	Total Aromatics (C10 to C35)	EPA 16 Priority-Pollutant PAHs	Benzo(a)pyrene
	Industrial/Commercial PSRGs	5.4 (1)	89 (2)	600 (3)	89 (2)	89 (2)	2.1 (4)	2.1
Boring	Units / Sample Depth (feet bgs)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B-1	2.0 to 3.0	<0.6	<0.6	0.10	0.10	0.09	0.009	<0.007
B-2	2.7 to 3.7	<0.4	<0.4	0.28	0.28	0.15	0.006	<0.001
B-2	8.0 to 9.0	<0.4	<0.4	<0.19	<0.4	<0.01	<0.01	<0.006
B-3	1.5 to 2.5	<0.5	<0.5	0.80	0.80	0.30	0.017	<0.006
B-4	1.5 to 2.5	<0.6	<0.6	0.70	0.70	0.40	0.014	<0.002
B-5	1.0 to 2.0	<0.6	<0.6	0.90	0.90	0.40	0.023	0.001

Bold - detected concentration above North Carolina DEQ Industrial/Commercial PSRG, June 2021.
None of the detected concentrations were above the North Carolina DEQ Industrial/Commercial PSRG.
"<" - below laboratory Method Detection Limit.
mg/kg - milligrams per kilogram.

(1) - NCDOT Industrial/Commercial PSRG for benzene.
(2) - NCDOT Industrial/Commercial PSRG for total petroleum hydrocarbons (aromatic low).
(3) - NCDOT Industrial/Commercial PSRG for total petroleum hydrocarbons (aromatic high).
(4) - NCDOT Industrial/Commercial PSRG for benzo(a)pyrene.

This material is the property of NCDOT and is provided for information purposes only. NCDOT assumes no liability for the information contained in this material. The borrower is responsible for verification of all information.

FIGURES

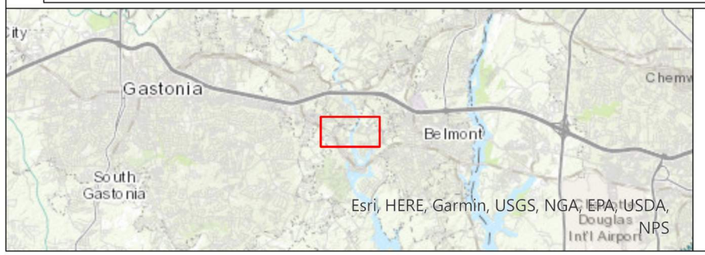
Figure 1: Site Location Map

Figure 2: Site Plan

This material is the property of NCDOT and is provided for information purposes only.
NCDOT assumes no liability for the information contained in this material.
The borrower is responsible for verification of all information.

1,000 500 0 1,000 Feet

N



Legend

- Subject Parcel Property
- Parcel Properties

RK&K

GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
McAdenville, Gaston County, North Carolina

Map Title:
Figure 1 - Sheet 1:
Site Location Map

Sources:
NCDOT

Date: December 2021
Scale: 1:8,000

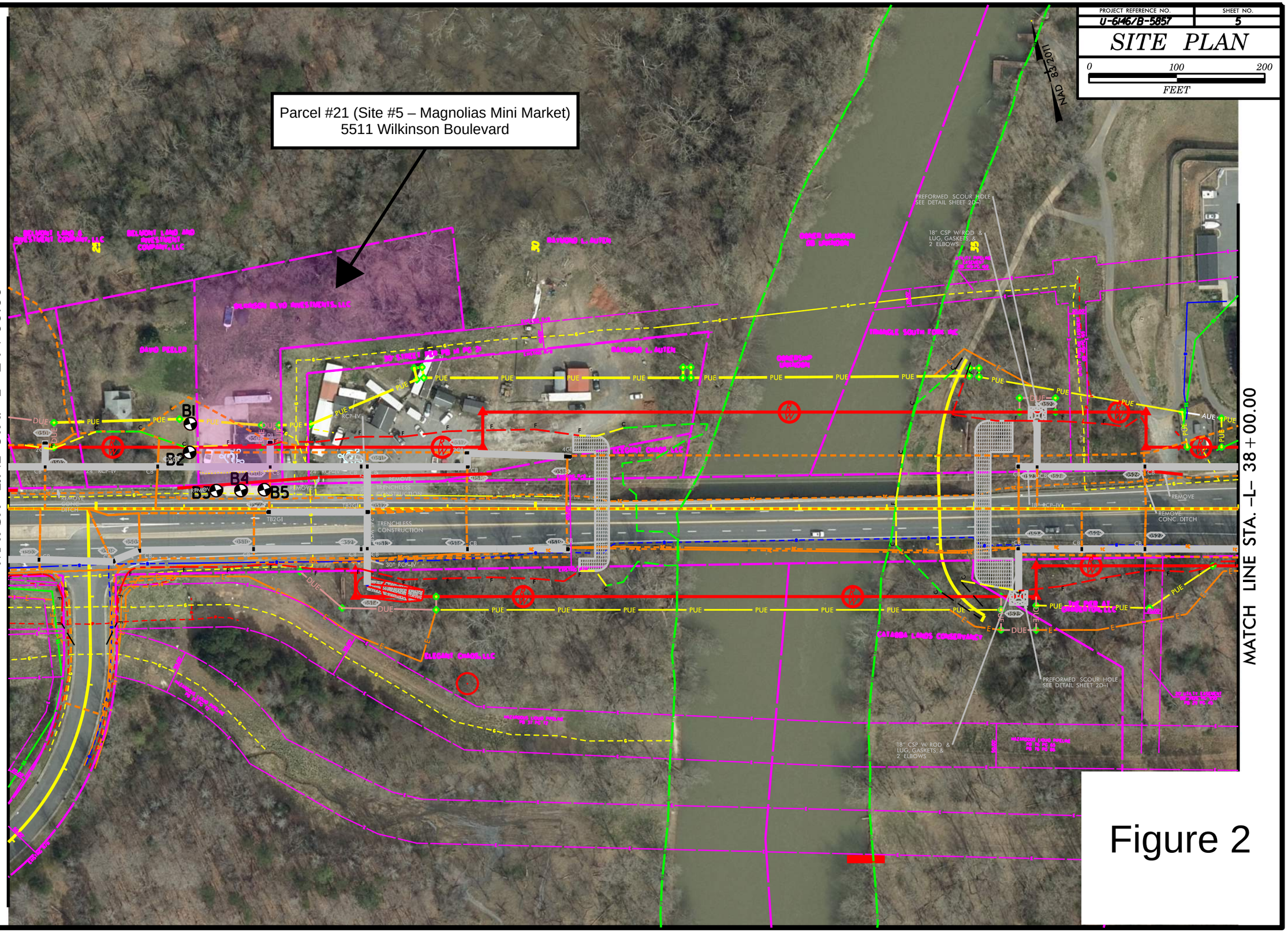

PROJECT REFERENCE NO.
U-6146/B-5857
SHEET NO.
5
SITE PLAN
0
100
200
FEET
NAD 83/2011
Parcel #21 (Site #5 – Magnolias Mini Market)
5511 Wilkinson Boulevard
MATCH LINE STA. –L– 24+00.00
MATCH LINE STA. –L– 38+00.00
B1
B2
B3
B4
B5
PUE
DUE
AUE
REMOVE
TRENCHLESS CONSTRUCTION
30" RCP-IV
18" RCP-IV
PREFORMED SCOUR HOLE SEE DETAIL SHEET 2D-1
18" CSP W/ ROD & LUG, GASKETS, & 2 ELBOWS
REVISIONS
8/17/99

Figure 2

Appendix A:

Site Photographs

Photo 1: Initial conditions of the site before field work, looking west.

Photo 2: Geoprobe drilling boring B-5, looking east.

Photo 3: Geoprobe drilling boring B-4, looking northeast.

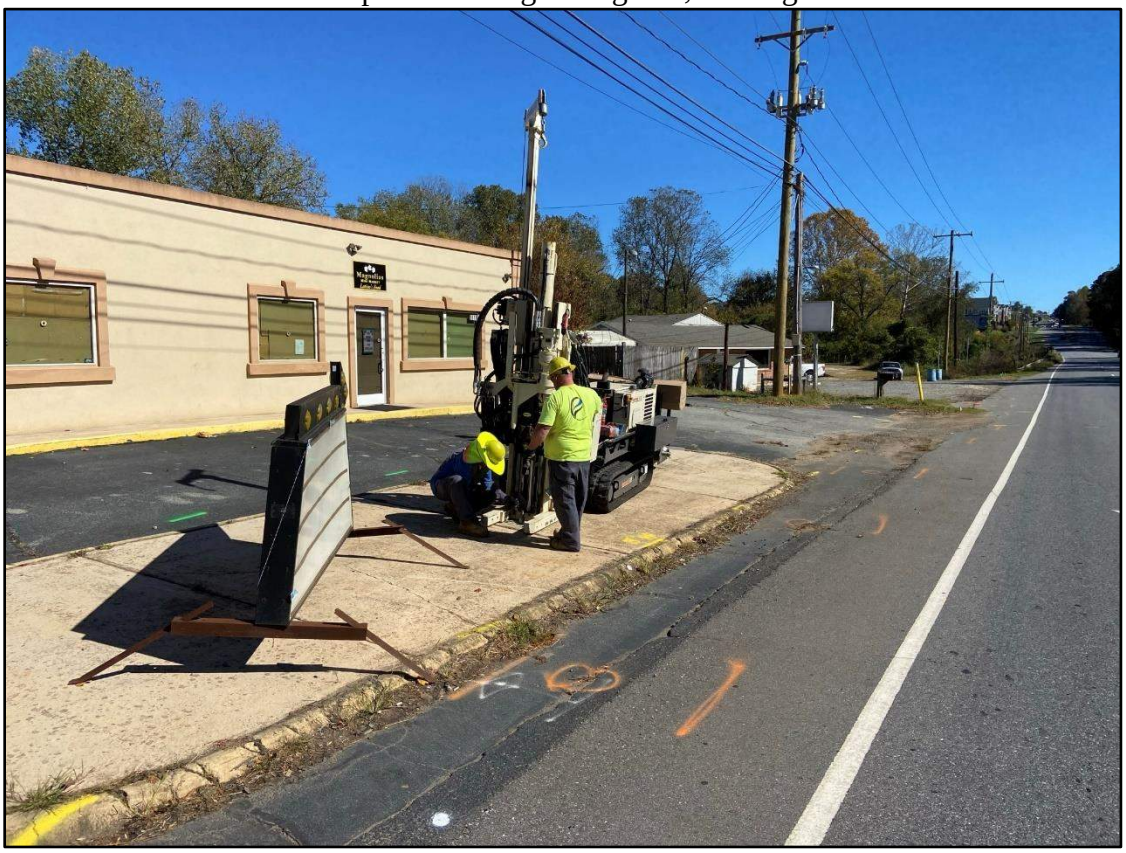


Photo 4: Geoprobe drilling boring B-3, looking east.

Photo 5: Geoprobe drilling boring B-2, looking west.

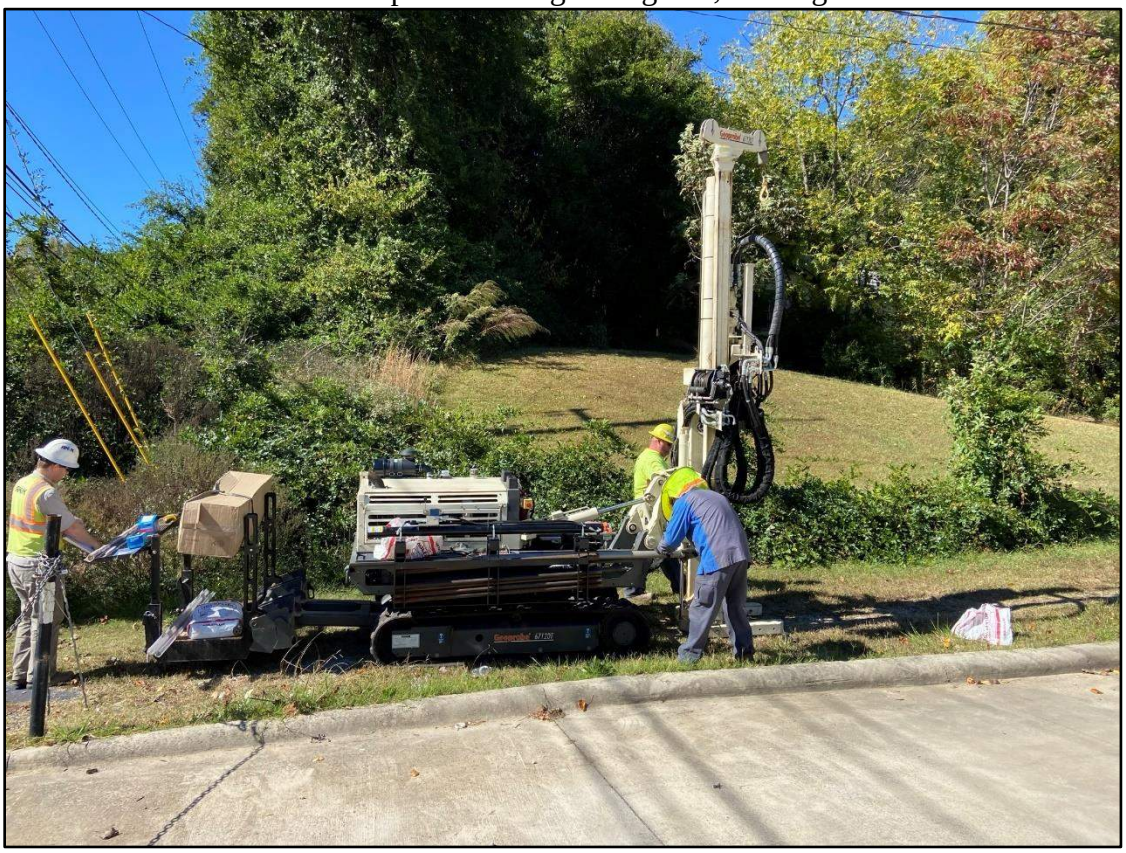


Photo 6: Geoprobe drilling boring B-1, looking west.

Photo 7: Condition of roadside island, looking west.

Photo 8: Final conditions of the site after field work, looking west.

Appendix B:

NCDEQ Database Information

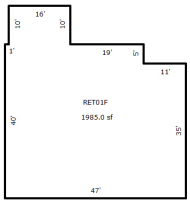
Property Information

Control Data with Tax Year Dropdown

Tax Year	2021
Parcel Number	185596
Class	2020 - General Retail
Tax Code	365 - LOWELL FD
Neighborhood	MV001 - McAdenville/Wilkinson
Physical Address	5511 WILKINSON BLVD MCADENVILLE NC 28101
Mapped Acres	1.0400
Assessed Value	159,750
Tax Rate	0.8980
Total Tax	$1,434.56

Property Sketches & Photos

Converted Sketch



Sketch by Apex Sketch

Mobile Video File

Billing Details

	Total
Tax Billed	$1,434.56
SA Billed	$0.00
Interest Billed	$0.00
Fees Billed	$0.00
Total Billed	$1,434.56
Amount Paid	$0.00
Total Unpaid	**$1,434.56**

Tax Due Amounts

If paid in...	Amount due is...
November 2021	$1,434.56
December 2021	$1,434.56

Pay Taxes

Tax Due amounts are for all unpaid years.

See Payment History section for year-by-year details.

Payment History

Tax Year	Total Due	Total Paid	Amount Unpaid	Date Paid
2021	$1,434.56	$0.00	$1,434.56	
2020	$1,434.56	$1,434.56	$0.00	12/18/2020
2019	$1,450.53	$1,450.53	$0.00	12/13/2019

Show 10 More

Legal Descriptions

Legal Description	Subdivision Name	Block	Lot	Plat Book	Plat Page
THOMAS C CLONINGER L 4,10-11 & P/3 15 031C 071 01 000					

No Exclusions

Related Names

OWNER	WILKINSON BLVD INVESTMENTS LLC,
Mailing Address	329 PARADISE CIR BELMONT, NC 280127705

Transfer History

Book & Page	Sale Type	Sale Date	Sold By	Sold To	Price
4596 1423	WD	2/10/2012	BURDETTE CLAUDE PINKNEY	WILKINSON BLVD INVESTMENTS LLC	$150,000
3562 0177	WD	10/29/2002	BURDETTE CLAUDE 1%	BURDETTE CLAUDE PINKNEY	$0
3560 0606	WD	10/25/2002	BURDETTE PEARL	BURDETTE CLAUDE 1%	$0
082E 0330	WB	4/1/1982	BURDETTE JACK A	BURDETTE PEARL	$0
1008 0308	WD	10/30/1969		BURDETTE JACK A	$0

No Genealogy Information

Land Valuation

Property Class	Valued Acres	Appraised Value
COMM SECONDARY SITE	1.0000	114,750
COMM RESIDUAL	0.0400	144

Structure (1 of 1) Real Estate

Property Class	Description	Total Finished Area	Year Built
COM - Commercial	RETAIL GENERAL	1,985	1950

EXTERIOR WALLS

CONCRETE BLOCK	100 Percent

Paving

PAVING ASPHALT	2,500 Square Ft.
PAVING CONCRETE	2,500 Square Ft.

HEAT AND AIR CONDITION

HEAT & AIR	100 Percent

Other

OVERHEAD DOOR	1 Square Ft.

Main Level Framing

RETAIL	100 Percent

Market Value

Year	Market Land	Market Building	Market Total
2022	114,890	44,860	159,750
2021	114,890	44,860	159,750
2020	114,890	44,860	159,750

Show 1 More

Contact Information

128 W. Main Ave.
PO Box 1578
Gastonia, NC 28053-1578

Appendix C:

Geophysical Survey Report

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2021-287)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 21
NCDOT PROJECT U-6146

5511 WILKINSON BOULEVARD, MCADENVILLE, NC

November 2, 2021

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GEOPHYSICAL INVESTIGATION REPORT
Parcel 21 - 5511 Wilkinson Boulevard
McAdenville, Gaston 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

Project Description: Pyramid Environmental (Pyramid) conducted a geophysical investigation for RK&K at Parcel 21, located at 5511 Wilkinson Boulevard, in McAdenville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-6146). 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 October 22, 2021, 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 eight EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. Evidence of buried utilities and minor suspected buried metallic debris was observed. No evidence of any significant buried structures such as USTs was observed. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 21.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for RK&K at Parcel 21, located at 5511 Wilkinson Boulevard, in McAdenville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-6146). 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 October 22, 2021, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site consisted of a commercial building surrounded by grass, concrete, and asphalt 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 October 22, 2021, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 control unit coupled to 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 SIR 4000 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	Suspected Buried Metallic Debris	✓
2	Pole	
3	Chain	
4	Building	
5	Suspected Buried Metallic Debris/Utility	✓
6	Utility	
7	Sign	
8	Utilities	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a pole, a chain, a building, utilities, and a sign. GPR was performed across EM Anomalies 1, 5, and 8 to investigate whether the EM responses were a result of a significant buried structure such as a UST.

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 four formal GPR transects were performed at the site. GPR Transect 1 was performed across EM Anomaly 8. This transect recorded evidence of a larger hyperbolic reflector consistent with a utility. GPR Transects 2 and 3 recorded smaller hyperbolic reflectors indicative of suspected buried metallic debris at EM Anomalies 1 and 5. GPR Transect 4 recorded evidence of a linear feature consistent with a suspected utility associated with EM Anomaly 5.

Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 21. **Figure 4** provides an overlay of the metal detection results on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 21 in McAdenville, 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.
- Evidence of buried utilities and minor suspected buried metallic debris was observed. No evidence of any significant buried structures such as USTs was observed.
- Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 21.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for RK&K, 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 West)

View of Survey Area (Facing Approximately West)

N

PYRAMID GEOPHYSICS
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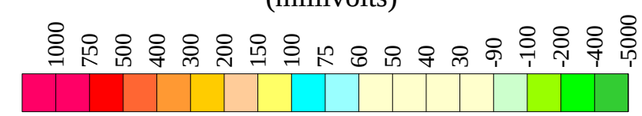
PROJECT	PARCEL 21 MCADENVILLE, NORTH CAROLINA NCDOT PROJECT U-6146	TITLE	PARCEL 21 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS
DATE	10/27/2021	CLIENT	RK&K
PYRAMID PROJECT #:	2021-287		**FIGURE 1**

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 EM data were collected on October 22, 2021, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 instrument with a 350 MHz HS antenna on October 22, 2021.

EM61 Metal Detection Response (millivolts)



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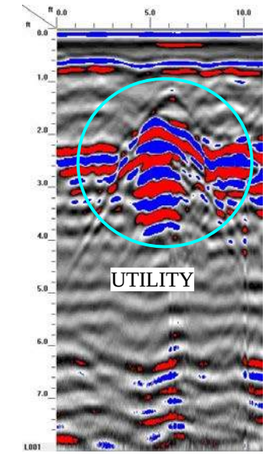
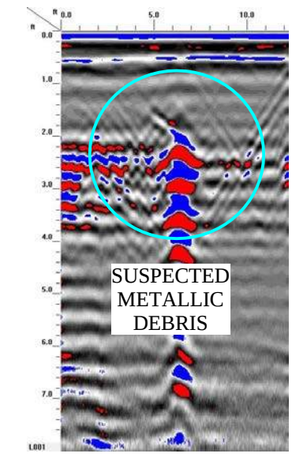
PROJECT	PARCEL 21 MCADENVILLE, NORTH CAROLINA NCDOT PROJECT U-6146	TITLE	PARCEL 21 - EM61 METAL DETECTION CONTOUR MAP
DATE	10/27/2021	CLIENT	RK&K
PYRAMID PROJECT #:	2021-287		**FIGURE 2**

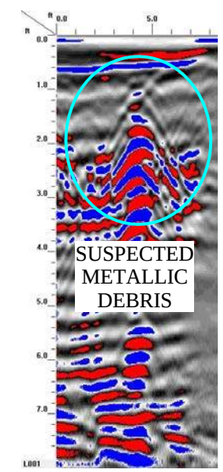
GPR TRANSECT LOCATIONS



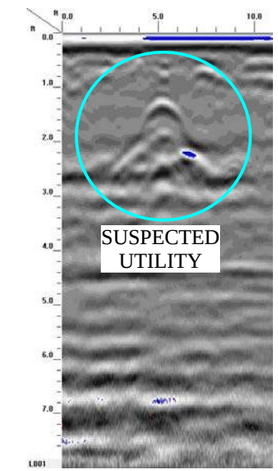
GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



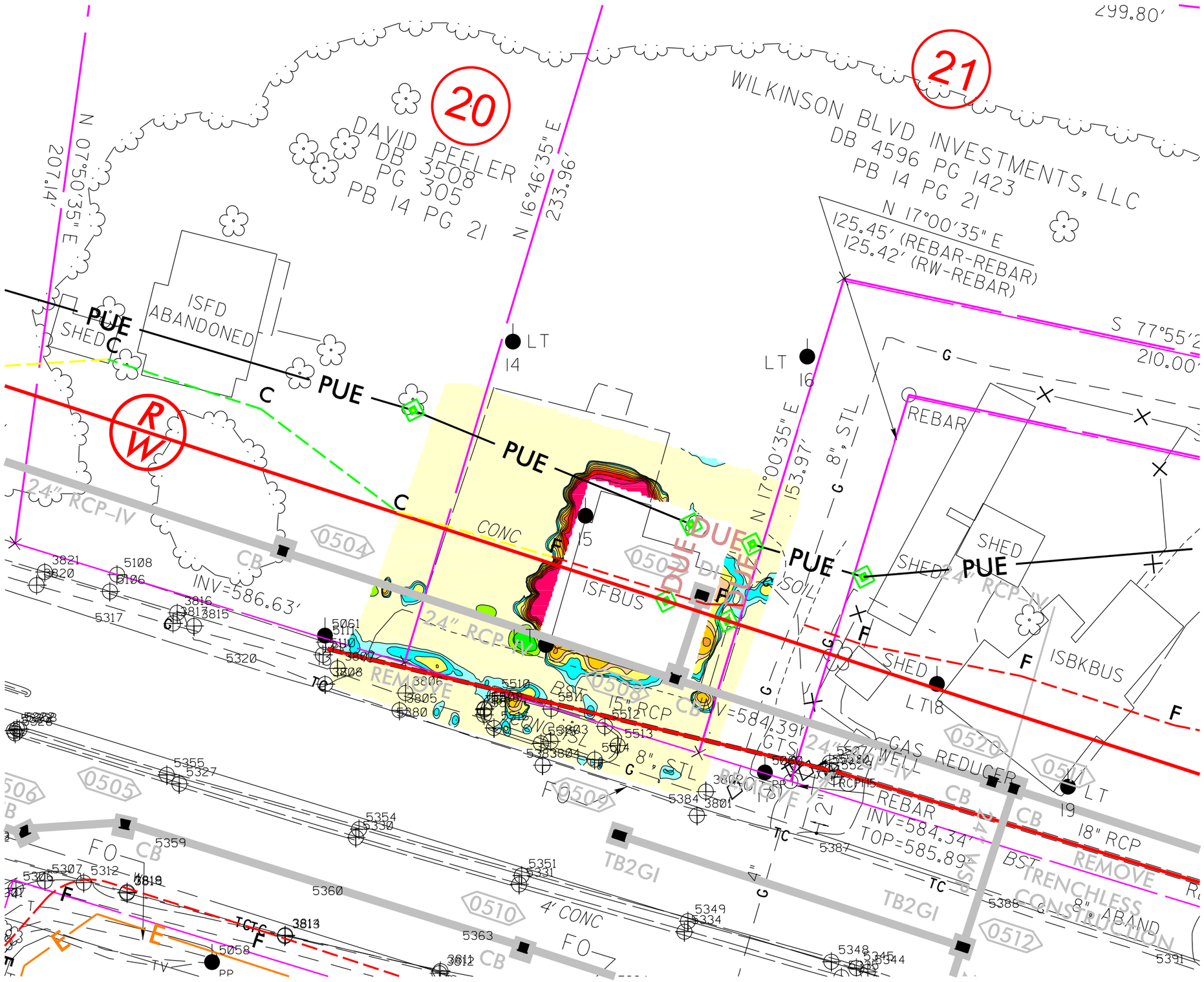
GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)

N

PYRAMID GEOPHYSICS	503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	PROJECT PARCEL 21 MCADENVILLE, NORTH CAROLINA NCDOT PROJECT U-6146	TITLE PARCEL 21 - GPR TRANSECT LOCATIONS AND IMAGES	DATE 10/27/2021 PYRAMID PROJECT #: 2021-287	CLIENT RK&K **FIGURE 3**



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PUE — 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 20 40
FEET

N

TITLE
OVERLAY OF METAL DETECTION RESULTS ON NCDOT ENGINEERING PLANS

PROJECT
5511 WILKINSON BLVD.
MCADENVILLE, NORTH CAROLINA
NCDOT PROJECT U-6146

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DATE: 10-29-2021	REVISION NO. 0
PYRAMID PROJECT NO. 2021-287	FIGURE NO. 4

Appendix D:

Geoprobe Boring Logs

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 0	**TIP** U-6146	**COUNTY** GASTON	**GEOLOGIST** J Mize
SITE DESCRIPTION Gaston County PSAs			**GROUND WTR (ft)**
BORING NO. B-1	**STATION** 26+08	**OFFSET** 97 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. N/A	**TOTAL DEPTH** 10.0 ft	**NORTHING** 552,321	**EASTING** 1,380,525	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Geoprobe	**HAMMER TYPE** Automatic
DRILLER D. Summers	**START DATE** 10/26/21	**COMP. DATE** 10/26/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	0.0
							S-15			**RESIDUAL** Red-brown to gray, clayey SILT (A-5), saprolitic, trace mica	10.0
										Boring Terminated at Depth 10.0 ft in Residual: clayey SILT (A-5) RUN 1 (0'-5'): 4.2'/5.0' RUN 2 (5'-10'): 4.5'/5.0' S-15 PID READING: 0.3 PPM	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 0	**TIP** U-6146	**COUNTY** GASTON	**GEOLOGIST** J Mize
SITE DESCRIPTION Gaston County PSAs			**GROUND WTR (ft)**
BORING NO. B-2	**STATION** 26+07	**OFFSET** 64 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. N/A	**TOTAL DEPTH** 10.0 ft	**NORTHING** 552,290	**EASTING** 1,380,514	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Geoprobe	**HAMMER TYPE** Automatic
DRILLER D. Summers	**START DATE** 10/26/21	**COMP. DATE** 10/26/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	0.0
							S-13			**RESIDUAL** Tan to orange, fine sandy SILT (A-4), saprolitic, trace mica	8.0
							S-14			Tan, clayey SILT (A-5), saprolitic, trace mica	10.0

Boring Terminated at Depth 10.0 ft in Residual: clayey SILT (A-5)

RUN 1 (0'-5'): 3.7'/5.0'
RUN 2 (5'-10'): 4.8'/5.0'

S-13 PID READING: 0.1 PPM
S-14 PID READING: 0.1 PPM

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 0	**TIP** U-6146	**COUNTY** GASTON	**GEOLOGIST** J Mize
SITE DESCRIPTION Gaston County PSAs			**GROUND WTR (ft)**
BORING NO. B-3	**STATION** 26+37	**OFFSET** 21 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. N/A	**TOTAL DEPTH** 10.0 ft	**NORTHING** 552,240	**EASTING** 1,380,530	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Geoprobe	**HAMMER TYPE** Automatic
DRILLER D. Summers	**START DATE** 10/26/21	**COMP. DATE** 10/26/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	0.0
							S-12			**ARTIFICIAL FILL** Red, fine sandy CLAY (A-6)	1.5
										RESIDUAL Tan, fine to coarse sandy SILT (A-4), saprolitic, trace mica	6.0
										Tan, silty fine to coarse SAND (A-2-4), saprolitic, trace mica	10.0
										Boring Terminated at Depth 10.0 ft in Residual: silty SAND (A-2-4)	

RUN 1 (0'-5'): 3.7'/5.0'
RUN 2 (5'-10'): 4.3'/5.0'

S-12 PID READING: 0.3 PPM

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 0	**TIP** U-6146	**COUNTY** GASTON	**GEOLOGIST** J Mize
SITE DESCRIPTION Gaston County PSAs			**GROUND WTR (ft)**
BORING NO. B-4	**STATION** 26+65	**OFFSET** 21 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. N/A	**TOTAL DEPTH** 10.0 ft	**NORTHING** 552,231	**EASTING** 1,380,556	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Geoprobe	**HAMMER TYPE** Automatic
DRILLER D. Summers	**START DATE** 10/26/21	**COMP. DATE** 10/26/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	0.0
							S-11			**ARTIFICIAL FILL** Red, silty fine sandy CLAY (A-6)	1.9
										RESIDUAL Tan, fine sandy SILT (A-4), saprolitic, trace mica	10.0

Boring Terminated at Depth 10.0 ft in Residual: sandy SILT (A-4)

RUN 1 (0'-5'): 3.3'/5.0'
RUN 2 (5'-10'): 3.9'/5.0'

S-11 PID READING: 0.0 PPM

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 0	**TIP** U-6146	**COUNTY** GASTON	**GEOLOGIST** J Mize
SITE DESCRIPTION Gaston County PSAs			**GROUND WTR (ft)**
BORING NO. B-5	**STATION** 26+92	**OFFSET** 22 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. N/A	**TOTAL DEPTH** 10.0 ft	**NORTHING** 552,224	**EASTING** 1,380,582	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Geoprobe	**HAMMER TYPE** Automatic
DRILLER D. Summers	**START DATE** 10/26/21	**COMP. DATE** 10/26/21	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	0.0
							S-10			**ARTIFICIAL FILL** Red, silty CLAY (A-7-6)	2.5
										RESIDUAL Tan, fine sandy SILT (A-4), saprolitic, trace mica	10.0

Boring Terminated at Depth 10.0 ft in Residual: sandy SILT (A-4)

RUN 1 (0'-5'): 2.9'/5.0'
RUN 2 (5'-10'): 3.7'/5.0'

S-10 PID READING: 0.2 PPM

Appendix E:

RED Lab Hydrocarbon Analysis Results,
RED Lab QED Hydrocarbon Fingerprint Graphs

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT

GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
NCDOT STIP No. U-6146 and NCDOT WBS No. 48392.1.1

Hydrocarbon Analysis Results

Project: U-6141 10/26/2021

Hydrocarbon Analysis Results

QED

Client: RK&K
Address:

REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS

AQROS

Samples taken Tuesday, October 26, 2021
Samples extracted Tuesday, October 26, 2021
Samples analysed Tuesday, October 26, 2021

Contact: MARK PIERCE ; TED CHADEAYNE

Operator MAX MOYER

Project: U-6141

T03308

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 C5:10	% Ratios C10:C18	% Ratios C18+	HC Fingerprint Match
Soil	B-5 1-2' 1312	24.0	<0.6	<0.6	0.9	0.9	0.4	0.023	0.001	0	80.5	19.5	V.Deg.PHC 95.1%,(FCM)
Soil	B-4 1.5-2.5' 1325	24.0	<0.6	<0.6	0.7	0.7	0.4	0.014	<0.002	0	89.8	10.2	V.Deg.PHC 73.7%,(FCM)
Soil	B-3 1.5-2.5' 1330	20.0	<0.5	<0.5	0.8	0.8	0.3	0.017	<0.006	0	67.5	32.5	V.Deg.PHC 45.5%,(FCM)
Soil	B-2 2.7-3.7' 1342	17.0	<0.4	<0.4	0.28	0.28	0.15	0.006	<0.001	0	65.7	34.3	V.Deg.PHC 41.4%,(FCM)
Soil	B-2 8-9' 1345	19.0	<0.4	<0.4	<0.19	<0.4	<0.01	<0.01	<0.006	0	0	0	PHC ND,(FCM)
Soil	B-1 2-3' 1355	24.0	<0.6	<0.6	0.1	0.1	0.09	0.009	<0.007	0	34	66	Residual HC

Initial Calibrator QC check OK Final FCM QC Check OK 94.6%

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.

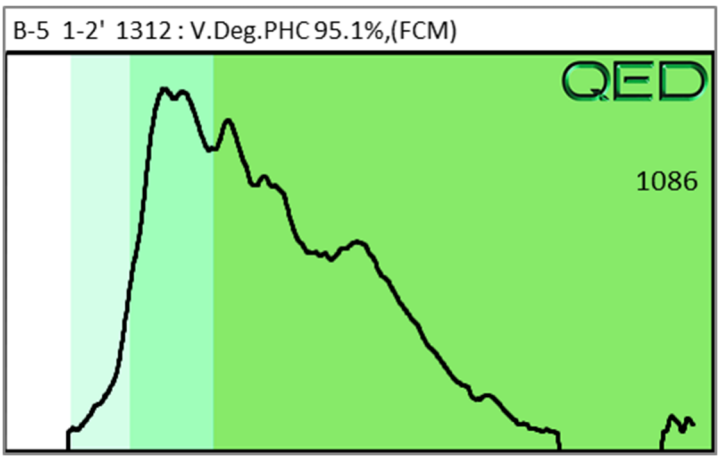
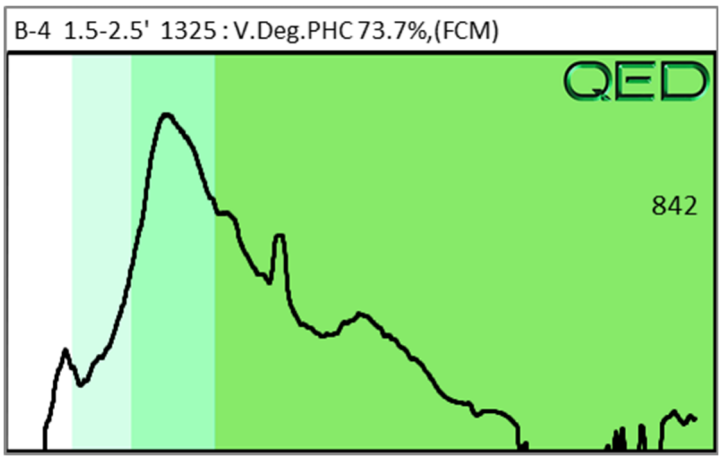
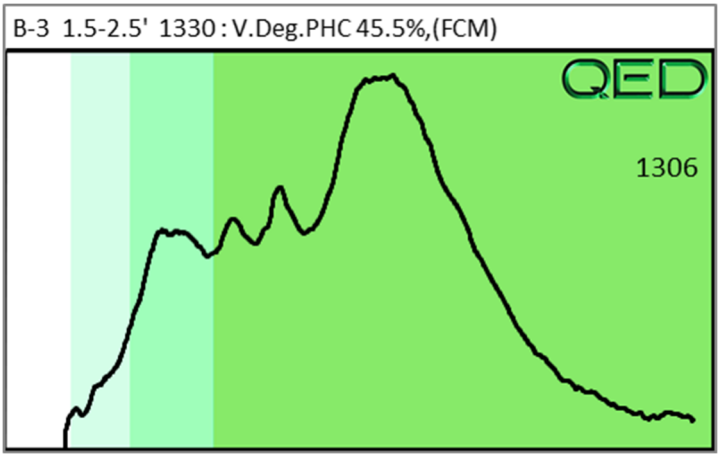
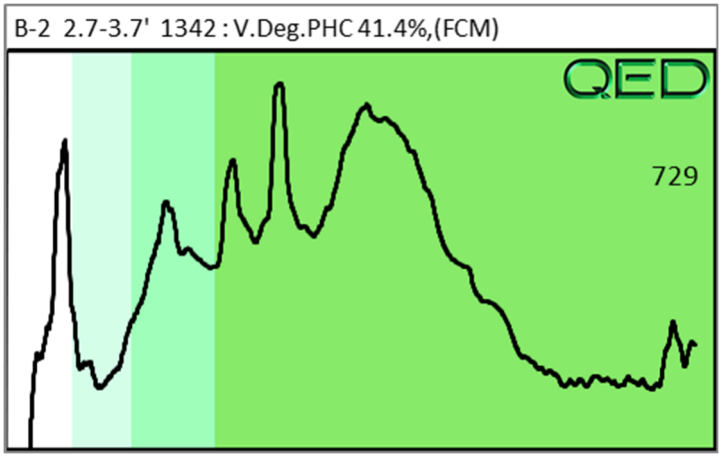
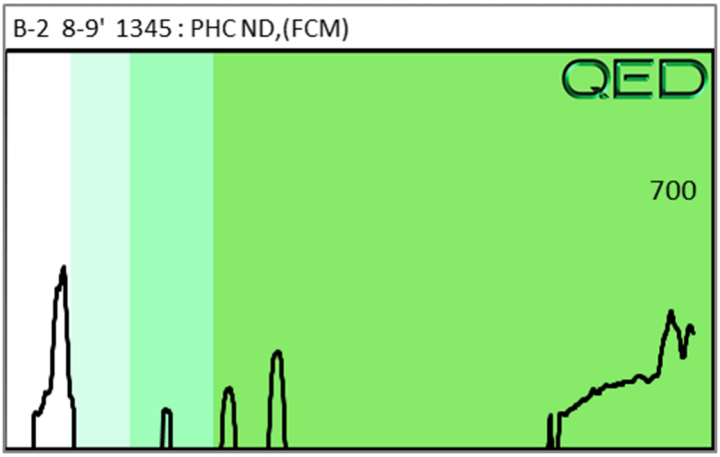
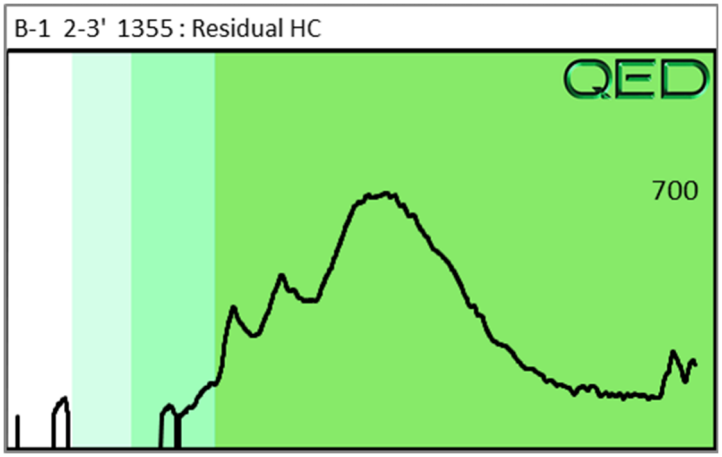
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

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

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

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT

GeoEnvironmental Phase II Investigation
Parcel #21 (Site #5 – Magnolias Mini Market)
NCDOT TIP No. U-6146, WBS No. 48392.1.1

QED Hydrocarbon Fingerprint Graphs

Project: U-6141 10/26/2021