North Carolina Department of Transportation

Phase II Investigation
State Project: R-5709
WBS Element: 50205.1.1
Hoke County

Parcel 431
Herbert L./Jennifer Jones – Just Country Antiques Store Property
5735 NC 211 Highway
Raeford, North Carolina
October 28, 2021

Wood Environment & Infrastructure Solutions, Inc.
Project: 20478R5709

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Principal Hydrogeologist

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1.0 INTRODUCTION

In response to the North Carolina Department of Transportation (NCDOT) Request for Proposal, dated June 2, 2021, Wood Environment & Infrastructure Solutions, Inc. (Wood) has performed a Phase II Investigation for Parcel 431 (Site). The investigation was conducted in accordance with Wood's Technical and Cost proposal dated June 18, 2021, and NCDOT's July 6, 2021, Notice to Proceed. NCDOT contracted Wood to perform the Phase II Investigation at the parcel, within areas that will be affected by the proposed widening of NC 211 Hwy from US 15-501 in Aberdeen, North Carolina to SR 1244 (West Palmer Street)/SR 1311 (Mockingbird Hill Road) in Raeford, North Carolina.

The Site is located along the southwestern side of NC 211 Hwy, as shown on the Vicinity Map, **Figure 1**. The parcel, which is located at 5735 NC 211 Hwy, is currently occupied by Just County, an antiques store, and a two-story single-family residence with a garage and shed. The residence, garage, and shed are located outside of the area of investigation. The Site is identified as Parcel 431, Herbert L./Jennifer Jones property, within the NCDOT MicroStation survey file and is in Raeford of Hoke County, North Carolina. The area of investigation at Parcel 431 is approximately 1.327-acres as shown on **Figure 2**.

The Site was reported as a possible former gasoline station (currently an antiques store) with suspected dispenser island in the 2019 NCDOT Phase I Report. Wood reviewed the North Carolina Laserfiche online database and NCDEQ environmental documentation for Parcel 431 does not exist. Wood reviewed the NCDOT Historical Aerial Imagery Index, and Parcel 431 was not covered by photographs in the index

The following report describes a geophysical survey and subsurface field investigation at the Site, with results from our ultraviolet fluorescence (UVF) soil analyses and evaluation for potential soil contamination within the Site.

2.0 GEOLOGY

2.1 Regional Geology

The Site is located within the Coastal Plain Physiographic Province of North Carolina. According to the 1985 State Geologic Map of North Carolina, the area is within the

Pinehurst Formation and is underlain by medium- to coarse-grained sand with cross-bedding and rhythmic bands of clayey sand.

2.2 Site Geology

Site geology was observed through the advancement of 11 shallow soil borings (P431-B1 to P431-B11). The borings were advanced to approximate depths of 10 to 15 feet below ground surface (bgs). Groundwater was not encountered during boring advancement. Figure 2 presents the boring locations and Site layout. Soils encountered in the borings consisted mostly of tan to brown to orange sand overlying tan to orange clayey sand. Staining and petroleum odors were not observed in the borings. Based on observations of topography of the Site vicinity, the groundwater flow direction is inferred to be generally toward the southwest. Boring logs are presented in **Appendix A**.

3.0 FIELD ACTIVITIES

3.1 Preliminary Activities

Prior to commencing field sampling activities at the Site, several tasks were accomplished in preparation for the subsurface investigation. A Health and Safety Plan (HASP) was created with the Site-specific health and safety information necessary for the field activities, including protocol for COVID-19. North Carolina 811 was contacted on August 24, 2021, for the parcel.

Pyramid Geophysical Services of Greensboro, North Carolina (Pyramid) was retained to conduct a geophysical investigation. Probe Utility Locating (PUL) was retained to perform utility locating activities at the Site. Innovative Environmental Technologies, Inc. (IET) of Concord, North Carolina was retained by Wood to perform the direct push sampling for soil borings, and UVF instrumentation was rented from Red Lab, LLC (Red Lab) of Wilmington, North Carolina.

Boring locations were strategically placed within the parcel to maximize the opportunity to encounter potential contaminated soil and evaluate areas of subsurface design features.

3.2 Site Reconnaissance

Wood personnel visited the parcel on June 8, 2021, and observed a commercial building occupied by an antiques store. A suspected dispenser island and a possible product line were observed along the northeastern building. The possible product line was observed extending from the suspected dispenser island toward the northwest to an area of broken concrete and gravel. A photographic log is included in **Appendix B**.

3.3 Geophysical Survey Results and Utility Locating

The geophysical survey was conducted by Pyramid personnel between August 11 and 12, 2021. Pyramid conducted a geophysical investigation using electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys to the north, east, and south of the Site building, as these areas were most likely to contain USTs. A total of four EM anomalies were identified, the majority of which were attributed to visible cultural features located at ground surface. The area along the northeast exterior of the building, suspected to contain reinforced concrete, was investigated further using GPR. Three no confidence anomalies were identified within this area. The GPR survey identified sections of reinforced concrete at the locations of the no confidence anomalies. These three anomalies contained features characteristic of buried shallow foundations or slabs. No confidence anomaly #1 measured approximately 12 feet long and 13 feet wide, while no confidence anomalies #2 and #3 both measured approximately 12 feet long by 9.5 feet wide. The estimated depth to the top each of the three anomalies was 0.5 feet bgs. These areas were not characteristic of USTs. The geophysical survey did not identify evidence of USTs within the investigation area. The complete Pyramid geophysics report is included as **Appendix C**.

Utility locating was performed by PUL personnel on August 26, 2021. The utility locating effort identified a buried water line and associated service lines, several buried telephone and communication lines, as well as buried electrical lines. The buried water line was observed along the eastern parcel boundary parallel to NC 211 Hwy with a service line extending toward the southwest to the residence located outside of the area of investigation. A secondary service line was identified extending from the residence toward the southeast to the antiques shop. Several buried telephone and communications lines were observed along the eastern parcel boundary parallel to NC 211 Hwy. In addition, a buried telephone line was identified extending from NC 211 Hwy to the northern exterior wall of the antiques shop. Buried electrical lines were identified extending from the antique

shop towards light poles at the site. Overhead electrical lines were noted along the eastern parcel boundary parallel to NC 211 Hwy. PUL was able to trace the possible product line and observed the line extending from the suspected dispenser island towards the northwest and ending in an area covered by broken concrete and gravel. Based on this evidence, it is suspected a UST or USTs were formerly located in the area of broken concrete and gravel.

3.4 Soil Sampling

On August 31, 2021, Wood and IET mobilized to the Site to advance 11 shallow soil borings (P431-B1 to P431-B11). The borings were advanced via direct-push technology to approximate total depths ranging from 10 to 15 feet bgs. Boring locations targeted potential environmental sources at the Site and future drainage features. The direct-push rig was not able to access the immediate vicinity of the suspected former dispenser island due to the presence of a canopy extending east from the Site building. Flower beds constructed on top of the suspected former dispenser island also obstructed access. Therefore, soil borings were advanced along the southern, eastern, and northern sides of the suspected dispenser island.

The purpose of soil sampling was to assess if a petroleum release had impacted the Site and if so, to estimate the volume of impacted soil that might require special handling during NCDOT construction activities. IET advanced a soil sampler to the target depth at each boring location using an AMS PowerProbe. To minimize the potential for cross-contamination between samples, a new polyvinyl chloride (PVC) sleeve (tube) was inserted into the sampler for each soil interval. Visual and olfactory observations relative to the soil cores were recorded by Wood personnel. The soil types encountered in the borings were recorded to prepare soil boring logs. Wood conducted field screening for volatile organic compounds (VOCs) of the soil borings with a photoionization detector (PID). The portion of each soil core with the highest PID reading was selected from the 0–5 foot interval and the 5-10 foot interval for analysis of total petroleum hydrocarbons (TPH), diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene, and xylene (BTEX), total aromatics, and polycyclic aromatic hydrocarbons (PAH) by UVF. In borings extended to 15 feet bgs near the suspected location of a former UST(s), an additional portion was selected from the 10-15 foot interval for the analyses indicated above. Neither groundwater nor bedrock were encountered in the borings. Twenty-four soil samples were collected from the 11 borings at the Site for onsite UVF analysis.

4.0 SOIL SAMPLING RESULTS

Based on August 31, 2021, PID screening and UVF hydrocarbon analysis, evidence of petroleum hydrocarbon impacts was not identified. The NCDEQ Action Levels of 100 milligrams per kilogram (mg/kg) for DRO and 50 mg/kg for GRO were not exceeded in samples collected from the 11 borings advanced at the Site.

PID readings for the 11 borings ranged from 5.4 parts per million (ppm) in sample P431-B7-10-12 collected from 10 to 12 feet bgs, to 13.7 ppm in sample P431-B11-4-6 collected from 4 to 6 feet bgs. The PID field screening results for samples selected for UVF analysis are summarized in **Table 1** and the full list of PID readings are provided on the boring logs in Appendix A.

Results from the on-Site UVF petroleum soil analyses are presented in **Table 2**, with instrument generated tables in **Appendix D**. Several categories of analyses were measured such as: DRO, GRO, TPH, PAHs, and total aromatics. **Figure 3** presents the GRO and DRO results for the August 2021 investigation.

GRO or DRO detections in the 24 soil samples collected at the Site did not exceed their respective NCDEQ Action Levels. The hydrocarbon results from the QED QROS Hydrocarbon Analyzer are provided in Appendix D.

5.0 CONCLUSIONS

Based on the Site observations and UVF analysis, petroleum-impacted soil contamination was not identified as defined by localized exceedances of the NCDEQ Action Levels of 50 mg/kg for GRO and 100 mg/kg for DRO.

The following bulleted summary is based upon Wood's evaluation of field observations, geophysical survey results and on-Site quantitative analyses of samples collected from the Site on August 31, 2021.

- The Site is occupied by a commercial building, suspected former dispenser island and a possible product line. USTs were not identified during the geophysical survey or field activities.

- Three no confidence anomalies were identified northeast of the Site building. The GPR survey identified sections of reinforced concrete at the locations of the no confidence anomalies. These three anomalies contained features characteristic of buried shallow foundations or slabs at a depth of approximately 0.5 feet bgs.

- Eleven soil borings were advanced to roughly 10 to 15 feet within the investigation area to collect soil samples for on-Site UVF analysis. Twenty-four soil samples were collected for on-Site UVF analysis.

- UVF analysis of 24 soil samples collected did not identify petroleum-impacted soil.

6.0 RECOMMENDATIONS

Based on these Phase II Investigation results, Wood recommends no further soil investigation. Wood notes that the suspected former dispenser island and possible product line located within the investigation area lie within the ROW and thus should be removed, in general accordance with the NCDEQ guidelines.

TABLES

Table 1: Summary of PID Screening Results
R-5709, Parcel 431 - Herbert L./Jennifer Jones –
Just Country Antiques Store Property
Aberdeen, North Carolina
Wood Project: 20478R5709

Boring ID	Depth of Sample Interval	PID Reading
P431-B1	2-4	12.1
	8-10	11.3
P431-B2	0-2	11.6
	4-6	11.1
P431-B3	2-4	10.9
	6-8	11.6
P431-B4	2-4	11.5
	8-10	10.8
P431-B5	2-4	10.8
	6-8	10.5
	12-14	10.6
P431-B6	2-4	10.8
	8-10	12.1
P431-B7	2-4	8.0
	4-6	7.6
	10-12	5.4
P431-B8	2-4	12.5
	6-8	12.1
P431-B9	2-4	11.8
	8-10	13.1
P431-B10	2-4	11.9
	6-8	11.6
P431-B11	2-4	12.0
	4-6	13.7

Notes:

1. Samples collected on 8/31/21
2. Depths shown in feet below ground surface (bgs)
3. PID = Photoionization Detector
4. PID readings shown in parts per million (ppm)

Prepared By/Date: AJF 9/9/21

Checked By/Date: DRH 10/4/21

Table 2: UVF Hydrocarbon Soil Sampling Results
R-5709, Parcel 431 - Herbert L./Jennifer Jones – Just Country Antiques Store Property
Aberdeen, North Carolina
Wood Project: 20478R5709

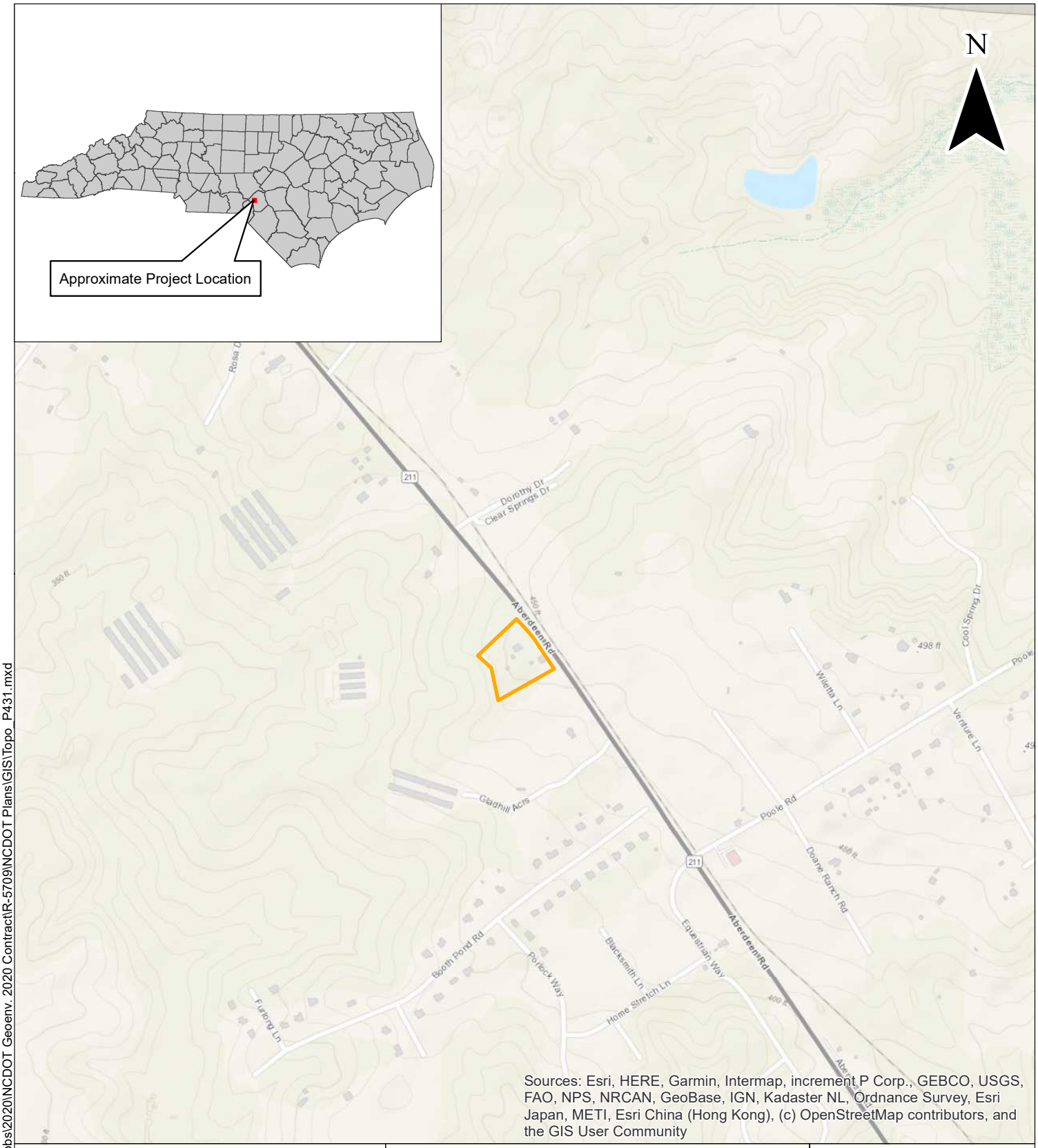
Sample ID Number	Sample Depth (ft. bgs)	BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	PAHs (mg/kg)
P431-B1-2-4	2-4	<0.22	<0.22	<0.09	<0.005
P431-B1-8-10	8-10	<0.3	<0.3	<0.12	<0.006
P431-B2-0-2	0-2	<0.2	<0.2	<0.08	<0.004
P431-B2-4-6	4-6	<0.2	<0.2	<0.08	<0.004
P431-B3-2-4	2-4	<0.2	<0.2	0.14	0.003
P431-B3-6-8	6-8	<0.3	<0.3	0.04	0.003
P431-B4-2-4	2-4	<0.2	<0.2	<0.08	<0.001
P431-B4-8-10	8-10	<0.22	<0.22	<0.09	<0.005
P431-B5-2-4	2-4	<0.3	<0.3	0.7	0.017
P431-B5-6-8	6-8	<0.3	<0.3	0.3	0.009
P431-B5-12-14	12-14	<0.25	<0.25	0.25	0.005
P431-B6-2-4	2-4	<0.22	<0.22	0.17	0.003
P431-B6-8-10	8-10	<0.25	<0.25	<0.1	<0.005
P431-B7-2-4	2-4	<0.22	<0.22	<0.09	<0.005
P431-B7-4-6	4-6	<0.22	<0.22	2.9	0.07
P431-B7-10-12	10-12	<0.22	<0.22	1.3	0.031
P431-B8-2-4	2-4	<0.22	<0.22	0.09	0.001
P431-B8-6-8	6-8	<0.2	<0.2	0.3	0.007
P431-B9-2-4	2-4	<0.5	<0.5	<0.21	<0.011
P431-B9-8-10	8-10	<0.27	<0.27	<0.11	<0.006
P431-B10-2-4	2-4	<0.27	<0.27	<0.11	<0.006
P431-B10-6-8	6-8	<0.2	<0.2	0.3	0.008
P431-B11-2-4	2-4	<0.27	<0.27	11	0.28
P431-B11-4-6	4-6	<0.25	<0.25	0.8	0.022
NC State Action Level		**N/A**	**50**	**100**	**N/A**

Notes:

1. Samples collected on August 31, 2021.
2. Depths shown in feet below ground surface (bgs)
3. Concentrations shown in milligrams per kilogram (mg/kg)
4. BTEX = Benzene, toluene, ethylbenzene, xylene
5. GRO = Gasoline Range Organics
6. DRO = Diesel Range Organics
7. PAHs = Polycyclic aromatic hydrocarbons
8. N/A = Not applicable
9. Bold values exceed respective NC State Action Level

Prepared By/Date: DRH 9/9/21
Checked By/Date: AJF 9/28/21

FIGURES



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

wood.
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VICINITY MAP
R5709-PARCEL 431
5735 NC 211 HWY
RAEFORD, NORTH CAROLINA

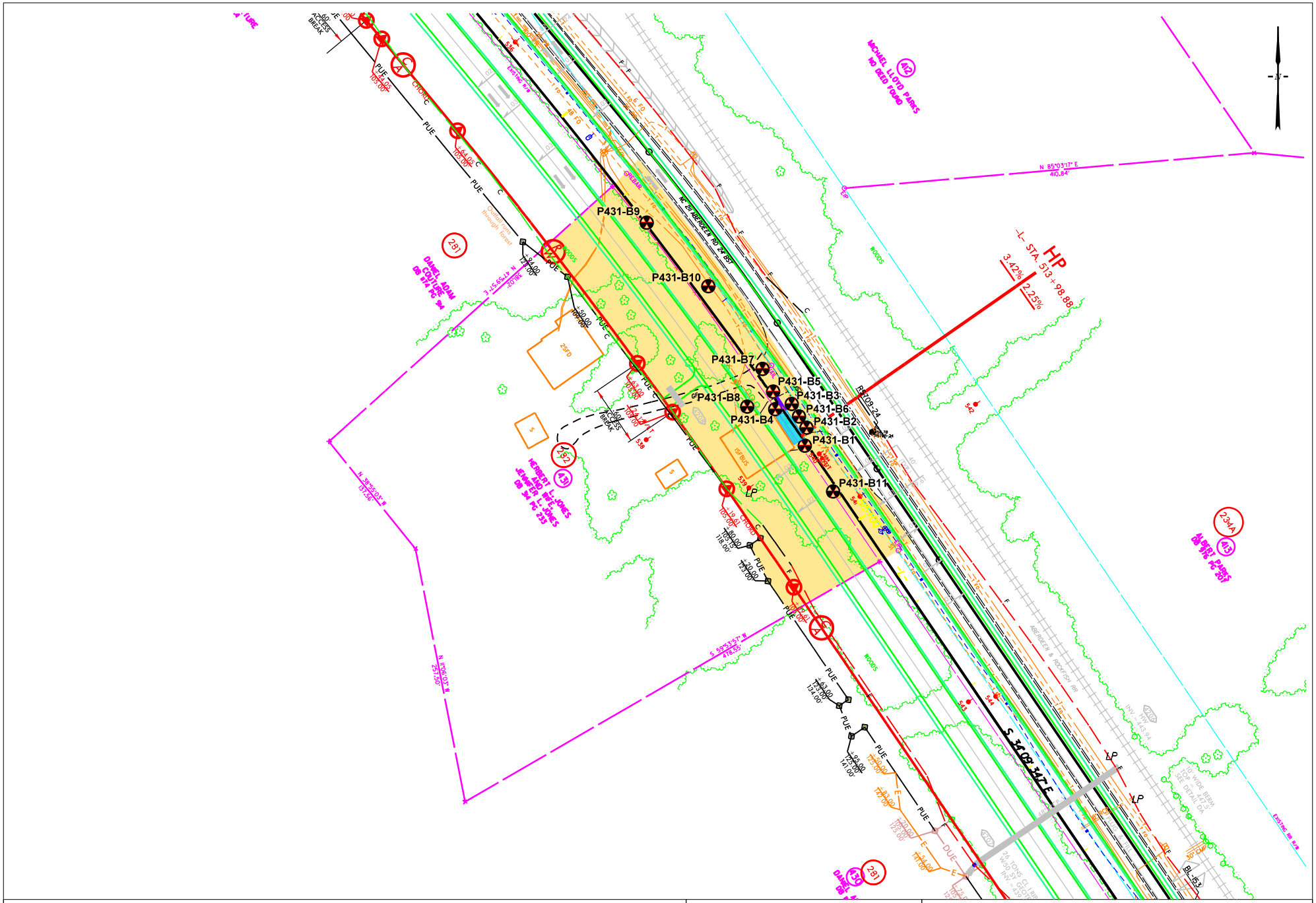
PREPARED BY:	LMM
DATE:	10/1/2021
CHECKED BY:	HPC
DATE:	10/1/2021
PROJECT NO:	20478R5709
FIGURE:	1

Legend

P431

0 1,000 2,000 Feet

Document Path: P:\6228 Environmental\jobs\2020\NCDOT Geoenv. 2020 Contract\R-5709\NCDOT Plans\GIS\Topo_P431.mxd



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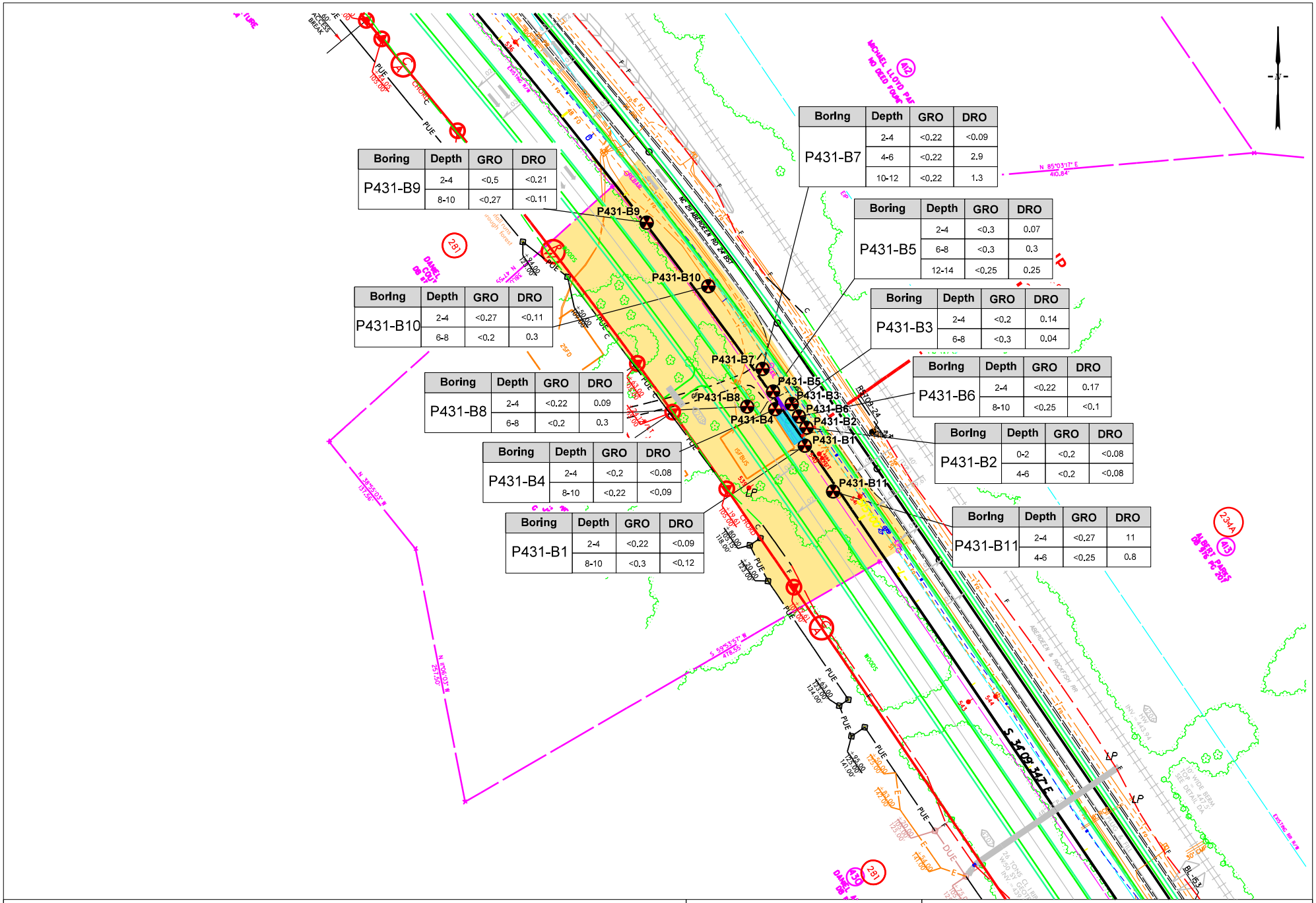
SITE MAP
R-5709 - PARCEL 431
5735 NC 211 HWY
RAEFORD, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	10/27/21	AJF	10/27/21	20478R5709	2



Boring	Depth	GRO	DRO
P431-B9	2-4	<0.5	<0.21
	8-10	<0.27	<0.11

Boring	Depth	GRO	DRO
P431-B10	2-4	<0.27	<0.11
	6-8	<0.2	0.3

Boring	Depth	GRO	DRO
P431-B8	2-4	<0.22	0.09
	6-8	<0.2	0.3

Boring	Depth	GRO	DRO
P431-B4	2-4	<0.2	<0.08
	8-10	<0.22	<0.09

Boring	Depth	GRO	DRO
P431-B1	2-4	<0.22	<0.09
	8-10	<0.3	<0.12

Boring	Depth	GRO	DRO
P431-B7	2-4	<0.22	<0.09
	4-6	<0.22	2.9
	10-12	<0.22	1.3

Boring	Depth	GRO	DRO
P431-B5	2-4	<0.3	0.07
	6-8	<0.3	0.3
	12-14	<0.25	0.25

Boring	Depth	GRO	DRO
P431-B3	2-4	<0.2	0.14
	6-8	<0.3	0.04

Boring	Depth	GRO	DRO
P431-B6	2-4	<0.22	0.17
	8-10	<0.25	<0.1

Boring	Depth	GRO	DRO
P431-B2	0-2	<0.2	<0.08
	4-6	<0.2	<0.08

Boring	Depth	GRO	DRO
P431-B11	2-4	<0.27	11
	4-6	<0.25	0.8

APPROXIMATE BORING LOCATION
AREA OF INVESTIGATION
SUSPECTED FORMER DISPENSER ISLAND
SUSPECTED FORMER PRODUCT LINE

DEPTHS SHOWN IN FEET BELOW GROUND SURFACE
CONCENTRATIONS SHOWN IN MILLIGRAMS PER KILOGRAM (mg/kg)
GRO=GASOLINE RANGE ORGANICS
DRO=DIESEL RANGE ORGANICS
GRO STATE ACTION LEVEL = 50 mg/kg
DRO STATE ACTION LEVEL = 100 mg/kg
BOLD CONCENTRATION EXCEEDS RESPECTIVE STATE ACTION LEVEL

50' 0' 50' 100'
25'
(ENGLISH)

wood.

ANALYTICAL RESULTS MAP
R-5709 - PARCEL 431
5735 NC 211 HWY
RAEFORD, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	10/27/21	AJF	10/27/21	20478R5709	3

APPENDIX A

BORING LOGS

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B1**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan/brown sand	
2			
3	12.1	Brown sand	P431-B1-2-4 selected for UVF analyses
4			
5	11.7	Tan sand	
6			
7	11.0		
8			
9	11.3	Tan/orange sand	P431-B1-8-10 selected for UVF analyses
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B2**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	11.6	Concrete/gravel Tan/brown sand	P431-B2-0-2 selected for UVF analyses
2			
3	10.7		
4		Tan sand	
5	11.1		P431-B2-4-6 selected for UVF analyses
6			
7	10.7	Tan/orange sand	
8			
9	11.0		
10		Tan/orange clayey sand	
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B3**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	10.3	Concrete/gravel	
2		Tan/brown sand	
3	10.9		P431-B3-2-4 selected for UVF analyses
4			
5	11.4	Tan sand	
6			
7	11.6		P431-B3-6-8 selected for UVF analyses
8		Tan/orange clayey sand	
9	11.2		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B4**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	10.4	Concrete/gravel	
2		Tan/brown sand	
3	11.5		P431-B4-2-4 selected for UVF analyses
4			
5	10.2	Tan sand	
6			
7	6.4	Tan/orange sand	
8			
9	10.8	Tan/orange clayey sand	P431-B4-8-10 selected for UVF analyses
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
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20			
21			

Log Completed By: **AJF**

Page: **1**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B5**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	10.7	Broken concrete/gravel Tan sand	
2			
3	10.8	Tan/brown sand	P431-B5-2-4 selected for UVF analyses
4			
5	10.3		
6			
7	10.5	Tan/orange sand	P431-B5-6-8 selected for UVF analyses
8			
9	9.2		
10		Tan/orange clayey sand	
11	10.5		
12			
13	10.6		P431-B5-12-14 selected for UVF analyses
14		Tan/orange/red clayey sand	
15	10.4		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

Page: **1**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B6**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	8.6	Broken concrete/gravel Tan/brown sand	
2			
3	10.8		P431-B6-2-4 selected for UVF analyses
4			
5	11.6	Tan sand	
6			
7	8.4		
8		Tan/orange sand	
9	12.1		P431-B6-8-10 selected for UVF analyses
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B7**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	7.4	Broken concrete/gravel	
2		Tan sand	
3	8.0	Tan/brown sand	P431-B7-2-4 selected for UVF analyses
4			
5	7.6	Tan sand	P431-B7-4-6 selected for UVF analyses
6			
7	7.3		
8		Tan/orange sand	
9	6.6		
10			
11	5.4	Tan/orange clayey sand	P431-B7-10-12 selected for UVF analyses
12			
13	3.0		
14			
15	2.6		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

Page: **1**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B8**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	11.5	Tan/brown sand	
2			
3	12.5		P431-B8-2-4 selected for UVF analyses
4		Tan sand	
5	11.4		
6			
7	12.1	Tan/orange clayey sand	P431-B8-6-8 selected for UVF analyses
8			
9	11.3		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B9**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	4.3	Tan/brown sand	
2			
3	11.8	Brown sand	P431-B9-2-4 selected for UVF analyses
4			
5	12.4	Tan sand	
6			
7	12.0		
8			
9	13.1	Tan/orange sand	P431-B9-8-10 selected for UVF analyses
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B10**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR		**IET**		DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	11.4	Tan sand	
2			
3	11.9		P431-B10-2-4 selected for UVF analyses
4		Tan/brown sand	
5	11.7		
6			
7	11.6	Tan/orange sand	P431-B10-6-8 selected for UVF analyses
8			
9	11.3	Tan/orange clayey sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

SOIL BORING FIELD WORKSHEET

BORING #	**P431-B11**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/31/2021**			WEATHER CONDITIONS	**Partly sunny, 93°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	11.8	Tan/brown sand	
2			
3	12.0	Brown sand	P431-B11-2-4 selected for UVF analyses
4			
5	13.7	Tan sand	P431-B11-4-6 selected for UVF analyses
6			
7	13.4		
8			
9	13.2	Tan/orange sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

APPENDIX B

PHOTOGRAPHIC LOG

Photograph 1:
View of antique store and suspected dispenser island (beneath flower beds), facing south.

Photograph 2:
View of suspected dispenser island (beneath flower beds) and possible product line (bottom of photo), facing southeast.

Photograph 3:
View of southern portion of investigation area at parcel 431, facing southeast.

Photograph 4:
View of northern portion of investigation area at parcel 431, facing northwest.

Photograph 5:
View of on-Site UVF analysis setup.

Photograph 6:
View of IET advancing direct push soil sampler.

APPENDIX C

GEOPHYSICAL REPORT

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2021-201)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 431
NCDOT PROJECT R-5709 (50205.1.1)

5731 ABERDEEN RD., RAEFORD, NC

August 25, 2021

Report prepared for: **Helen P. Corley, LG, RSM, BCES**
Wood, PLC
2801 Yorkmont Road #100
Charlotte, NC 28208

Prepared by: _____
Eric C. Cross, P.G.
NC License #2181

Reviewed by: _____
Douglas A. Canavello, P.G.
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C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 431 - 5731 Aberdeen Rd.
Raeford, Hoke County, North Carolina

Table of Contents

Figures

Appendices

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 Wood, PLC at Parcel 431, located at 5731 Aberdeen Rd., in Raeford, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5709). Wood, PLC indicated the survey area to Pyramid, which was focused in front of, and immediately surrounding, the building. Conducted from August 11-12, 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 four EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. One area in front of the building was suspected to contain reinforced concrete and possible buried slabs and was investigated further with GPR. GPR identified sections of reinforced concrete and sections of very shallow, high-amplitude lateral reflectors. These reflectors are characteristic of a buried shallow foundation or slab.

The intermittent shallow features were divided into three no confidence anomalies. From north to south, No Confidence Anomaly #1 covered an area approximately 12 feet long and 13 feet wide, and No Confidence Anomalies #2 and #3 both covered areas approximately 12 feet long and 9.5 feet wide. These features are not characteristic of USTs; however, it is important to note that the shallow structures prevented deeper penetration by GPR in some areas. This may obscure any other structures below the shallow anomalies identified by GPR.

Collectively, the geophysical data recorded evidence of three no confidence anomalies at Parcel 431.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Wood, PLC at Parcel 431, located at 5731 Aberdeen Rd., in Raeford, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5709). Wood, PLC indicated the survey area to Pyramid, which was focused in front of, and immediately surrounding, the building. Conducted from August 11-12, 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 asphalt, concrete, and grass 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 August 12, 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 Reinforced Concrete **(3 No Confidence Anomalies)**	✓
2	Sign	
3	Pole	
4	Light Base	

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a sign, a pole, and a light base. EM Anomaly 1 was partially associated with concrete slabs that were suspected to contain reinforcement and was investigated further with GPR.

Discussion of GPR Results

Figure 3 presents the locations of the formal GPR transects performed at the property as well as select transect images. All of the GPR transect images are included in **Appendix A**. A total of eight formal GPR transects were performed at the site.

GPR Transects 1-8 were performed across EM Anomaly 1. These transects recorded evidence of sections of reinforced concrete and sections of very shallow, high-amplitude lateral reflectors. These reflectors are characteristic of a buried shallow foundation or slab. The intermittent shallow features were divided into three distinct zones. The high-amplitude responses resulted in repeating lateral reflectors with depth, preventing GPR data collection below the suspected shallow slab in some places. For this reason, the three zones have been classified as three no confidence anomalies. From north to south, No Confidence Anomaly #1 covered an area approximately 12 feet long and 13 feet wide, and No Confidence Anomalies #2 and #3 both covered areas approximately 12 feet long and 9.5 feet wide. These features are not characteristic of USTs; however, as mentioned above, the shallow structures prevented deeper penetration by GPR in some areas. **Figure 4**

provides the locations and sizes of the three no confidence anomalies, overlain on an aerial, along with ground-level photographs.

Collectively, the geophysical data recorded evidence of three no confidence anomalies at Parcel 431. **Figure 5** provides an overlay of the metal detection results and the three no confidence anomalies on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 431 in Raeford, 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. One area in front of the building was suspected to contain reinforced concrete and possible buried slabs and was investigated further with GPR.
- GPR identified sections of reinforced concrete and sections of very shallow, high-amplitude lateral reflectors. These reflectors are characteristic of a buried shallow foundation or slab.
- The intermittent shallow features were divided into three no confidence anomalies. From north to south, No Confidence Anomaly #1 covered an area approximately 12 feet long and 13 feet wide, and No Confidence Anomalies #2 and #3 both covered areas approximately 12 feet long and 9.5 feet wide.
- These features are not characteristic of USTs; however, it is important to note that the shallow structures prevented deeper penetration by GPR in some areas. This may obscure any other structures below the shallow anomalies identified by GPR.
- Collectively, the geophysical data recorded evidence of three no confidence anomalies at Parcel 431.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Wood, PLC, 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 Southeast)

View of Survey Area (Facing Approximately Northwest)

N

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PROJECT: PARCEL 431 RAEFORD, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 431 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	DATE: 8/16/2021 PYRAMID PROJECT #: 2021-201	CLIENT: Wood, PLC **FIGURE 1**

EM61 METAL DETECTION RESULTS

EVIDENCE OF THREE NO CONFIDENCE ANOMALIES 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 August 11, 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 August 12, 2021.

EM61 Metal Detection Response (millivolts)

N

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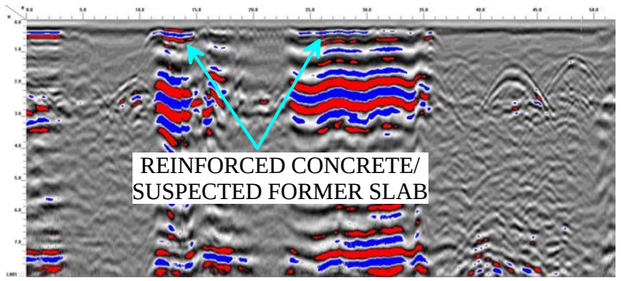
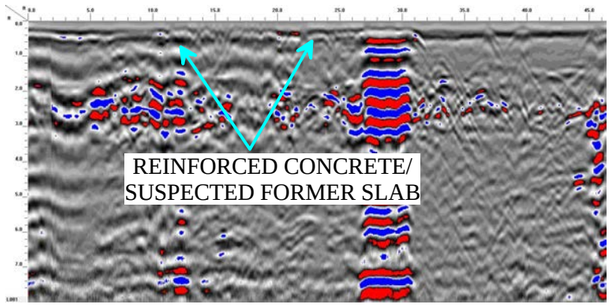
PROJECT: PARCEL 431 RAEFORD, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 431 - EM61 METAL DETECTION CONTOUR MAP	DATE: 8/16/2021	CLIENT: Wood, PLC
		PYRAMID PROJECT #: 2021-201	**FIGURE 2**

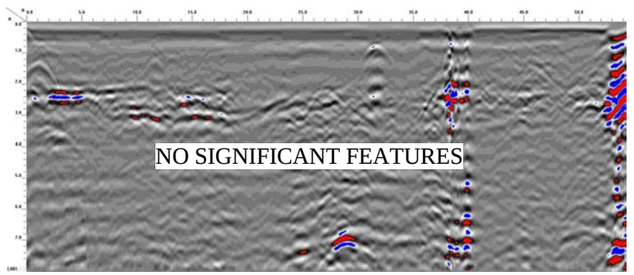
GPR TRANSECT LOCATIONS



GPR TRANSECT 1 (T1)



GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)

N

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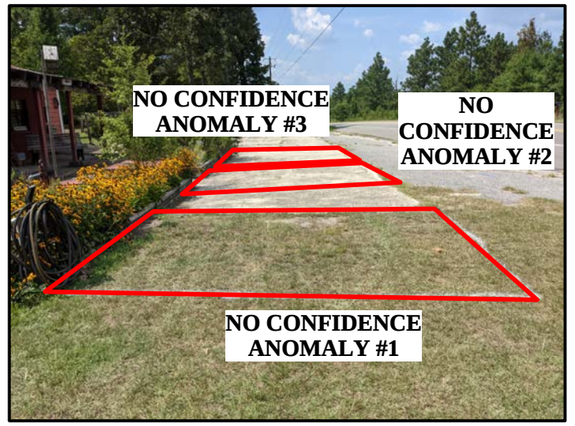
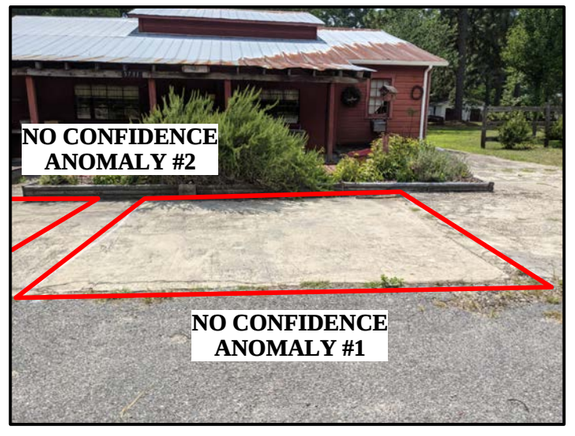
PROJECT: PARCEL 431 RAEFORD, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 431 - GPR TRANSECT LOCATIONS AND SELECT IMAGES	DATE: 8/16/2021	CLIENT: Wood, PLC
		PYRAMID PROJECT #: 2021-201	**FIGURE 3**

LOCATIONS AND SIZES OF THREE NO CONFIDENCE ANOMALIES



View of Three No Confidence Anomalies
(Facing Approximately Northwest)



View of Two No Confidence Anomalies
(Facing Approximately Southwest)

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 431 RAEFORD, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE PARCEL 431 - LOCATIONS AND SIZES OF THREE NO CONFIDENCE ANOMALIES	DATE 8/16/2021 PYRAMID PROJECT #: 2021-201	CLIENT Wood, PLC **FIGURE 4**

THREE NO CONFIDENCE ANOMALIES

LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED PERMANENT DRAINAGE
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- NO CONFIDENCE ANOMALY

MILLIVOLTS (mV)

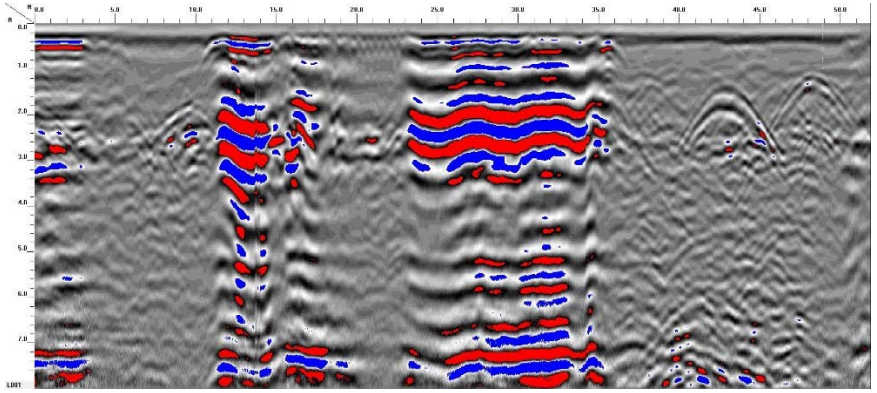
1000 750 500 400 300 200 150 100 75 60 50 40 30 -90 -100 -200 -400 -5000

0 15 30
FEET

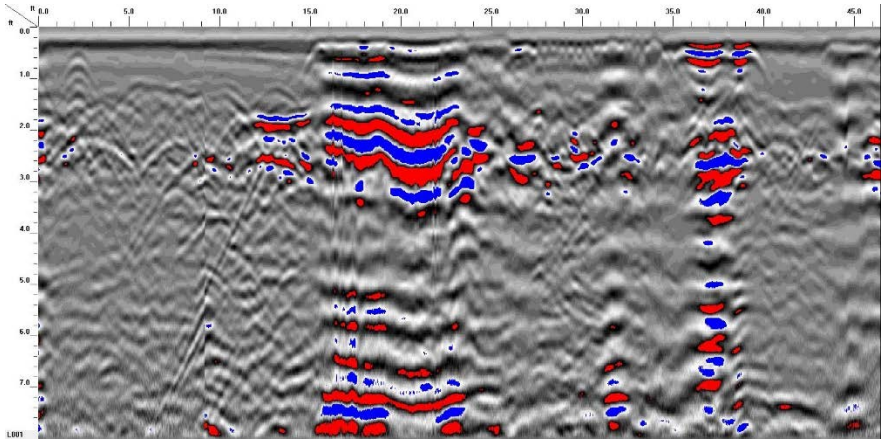
N

TITLE: OVERLAY OF METAL DETECTION RESULTS AND THREE NO CONFIDENCE ANOMALIES ON NCDOT ENGINEERING PLANS	
PROJECT: PARCEL 431 RAEFORD, NORTH CAROLINA NCDOT PROJECT R-5709	
PYRAMID GEOPHYSICS 503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology	
DATE: 08-18-2021	REVISION NO. 0
PYRAMID PROJECT NO. 2021-201	FIGURE NO. 5

Appendix A – GPR Transect Images



GPR TRANSECT 1



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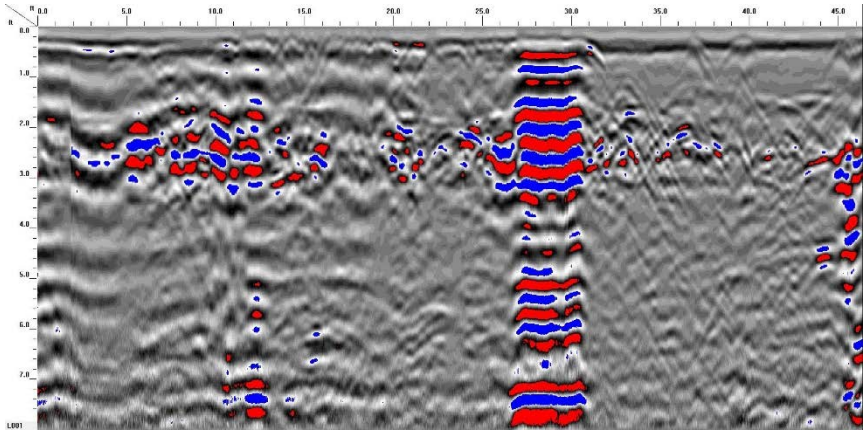
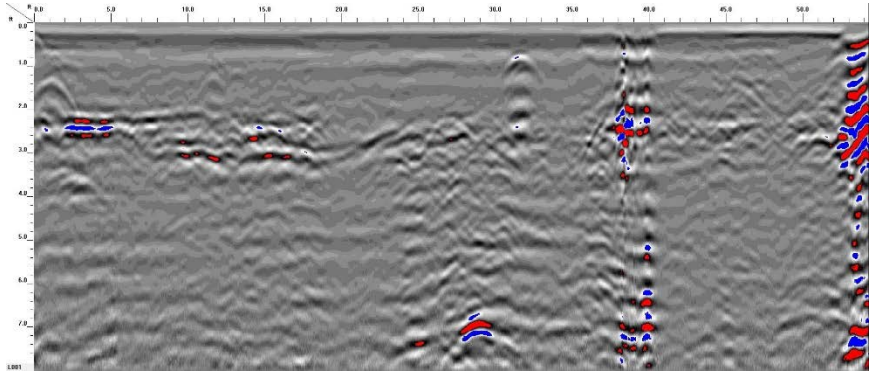
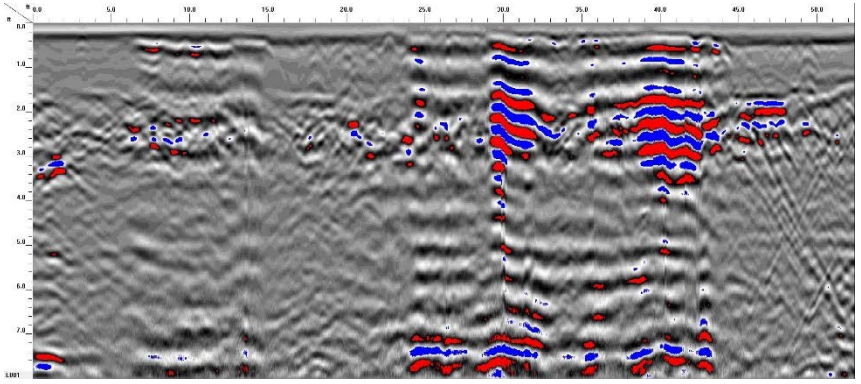


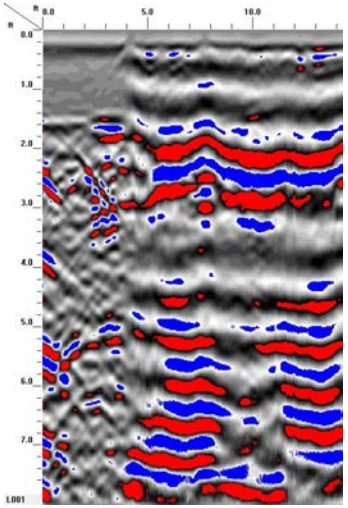
GPR TRANSECT 3



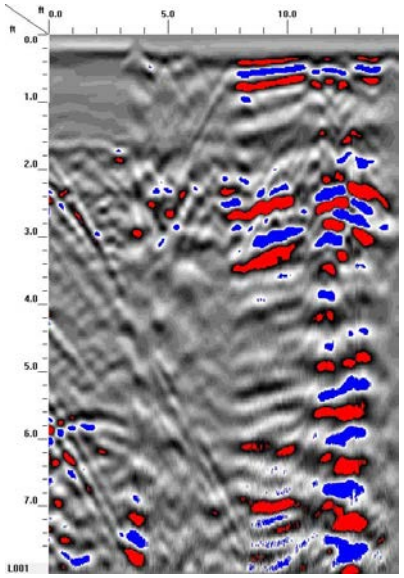
GPR TRANSECT 4



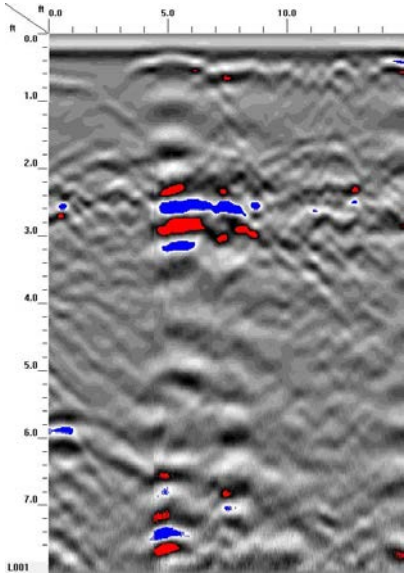
GPR TRANSECT 5



GPR TRANSECT 6



GPR TRANSECT 7



GPR TRANSECT 8

APPENDIX D

UVF HYDROCARBON ANALYTICAL RESULTS

Hydrocarbon Analysis Results

Client: Wood
Address: 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P431

Samples taken Tuesday, August 31, 2021
Samples extracted Tuesday, August 31, 2021
Samples analysed Tuesday, August 31, 2021

Operator DRH

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 C5:10	% Ratios C10:C 18	% Ratios C18+	HC Fingerprint Match
Soil	P431-B1-2-4	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P431-B1-8-10	12.0	<0.3	<0.3	<0.12	<0.3	<0.006	<0.006	<0.004	0	0	0	PHC ND,(FCM)
Soil	P431-B2-0-2	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P431-B2-4-6	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P431-B3-2-4	8.0	<0.2	<0.2	0.14	0.14	0.06	0.003	<0.001	0	80.9	19.1	V.Deg.PHC 80.1%,(FCM),(BO)
Soil	P431-B3-6-8	15.0	<0.3	<0.3	0.04	0.04	0.04	0.003	<0.005	0	52.5	47.5	Residual HC,(BO)
Soil	P431-B4-2-4	8.0	<0.2	<0.2	<0.08	0.017	0.017	<0.001	<0.002	0	100	0	Residual HC
Soil	P431-B4-8-10	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P431-B5-2-4	13.0	<0.3	<0.3	0.7	0.7	0.3	0.017	<0.0	0	80.7	19.3	V.Deg.PHC 86.6%,(FCM)
Soil	P431-B5-6-8	13.0	<0.3	<0.3	0.3	0.3	0.2	0.009	<0.001	0	59.2	40.8	V.Deg.PHC 67.7%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 103.3%

Analysis by QED HC-1 Analyser

Concentration values in mg/kg for soil 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 for hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

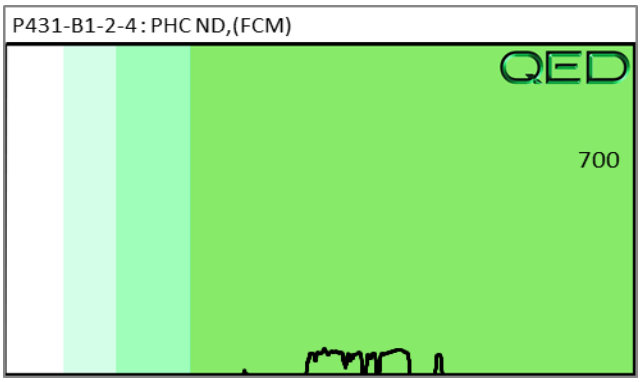
HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only : % Ratios estimated carbon number proportions : (OCR)/(Q) = Outside cal range, values and HC match estimates : ND = Not Detected

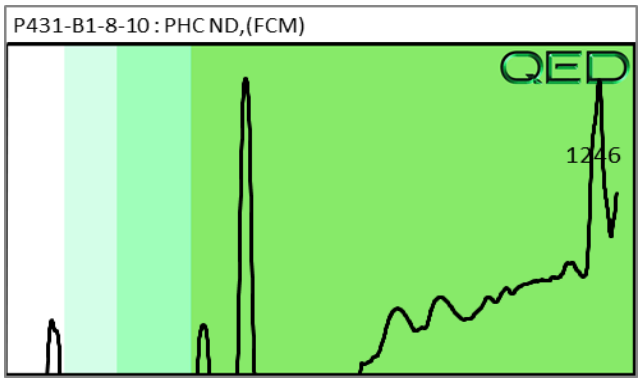
(B) = Blank Drift : (M) = Adjusted value : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : SB = sample selected as site background

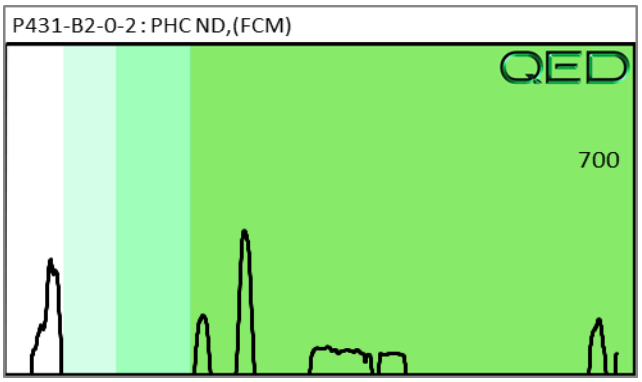
(TD) = Calibration outside limit

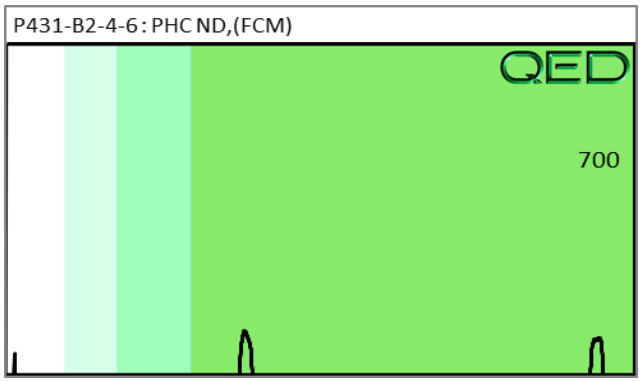
QED Hydrocarbon Fingerprints

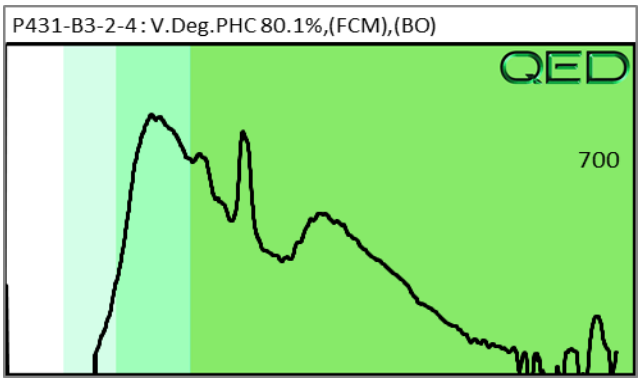
Project: P431

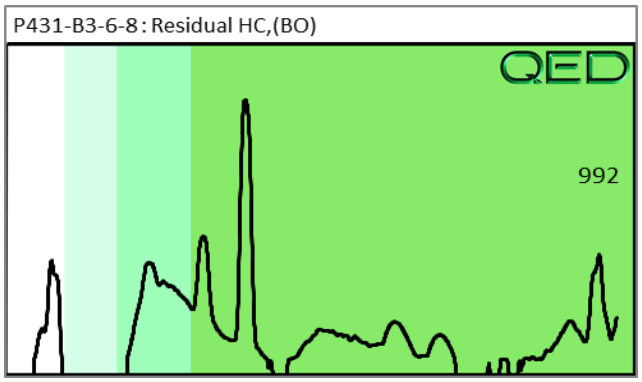


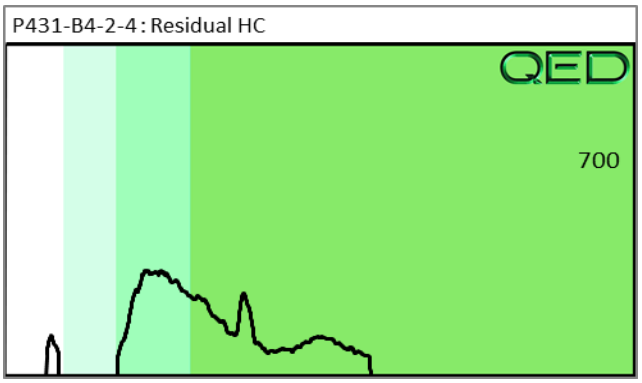


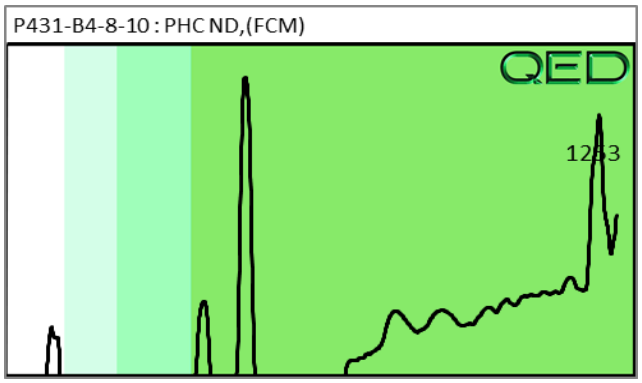


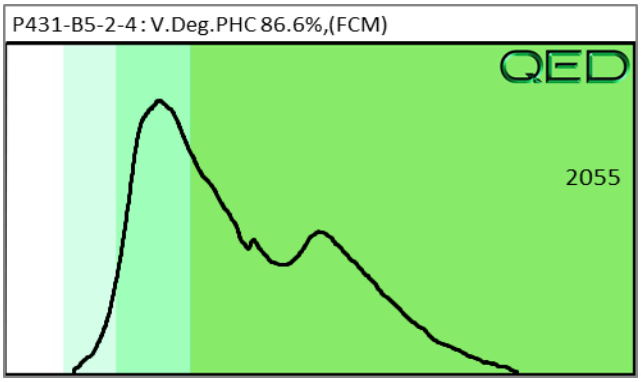


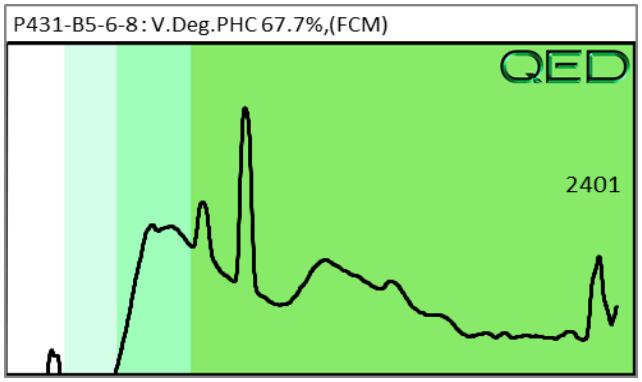












Hydrocarbon Analysis Results

Client: Wood
Address: 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P431

Samples taken Tuesday, August 31, 2021
Samples extracted Tuesday, August 31, 2021
Samples analysed Tuesday, August 31, 2021

Operator DRH

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
										C5:10	C10:C 18	C18+	
Soil	P431-B5-12-14	10.0	<0.25	<0.25	0.25	0.25	0.12	0.005	<0.001	0	73.6	26.4	V.Deg.PHC 60.4%,(FCM)
Soil	P431-B6-2-4	9.0	<0.22	<0.22	0.17	0.17	0.08	0.003	<0.003	0	71.9	28.1	V.Deg.PHC 62.7%,(FCM)
Soil	P431-B6-8-10	10.0	<0.25	<0.25	<0.1	<0.25	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P431-B7-2-4	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P431-B7-4-6	9.0	<0.22	<0.22	2.9	2.9	1.3	0.07	0.001	0	80.3	19.7	V.Deg.PHC 87%,(FCM)
Soil	P431-B7-10-12	9.0	<0.22	<0.22	1.3	1.3	0.6	0.031	<0.001	0	80.1	19.9	V.Deg.PHC 85.6%,(FCM)
Soil	P431-B8-2-4	9.0	<0.22	<0.22	0.09	0.09	0.016	0.001	<0.003	0	100	0	Residual HC
Soil	P431-B8-6-8	8.0	<0.2	<0.2	0.3	0.3	0.15	0.007	<0.0	0	77.7	22.3	V.Deg.PHC 88.3%,(FCM),(BO)
Soil	P431-B9-2-4	21.0	<0.5	<0.5	<0.21	<0.5	<0.011	<0.011	<0.006	0	0	0	PHC ND,(FCM)
Soil	P431-B9-8-10	11.0	<0.27	<0.27	<0.11	<0.27	<0.006	<0.006	<0.003	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK Final FCM QC Check OK 96.0%

Analysis by QED HC-1 Analyser

Concentration values in mg/kg for soil 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 for hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only : % Ratios estimated carbon number proportions : (OCR)/(Q) = Outside cal range, values and HC match estimates : ND = Not Detected

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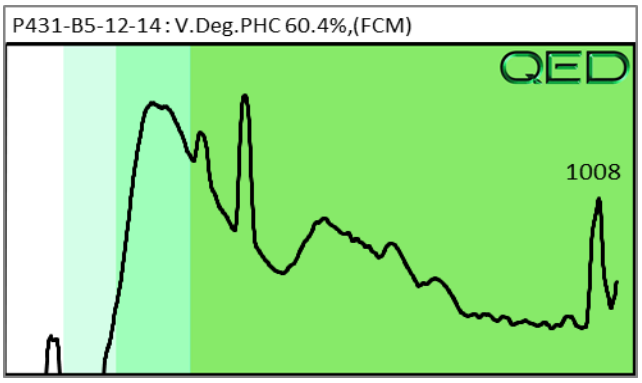
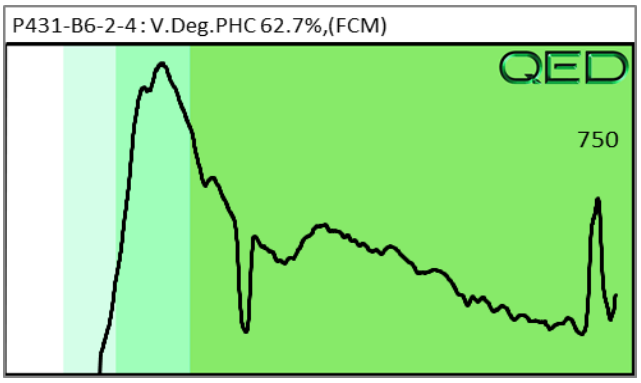
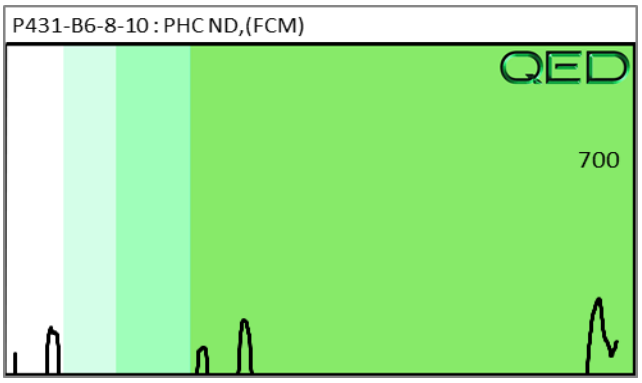
(TD) = Calibration outside limit

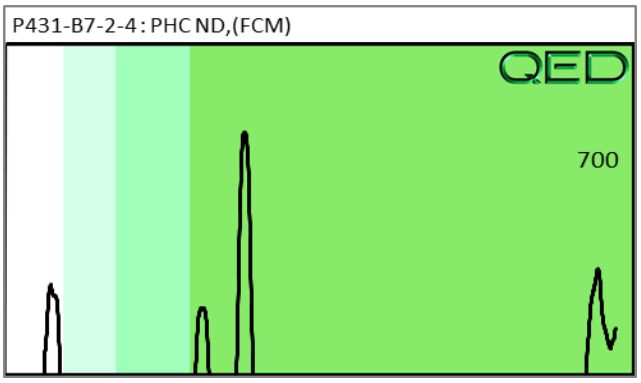
QED Hydrocarbon Fingerprints

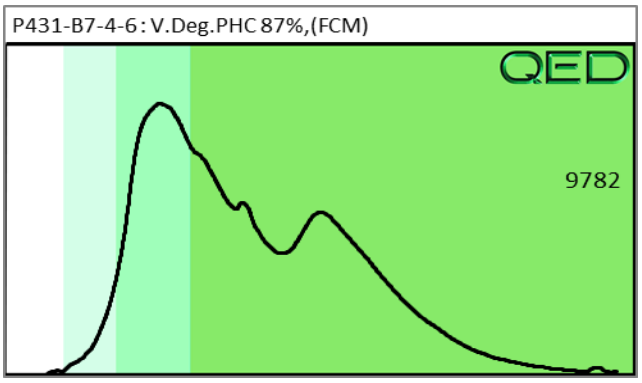
Project: P431

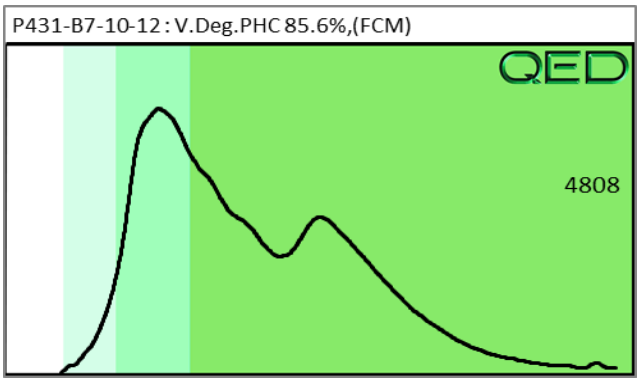


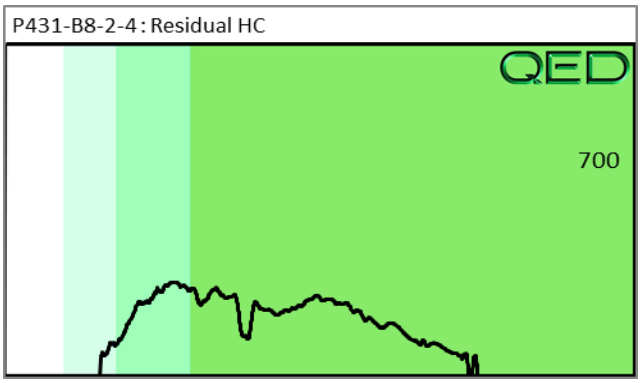


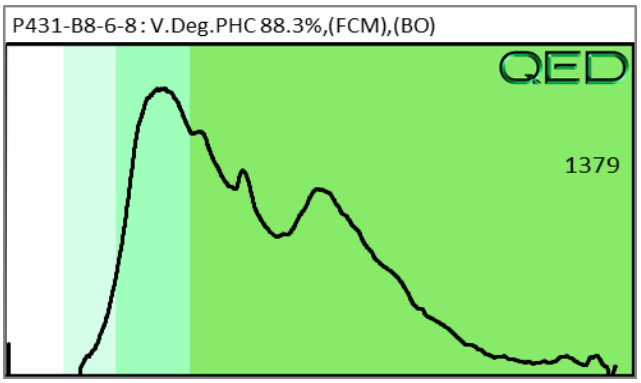


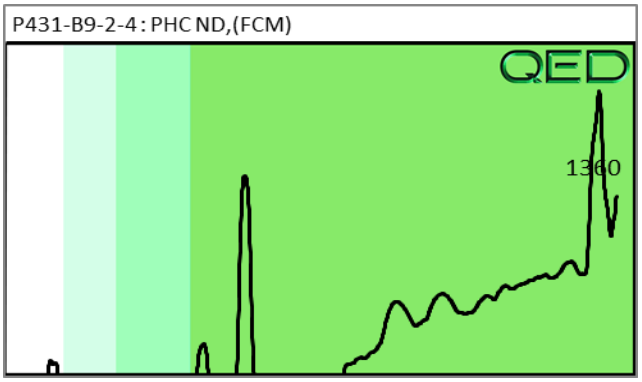


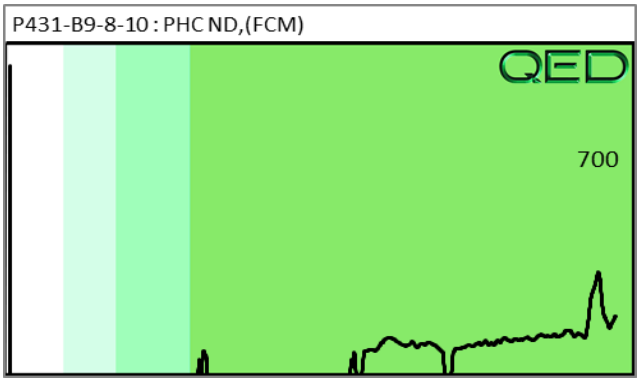












Hydrocarbon Analysis Results

Client: Wood
Address: 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P431

Samples taken Tuesday, August 31, 2021
Samples extracted Tuesday, August 31, 2021
Samples analysed Tuesday, August 31, 2021

Operator DRH

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
										C5:10	C10:C18	C18+	
Soil	P431-B10-2-4	11.0	<0.27	<0.27	<0.11	<0.27	<0.006	<0.006	<0.003	0	0	0	PHC ND,(FCM)
Soil	P431-B10-6-8	8.0	<0.2	<0.2	0.3	0.3	0.15	0.008	<0.001	0	78.9	21.1	V.Deg.PHC 96.5%,(FCM),(BO)
Soil	P431-B11-2-4	11.0	<0.27	<0.27	11	11	5.5	0.28	0.008	0	75.8	24.2	V.Deg.PHC 71.7%,(FCM)
Soil	P431-B11-4-6	10.0	<0.25	<0.25	0.8	0.8	0.4	0.022	<0.001	0	77.4	22.6	V.Deg.PHC 81.4%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 101.0%

Analysis by QED HC-1 Analyser

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

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QED Hydrocarbon Fingerprints

Project: P431