North Carolina Department of Transportation

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

Parcel 229
Donald Earl and Karen & Charles Gillis – Jay's Food Mart Property
10827 NC 211 Hwy
Aberdeen, North Carolina
October 27, 2021

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

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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 229 (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 in the eastern quadrant of the intersection of NC 211 Hwy and East Indiana Avenue, as shown on the Vicinity Map, **Figure 1**. The parcel, which is located at 10827 NC 211 Hwy, is currently occupied by an active Pure gasoline station with Jay's Food Mart convenience store, Moor County Mattress Brokers, and M&M Automotive used car dealership. The Site is identified as Parcel 229, Donald Earl and Karen & Charles Gillis – Jay's Food Mart Property, within the NCDOT MicroStation survey file and is in Aberdeen of Moore County, North Carolina. The area of investigation at Parcel 229 is approximately 1.51-acres as shown on **Figure 2**.

The Site is reported as a gasoline station and convenience store with four underground storage tanks (USTs) in the 2019 NCDOT Phase I Report. The four USTs are located outside of the area of investigation for this Phase II Investigation. According to the NCDEQ UST Database, the USTs were installed in December 1989. No releases related to the UST system have been reported and NCDEQ documentation for Parcel 229 was not present on the North Carolina Laserfiche online database. Wood reviewed the NCDOT Historical Aerial Imagery Index, and Parcel 229 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 18 shallow soil borings (P229-B1 to P229-B18). The borings were advanced to an approximate depth of 10 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 gold to orange sand overlaying tan to orange to gray 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 south. 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 that the Site was occupied with a gasoline station and convenience store with four USTs, a mattress store, and a used car dealership. The USTs were observed to be located outside of the investigation area. In addition, six fuel dispensers were observed during the Site reconnaissance with four of the dispensers located within the area of investigation. A photographic log is included in **Appendix B**.

3.3 Geophysical Survey Results and Utility Locating

The geophysical survey was conducted by Pyramid personnel on August 10 and 11, 2021. The Pyramid geophysical investigation using electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys was focused on the areas to the northwest, west, and south of the gas station and convenience store, as these areas were most likely to contain USTs. A total of eight EM anomalies were identified, with the majority of the anomalies attributed to visible cultural features located at the ground surface. The GPR survey identified evidence of underground utility lines and suspected buried debris; however, significate structures such as USTs were not observed. The complete Pyramid geophysics report is included as **Appendix C**.

Utility locating was performed by PUL personnel on August 25, 2021. The utility locating effort identified buried water lines, buried electrical lines, buried fuel lines, and several buried telephone and communication lines. A buried water line was observed along the western parcel boundary parallel to East Indiana Avenue and along the southern parcel boundary parallel to NC 211 Hwy. The water service line for the convenience store enters on the northern side of the building and the water service lines for the mattress store and used car dealership enter on the western sides of the two buildings. Buried electrical lines were observed extending from the Site buildings to light poles and fuel dispensers. Buried fuel lines were observed extending from the four USTs to the fuel dispensers. Several buried

telephone and communication lines were observed along the western parcel boundary parallel to East Indiana Avenue and along the southern parcel boundary parallel to NC 211 Hwy. Overhead power lines were observed along the southern parcel boundary parallel to NC 211 Hwy.

3.4 Soil Sampling

On August 30, 2021, Wood and IET mobilized to the Site to advance 18 shallow soil borings (P229-B1 to P299-B18). The borings were advanced via direct-push technology to an approximate depth of 10 feet bgs. Boring locations targeted potential environmental sources at the Site and future drainage features.

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. Neither groundwater nor bedrock were encountered in the borings. Thirty-six soil samples were collected from the 18 borings at the Site for onsite UVF analysis.

4.0 SOIL SAMPLING RESULTS

Based on August 30, 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 the 18 borings advanced at the Site.

PID readings for the 18 borings ranged from not detected in borings P229-B1, B2, B4, B5, B6, B7, B8, B9, and B14 to 1.1 parts per million (ppm) in sample P229-B10-6-8 collected from 6 to 8 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 36 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 and on-Site quantitative analyses of samples collected from the Site on August 30, 2021.

- The Site is occupied by an active gasoline station and convenience store with four USTs, a mattress store, and a used car dealership. The four USTs are located outside of the area of investigation. In addition, six fuel dispensers are located at the Site with four of the dispensers located within the aera of investigation.

- The geophysical survey did not identify evidence of USTs within the area of investigation.

- Eighteen soil borings were advanced to roughly 10 feet bgs in the NCDOT ROW investigation area to collect soil samples for on-Site UVF analysis. Thirty-six soil samples were collected for on-Site UVF analysis.

- UVF analysis of 36 soil samples collected did not identify petroleum-impacted soil.

6.0 RECOMMENDATIONS

Based on these Phase II Investigation results, Wood does not recommend further soil investigation. Wood notes that the four fuel dispensers 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 229 - Donald Earl & Karen & Charles Gillis – Jay's Food Mart Property
Aberdeen, North Carolina
Wood Project: 20478R5709

Boring ID	Depth of Sample Interval	PID Reading
P229-B1	2-4	0.0
	6-8	0.0
P229-B2	4-6	0.2
	8-10	0.0
P229-B3	2-4	0.0
	6-8	0.0
P229-B4	2-4	0.0
	6-8	0.0
P229-B5	2-4	0.0
	6-8	0.0
P229-B6	2-4	0.0
	8-10	0.0
P229-B7	0-2	0.0
	6-8	0.0
P229-B8	2-4	0.0
	8-10	0.0
P229-B9	0-2	0.0
	4-6	0.0
P229-B10	2-4	0.6
	6-8	1.1
P229-B11	2-4	0.0
	4-6	0.8
P229-B12	2-4	0.7
	6-8	0.9
P229-B13	2-4	0.0
	6-8	1.0
P229-B14	2-4	0.0
	6-8	0.0
P229-B15	2-4	0.0
	6-8	0.4
P229-B16	2-4	0.3
	4-6	0.1
P229-B17	2-4	0.0
	6-8	0.3
P229-B18	0-2	0.1
	4-6	0.3

Notes:

1. Samples collected on 8/30/21
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 9/8/21

Checked By/Date: DRH 10/4/21

Table 2: UVF Hydrocarbon Soil Sampling Results
R-5709, Parcel 229 - Donald Earl & Karen & Charles Gillis – Jay's Food Mart 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)
P229-B1-2-4	2-4	<0.2	<0.2	<0.08	<0.004
P229-B1-6-8	6-8	<0.17	<0.17	<0.07	<0.004
P229-B2-4-6	4-6	<0.15	<0.15	0.1	0.002
P229-B2-8-10	8-10	<0.15	<0.15	<0.06	<0.003
P229-B3-2-4	2-4	<0.17	<0.17	<0.07	<0.004
P229-B3-6-8	6-8	<0.15	<0.15	<0.06	<0.003
P229-B4-2-4	2-4	<0.17	<0.17	<0.07	0.001
P229-B4-6-8	6-8	<0.15	<0.15	<0.06	<0.003
P229-B5-2-4	2-4	<0.2	<0.2	0.05	0.003
P229-B5-6-8	6-8	<0.12	<0.12	4.4	0.002
P229-B6-2-4	2-4	<0.15	<0.15	0.9	0.016
P229-B6-8-10	8-10	<0.12	<0.12	<0.05	<0.003
P229-B7-0-2	0-2	<0.15	<0.15	0.4	0.01
P229-B7-6-8	6-8	<0.12	<0.12	<0.05	<0.003
P229-B8-2-4	2-4	<0.12	<0.12	0.1	0.003
P229-B8-8-10	8-10	<0.12	<0.12	<0.05	<0.003
P229-B9-0-2	0-2	<0.6	<0.6	24.1	0.4
P229-B9-4-6	4-6	<0.3	<0.3	<0.14	<0.007
P229-B10-2-4	2-4	<0.3	<0.3	<0.15	<0.008
P229-B10-6-8	6-8	<0.17	<0.17	<0.07	<0.004
P229-B11-2-4	2-4	<0.17	<0.17	<0.07	<0.004
P229-B11-4-6	4-6	<0.17	<0.17	<0.07	<0.004
P229-B12-2-4	2-4	<0.22	<0.22	<0.09	<0.005
P229-B12-6-8	6-8	<0.2	<0.2	<0.08	<0.004
P229-B13-2-4	2-4	<0.2	<0.2	<0.08	<0.004
P229-B13-6-8	6-8	<0.22	<0.22	<0.09	<0.005
P229-B14-2-4	2-4	<0.4	<0.4	<0.19	<0.01
P229-B14-6-8	6-8	<0.12	<0.12	<0.05	<0.003
P229-B15-2-4	2-4	<0.2	<0.2	<0.08	<0.004
P229-B15-6-8	6-8	<0.2	<0.2	<0.08	0.001
P229-B16-2-4	2-4	<0.17	<0.17	0.18	0.019
P229-B16-4-6	4-6	<0.17	<0.17	0.08	0.001
P229-B17-2-4	2-4	<0.22	<0.22	<0.09	<0.005
P229-B17-6-8	6-8	<0.2	<0.2	<0.08	<0.004
P229-B18-0-2	0-2	<0.17	<0.17	0.5	0.015
P229-B18-4-6	4-6	<0.17	<0.17	<0.07	<0.004
NC State Action Level		**N/A**	**50**	**100**	**N/A**

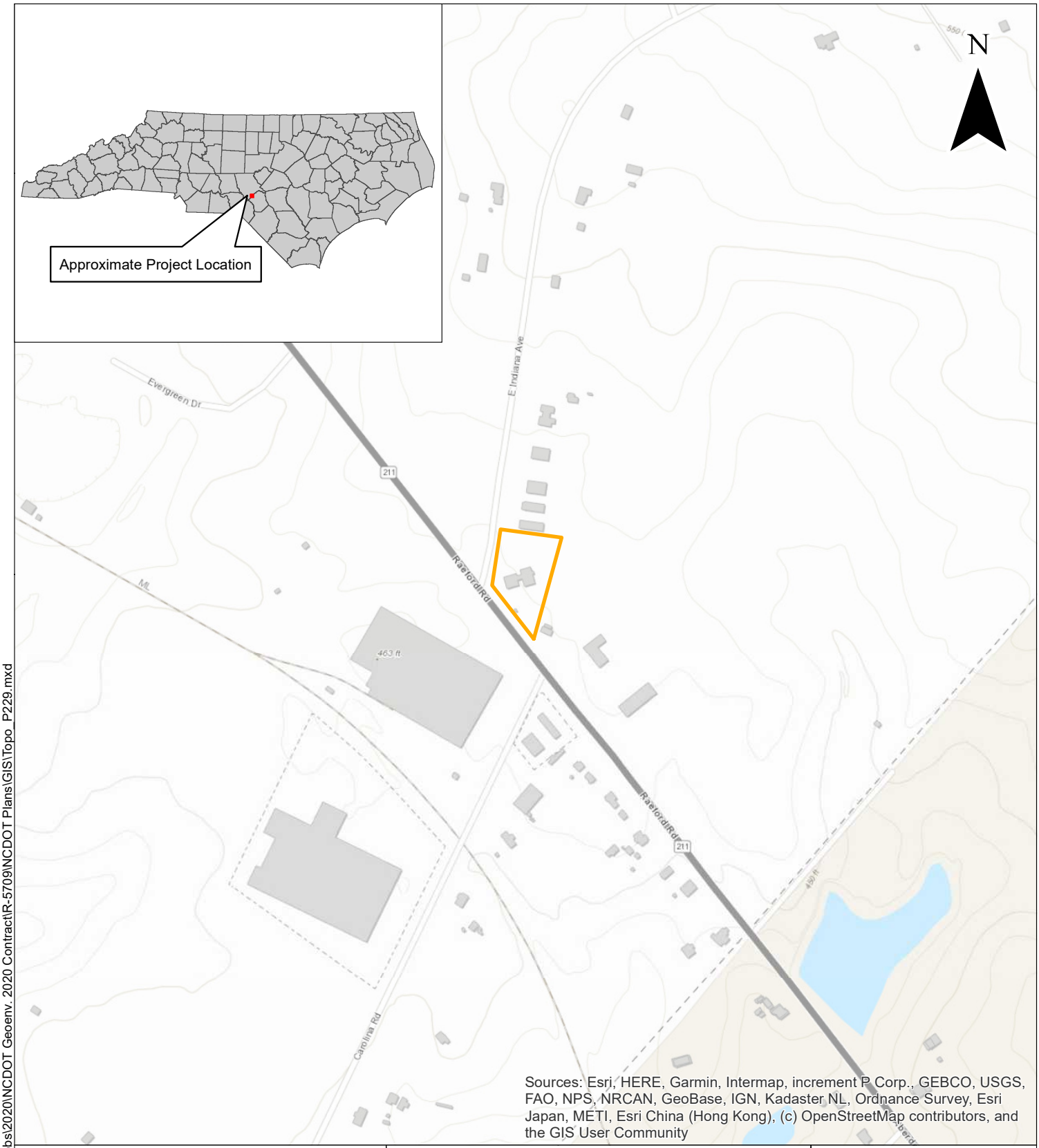
Notes:

1. Samples collected on August 30, 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



wood.
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VICINITY MAP
R5709-PARCEL 229
10827 NC 211 HWY
ABERDEEN, NORTH CAROLINA

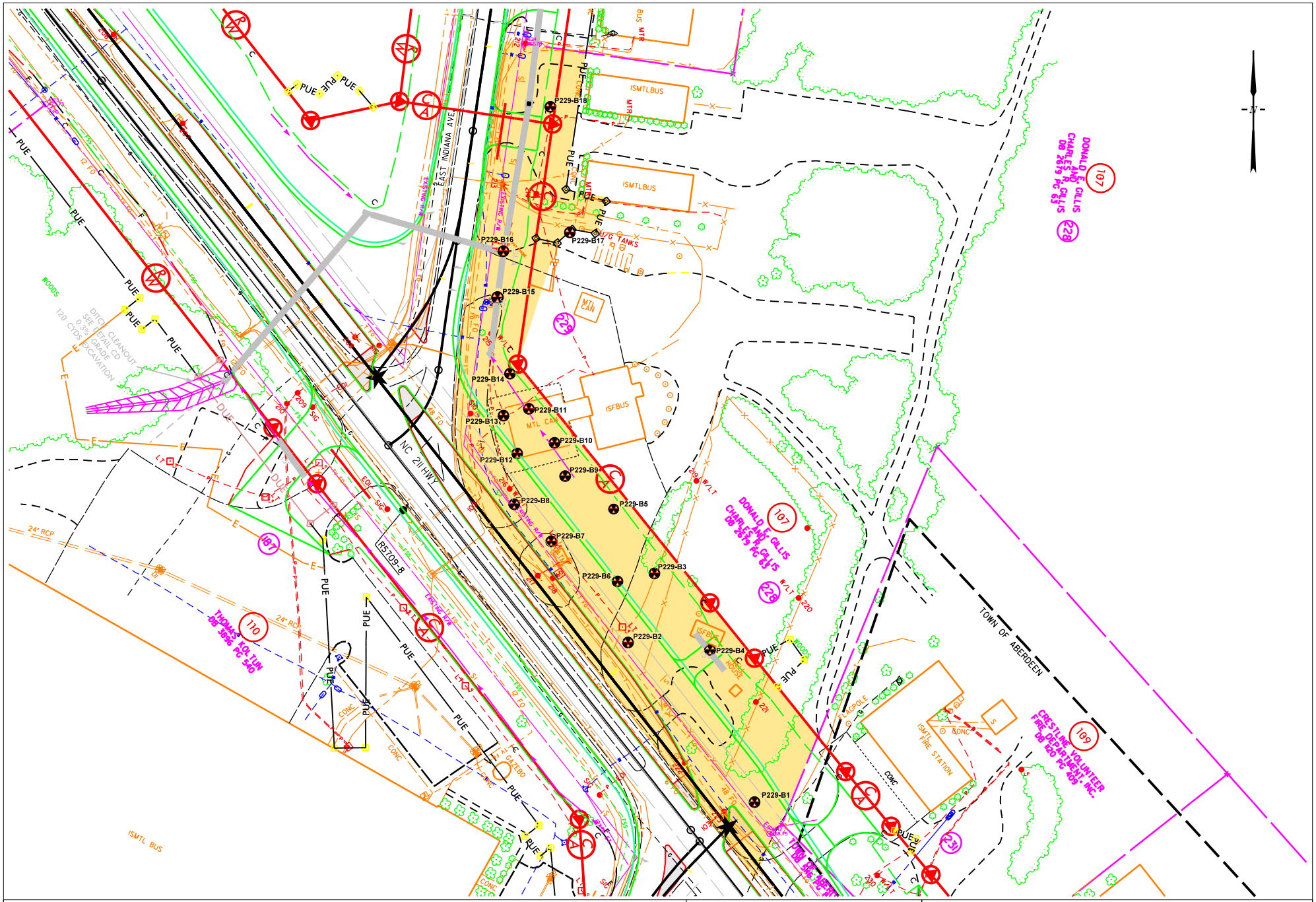
PREPARED BY:	LMM
DATE:	9/30/2021
CHECKED BY:	HPC
DATE:	9/30/2021
PROJECT NO:	20478R5709
FIGURE:	1

Legend

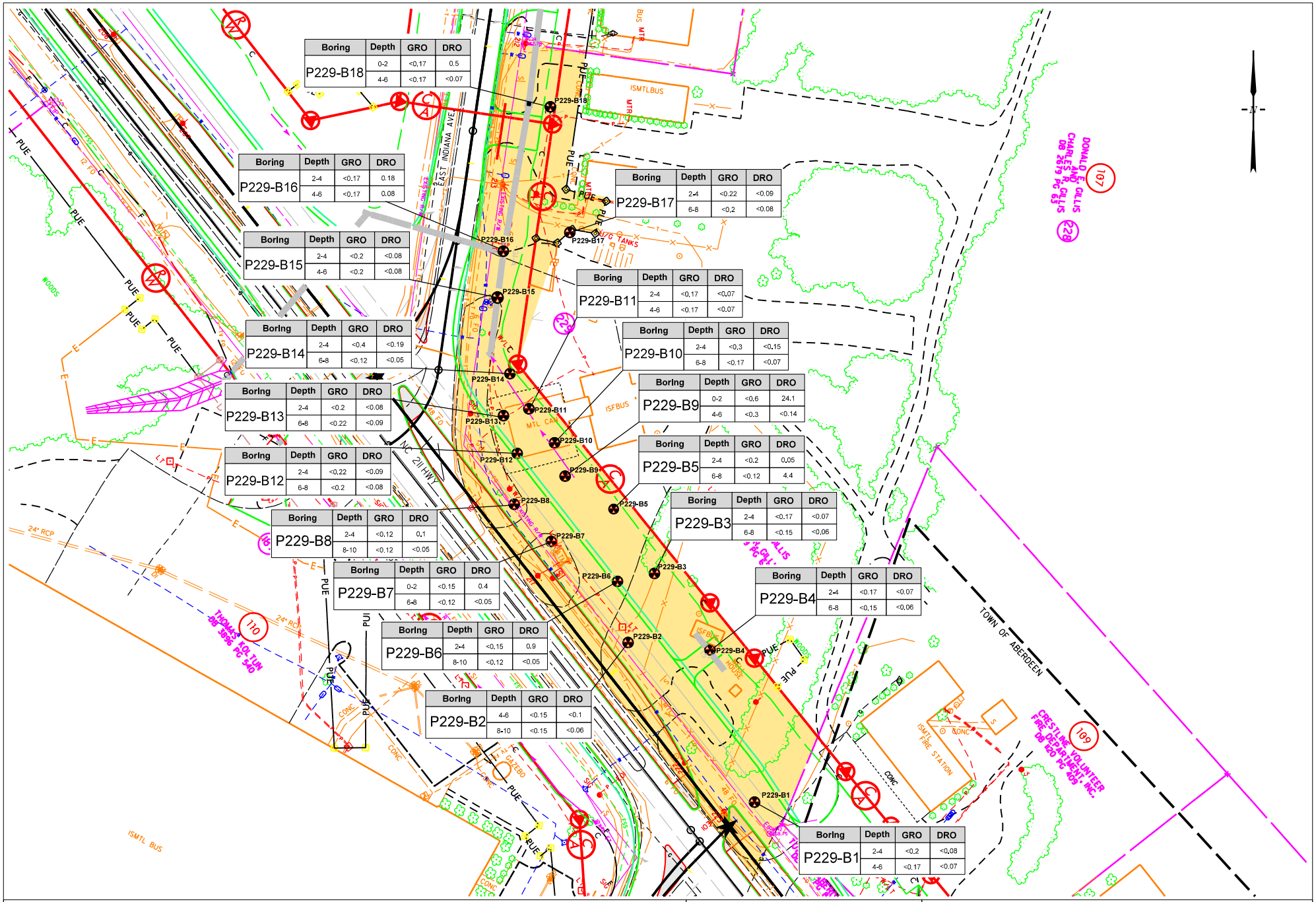
Site Boundary

0 500 1,000 Feet

Document Path: P:\6228 Environmental\jobs\2020\NCDOT Geoenv. 2020 Contract\R-5709\NCDOT Plans\GIS\Topo_P229.mxd



wood.				SITE MAP WITH BORING LOCATIONS R-5709 - PARCEL 229 10827 NC 211 HWY ABERDEEN, NORTH CAROLINA		
PREPARED BY: LMM	DATE: 10/15/21	CHECKED BY: HPC	DATE: 10/15/21	JOB NUMBER 20478R5709	FIGURE 2	



Boring	Depth	GRO	DRO
P229-B18	0-2	<0.17	0.5
	4-6	<0.17	<0.07

Boring	Depth	GRO	DRO
P229-B16	2-4	<0.17	0.18
	4-6	<0.17	0.08

Boring	Depth	GRO	DRO
P229-B17	2-4	<0.22	<0.09
	6-8	<0.2	<0.08

Boring	Depth	GRO	DRO
P229-B15	2-4	<0.2	<0.08
	4-6	<0.2	<0.08

Boring	Depth	GRO	DRO
P229-B11	2-4	<0.17	<0.07
	4-6	<0.17	<0.07

Boring	Depth	GRO	DRO
P229-B14	2-4	<0.4	<0.19
	6-8	<0.12	<0.05

Boring	Depth	GRO	DRO
P229-B10	2-4	<0.3	<0.15
	6-8	<0.17	<0.07

Boring	Depth	GRO	DRO
P229-B13	2-4	<0.2	<0.08
	6-8	<0.22	<0.09

Boring	Depth	GRO	DRO
P229-B9	0-2	<0.6	24.1
	4-6	<0.3	<0.14

Boring	Depth	GRO	DRO
P229-B12	2-4	<0.22	<0.09
	6-8	<0.2	<0.08

Boring	Depth	GRO	DRO
P229-B5	2-4	<0.2	0.05
	6-8	<0.12	4.4

Boring	Depth	GRO	DRO
P229-B8	2-4	<0.12	0.1
	8-10	<0.12	<0.05

Boring	Depth	GRO	DRO
P229-B3	2-4	<0.17	<0.07
	6-8	<0.15	<0.06

Boring	Depth	GRO	DRO
P229-B7	0-2	<0.15	0.4
	6-8	<0.12	<0.05

Boring	Depth	GRO	DRO
P229-B4	2-4	<0.17	<0.07
	6-8	<0.15	<0.06

Boring	Depth	GRO	DRO
P229-B6	2-4	<0.15	0.9
	8-10	<0.12	<0.05

Boring	Depth	GRO	DRO
P229-B2	4-6	<0.15	<0.1
	8-10	<0.15	<0.06

Boring	Depth	GRO	DRO
P229-B1	2-4	<0.2	<0.08
	4-6	<0.17	<0.07

APPROXIMATE BORING LOCATION

AREA OF INVESTIGATION

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

70' 0' 35' 70'
17.5'
(ENGLISH)

wood.

ANALYTICAL RESULTS MAP
R-5709 - PARCEL 229
10827 NC 211 HWY
ABERDEEN, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	10/15/21	HPC	10/15/21	20478R5709	3

APPENDIX A

BORING LOGS

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B1**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Top soil/organics	
2		Tan/light brown sand	
3	0.0		P229-B1-2-4 selected for UVF analyses
4		Orange/tan sand	
5	0.0		
6		Orange/tan clayey sand	
7	0.0		P229-B1-6-8 selected for UVF analyses
8		Orange/red clayey sand	
9	0.0		
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 #	**P229-B2**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan/gold sand	
2			
3	0.0		
4		Tan/brown sand	
5	0.2		P229-B2-4-6 selected for UVF analyses
6			
7	0.0	Orange/tan clayey sand	
8			
9	0.0	Orange/red clayey sand	P229-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**

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B3**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan/gray sand	
2		Tan sand	
3	0.0		P229-B3-2-4 selected for UVF analyses
4			
5	0.0	Orange/tan sand	
6			
7	0.0	Orange/tan clayey sand	P229-B3-6-8 selected for UVF analyses
8			
9	0.0		
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 #	**P229-B4**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan sand	
2			
3	0.0	Tan/gold sand	P229-B4-2-4 selected for UVF analyses
4			
5	0.0	Tan/brown sand	
6		Orange/tan sand	
7	0.0		P229-B4-6-8 selected for UVF analyses
8		Orange/tan clayey sand	
9	0.0		
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 #	**P229-B5**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Asphalt/gravel	
2		Tan sand	
3	0.0		P229-B5-2-4 selected for UVF analyses
4		Tan/gold sand	
5	0.0		
6		Orange/tan clayey sand	
7	0.0	Orange/red clayey sand	P229-B5-6-8 selected for UVF analyses
8			
9	0.0		
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 #	**P229-B6**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Asphalt/gravel Tan/gray sand	
2			
3	0.0	Tan sand	P229-B6-2-4 selected for UVF analyses
4			
5	0.0	Orange/tan sand	
6			
7	0.0	Orange/tan clayey sand	
8			
9	0.0		P229-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**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B7**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan/gray sand	P229-B7-0-2 selected for UVF analyses
2			
3	0.0		
4			
5	0.0	Tan/gold sand	
6			
7	0.0	Orange/tan sand	P229-B7-6-8 selected for UVF analyses
8		Orange/tan clayey sand	
9	0.0		
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 #	**P229-B8**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan sand	
2			
3	0.0	Tan/gray sand	P229-B8-2-4 selected for UVF analyses
4			
5	0.0		
6		Orange/tan sand	
7	0.0		
8		Orange/tan clayey sand	
9	0.0		P229-B8-8-10 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 #	**P229-B9**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Asphalt/gravel Tan/gray sand	P229-B9-0-2 selected for UVF analyses
2			
3	0.0		
4		Tan/gold sand	
5	0.0		P229-B9-4-6 selected for UVF analyses
6		Orange/tan clayey sand	
7	0.0		
8			
9	0.0	Orange/red clayey sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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SOIL BORING FIELD WORKSHEET

BORING #	**P229-B10**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.1	Concrete/gravel Tan sand	
2			
3	0.6		P229-B10-2-4 selected for UVF analyses
4		Tan/gray sand	
5	0.4		
6			
7	1.1	Tan/gray clayey sand	P229-B10-6-8 selected for UVF analyses
8		Orange/tan clayey sand	
9	0.7		
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 #	**P229-B11**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Concrete/gravel	
2		Tan/gray sand	
3	0.0		P229-B11-2-4 selected for UVF analyses
4			
5	0.8	Tan sand	P229-B11-4-6 selected for UVF analyses
6			
7	0.0	Orange/tan clayey sand	
8			
9	0.0		
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 #	**P229-B12**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.5	Concrete/gravel Tan/gray sand	
2			
3	0.7		P229-B12-2-4 selected for UVF analyses
4		Tan sand	
5	0.4		
6			
7	0.9	Orange/tan sand	P229-B12-6-8 selected for UVF analyses
8			
9	0.7	Orange/tan clayey sand	
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 #	**P229-B13**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Concrete/gravel	
2		Tan/gray sand	
3	0.0		P229-B13-2-4 selected for UVF analyses
4			
5	0.0	Orange/tan sand	
6		Tan sand	
7	1.0		P229-B13-6-8 selected for UVF analyses
8		Orange/tan clayey sand	
9	0.1		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B14**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Asphalt/gravel	
2		Tan sand	
3	0.0		P229-B14-2-4 selected for UVF analyses
4		Tan/gray sand	
5	0.0		
6			
7	0.0	Orange/tan sand	P229-B14-6-8 selected for UVF analyses
8			
9	0.0	Orange/tan clayey sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B15**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan/gold sand	
2			
3	0.0	Tan sand	P229-B15-2-4 selected for UVF analyses
4			
5	0.2	Tan/brown sand	
6			
7	0.4	Orange/tan sand	P229-B15-6-8 selected for UVF analyses
8			
9	0.1	Orange/tan clayey sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P229-B16**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.1	Tan sand	
2			
3	0.3	Tan/gold sand	P229-B16-2-4 selected for UVF analyses
4			
5	0.1	Tan sand	P229-B16-4-6 selected for UVF analyses
6		Orange/tan sand	
7	0.0		
8		Orange/tan clayey sand	
9	0.0		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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SOIL BORING FIELD WORKSHEET

BORING #	**P229-B17**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Tan sand	
2			
3	0.0		P229-B17-2-4 selected for UVF analyses
4		Tan/brown sand	
5	0.0		
6		Orange/tan sand	
7	0.3		P229-B17-6-8 selected for UVF analyses
8			
9	0.0	Orange/tan clayey sand	
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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SOIL BORING FIELD WORKSHEET

BORING #	**P229-B18**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**8/30/2021**			WEATHER CONDITIONS	**Partly sunny, 97°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.1	Gravel	P229-B18-0-2 selected for UVF analyses
2		Tan sand	
3	0.1	Tan/gold sand	
4			
5	0.3		P229-B18-4-6 selected for UVF analyses
6		Orange/tan sand	
7	0.0		
8		Orange/tan clayey sand	
9	0.1		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

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APPENDIX B

PHOTOGRAPHIC LOG

Photograph 1:
View of convenience store building at parcel 229, facing southeast.

Photograph 2:
View of four fuel dispenser islands located within the investigation area at parcel 229, facing southeast

Photograph 3:
Northern portion of investigation area at parcel 229, facing north.

Photograph 4:
Southeastern area of investigation area at parcel 229, facing southeast.

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

Photograph 6:
View of IET advancing direct push soil sampler at parcel 229.

APPENDIX C

GEOPHYSICAL REPORT

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2021-201)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 229
NCDOT PROJECT R-5709 (50205.1.1)

10827 NC-211, ABERDEEN, NC

August 25, 2021

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

Prepared by: _____
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C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 229 - 10827 NC-211
Aberdeen, Moore 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 229, located at 10827 NC-211, in Aberdeen, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5709). The survey area was indicated to Pyramid by Wood, PLC, and generally extended from the existing edge of pavement into the furthest proposed ROW and/or easement. Conducted from August 10-11, 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. GPR was performed around vehicles, across a buried reinforced pipe, beneath the canopy, and across a suspected utility or debris. Evidence of various utility lines and possible debris was observed. No evidence of significant structures such as USTs was observed.

Collectively, the geophysical data did not record any evidence of unknown metallic USTs at Parcel 229. The known USTs servicing the gas station are located outside of the survey area on the north side of the property.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Wood, PLC at Parcel 229, located at 10827 NC-211, in Aberdeen, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5709). The survey area was indicated to Pyramid by Wood, PLC, and generally extended from the existing edge of pavement into the furthest proposed ROW and/or easement. Conducted from August 10-11, 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 an active gas station and canopy surrounded by grass, asphalt, and concrete surfaces. The known USTs servicing the gas station were located outside of the survey area on the north side of the property. 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 11, 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	Hydrant	
2	Reinforced Concrete Pipe	✓
3	Light/Phone	
4	Vehicles	✓
5	Vehicles/ATM	✓
6	Light	
7	Signs	
8	Suspected Debris or Utility	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a hydrant, a reinforced concrete pipe, a light and phone box, vehicles, an ATM, signs, and an isolated minor feature suspected to be associated with buried debris or a utility. GPR was performed across the reinforced pipe and around the vehicles to confirm that the metallic interference did not obscure any significant structures such as USTs. GPR was also performed beneath the canopy where the GPS signal was not maintained during the EM survey. Lastly, GPR was performed across EM Anomaly 8 to verify it was not associated with any significant structures.

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 transect images are included in **Appendix A**. A total of twenty-two formal GPR transects were performed at the site. GPR Transects 1-2 were performed across the reinforced pipe, verifying its presence. GPR Transects 3-10

were performed beneath the canopy and recorded evidence of various buried utility lines and reinforcement. GPR Transects 11-21 were performed around vehicles and recorded evidence of buried utilities and some minor possible buried debris. GPR Transect 22 was performed across EM Anomaly 8 and recorded evidence of suspected utilities. No evidence of any significant structures such as USTs was observed.

Collectively, the geophysical data did not record any evidence of unknown metallic USTs at Parcel 229. The known USTs servicing the gas station are located outside of the survey area on the north side of the property. **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 229 in Aberdeen, 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.
- GPR was performed around vehicles, across a buried reinforced pipe, beneath the canopy, and across a suspected utility or debris. Evidence of various utility lines and possible debris was observed. No evidence of significant structures such as USTs was observed.
- Collectively, the geophysical data did not record any evidence of unknown metallic USTs at Parcel 229. The known USTs servicing the gas station are located outside of the survey area on the north side of the property.

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 Northwest)

View of Survey Area (Facing Approximately South)

N

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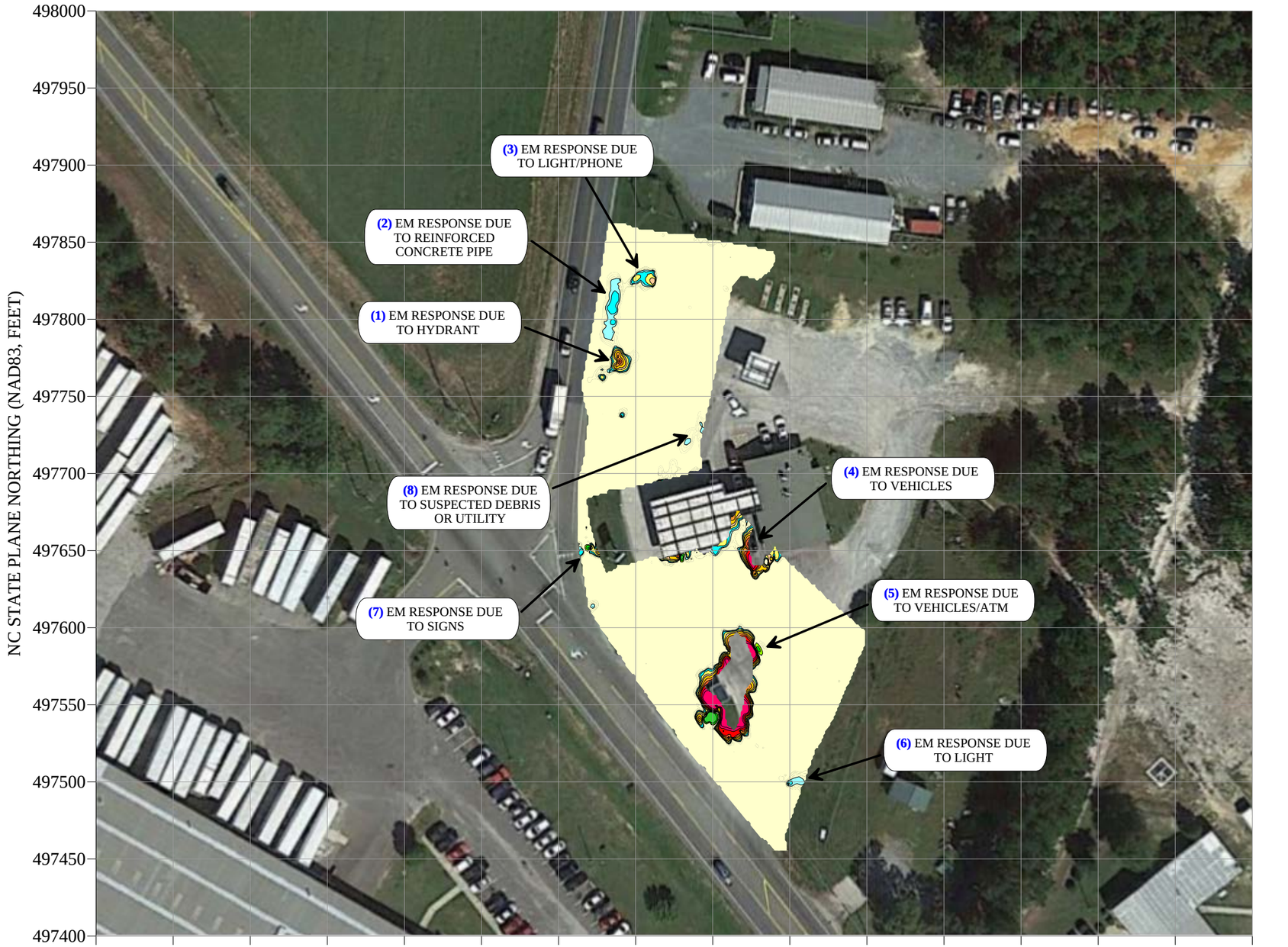
PROJECT: PARCEL 229 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 229 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	DATE: 8/16/2021 PYRAMID PROJECT #: 2021-201	CLIENT: Wood, PLC **FIGURE 1**

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 August 10, 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 11, 2021.

EM61 Metal Detection Response (millivolts)

N

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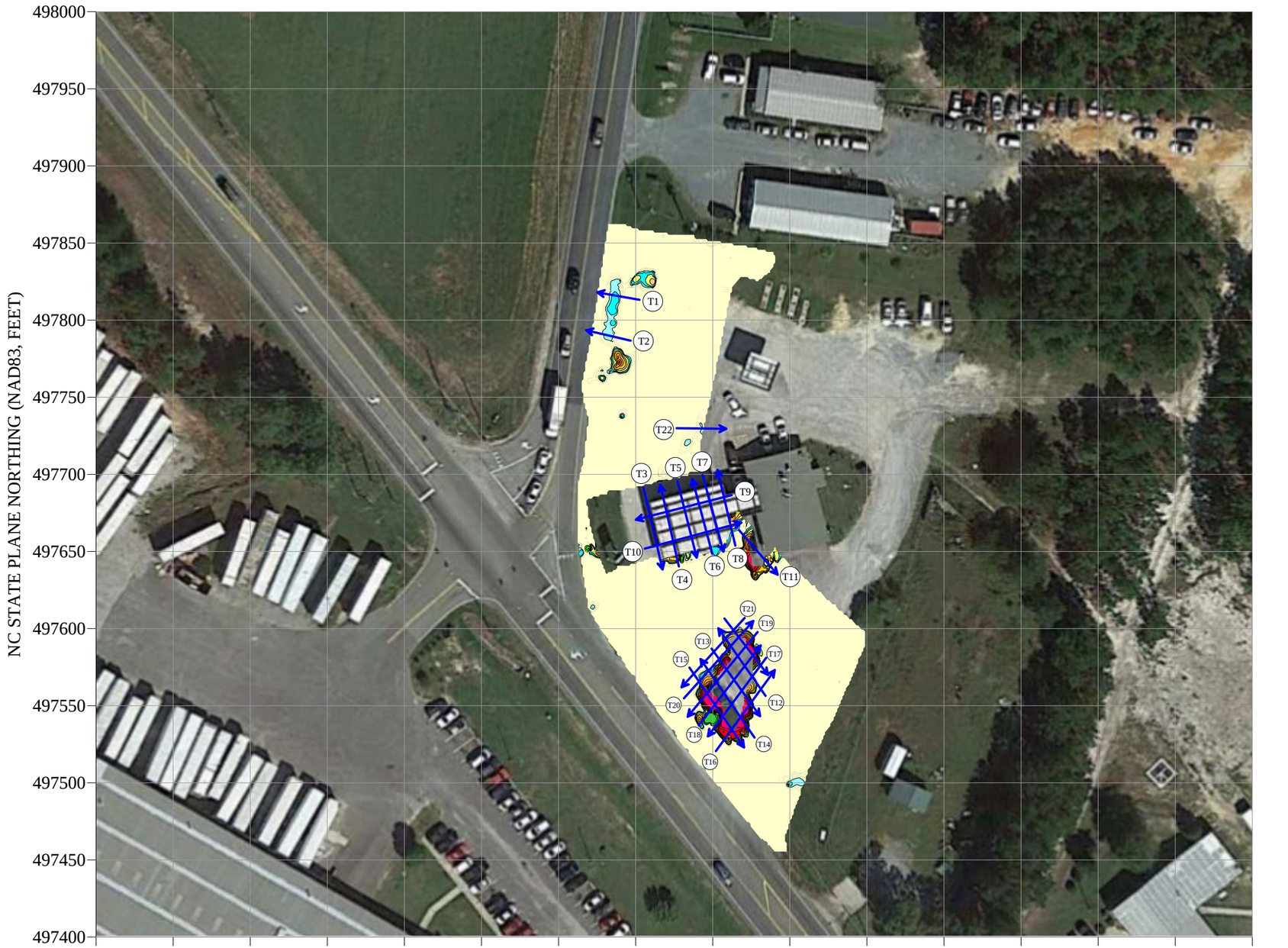
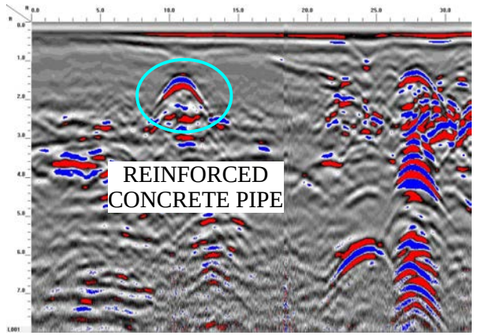
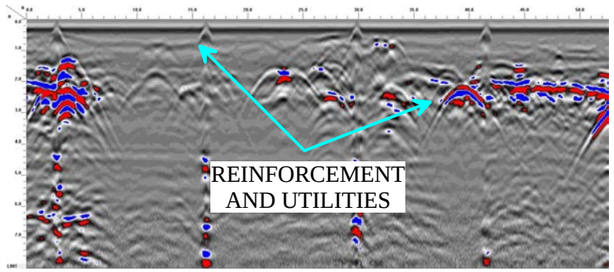
PROJECT: PARCEL 229 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 229 - EM61 METAL DETECTION CONTOUR MAP	DATE: 8/16/2021	CLIENT: Wood, PLC
		PYRAMID PROJECT #: 2021-201	**FIGURE 2**

GPR TRANSECT LOCATIONS





GPR TRANSECT 1 (T1)



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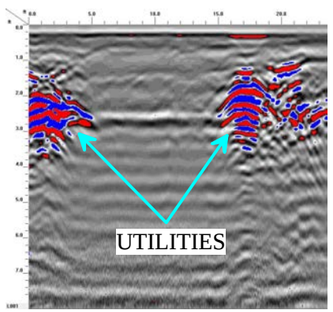
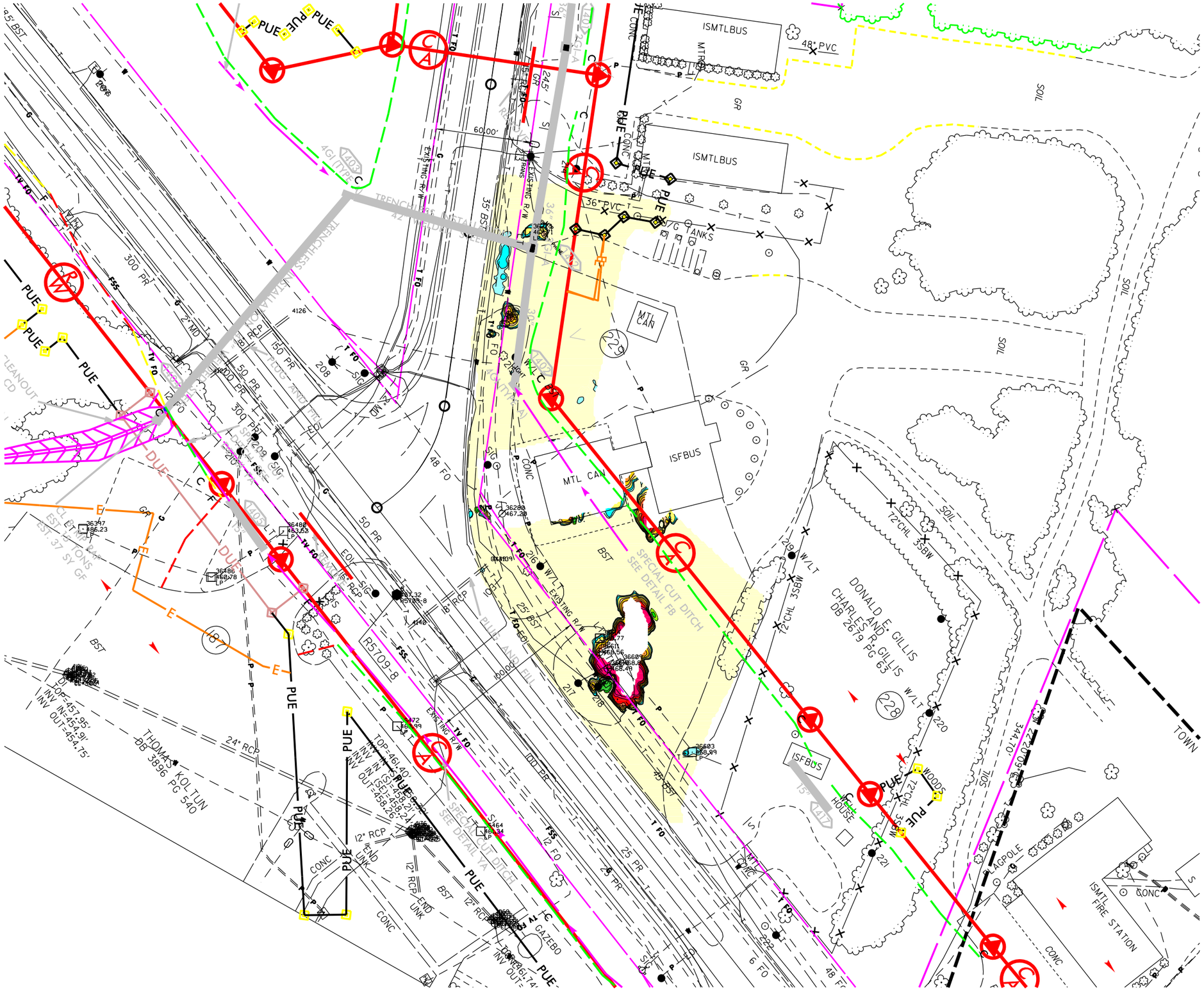


GPR TRANSECT 22 (T22)

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 229 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709
TITLE	PARCEL 229 - GPR TRANSECT LOCATIONS AND SELECT IMAGES
DATE	8/16/2021
CLIENT	Wood, PLC
PYRAMID PROJECT #:	2021-201
	FIGURE 3



TITLE

OVERLAY OF METAL DETECTION RESULTS
ON NCDOT ENGINEERING PLANS

PROJECT

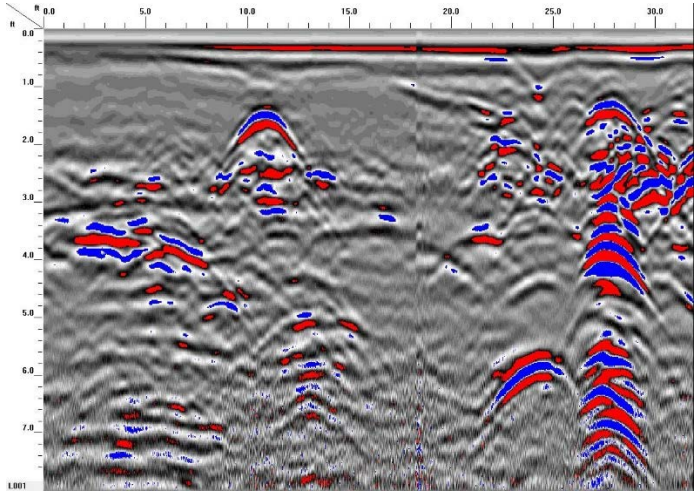
PARCEL 229
ABERDEEN, NORTH CAROLINA
NCDOT PROJECT R-5709

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. 4

Appendix A – GPR Transect Images



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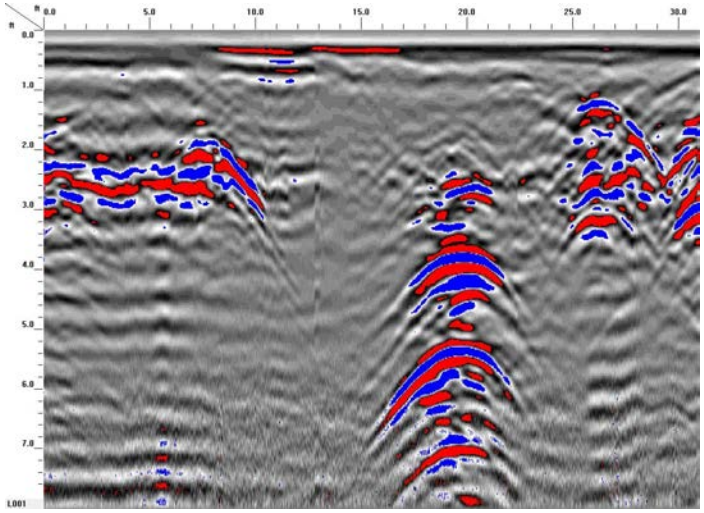

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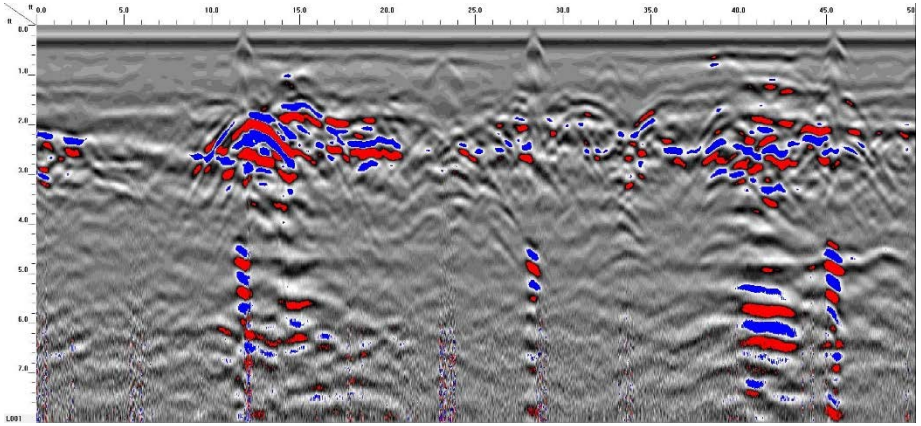

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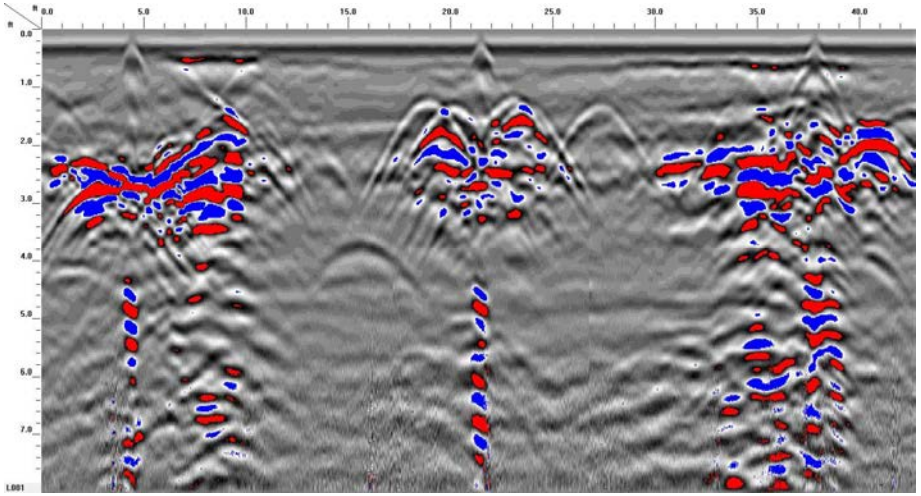

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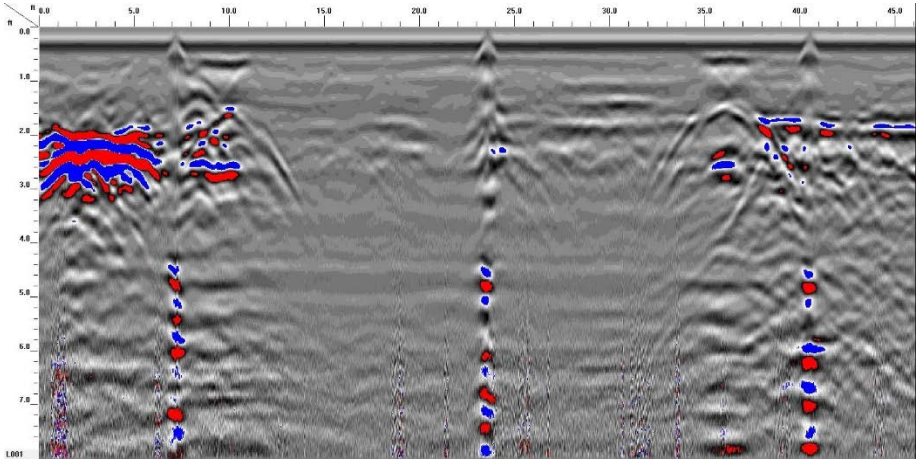

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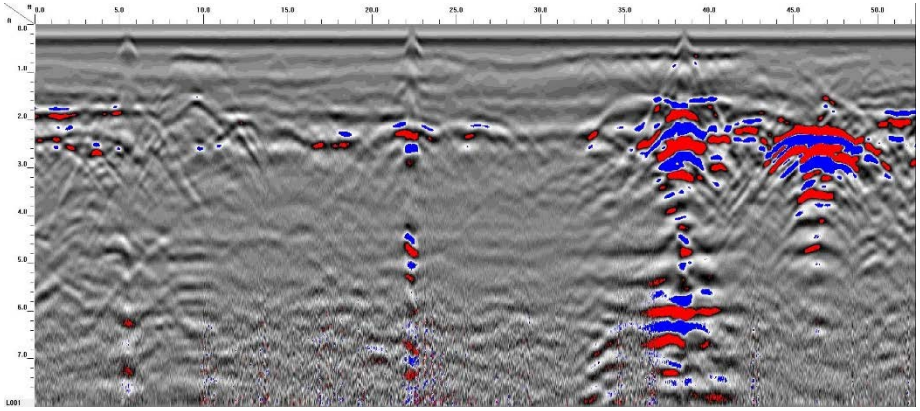

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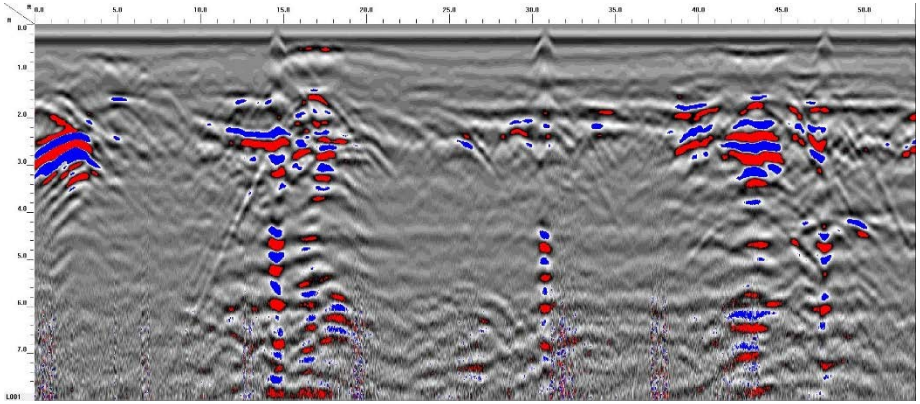

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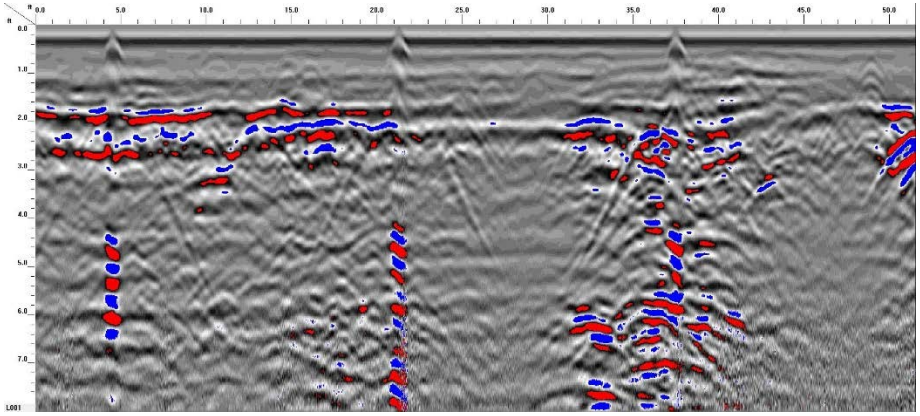

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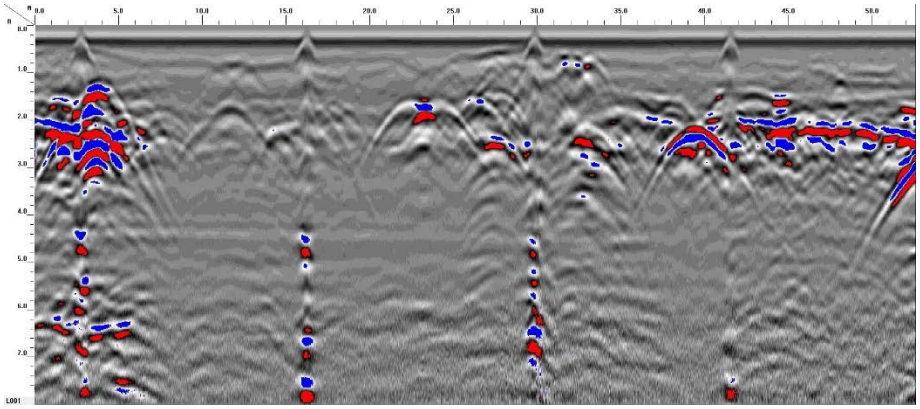

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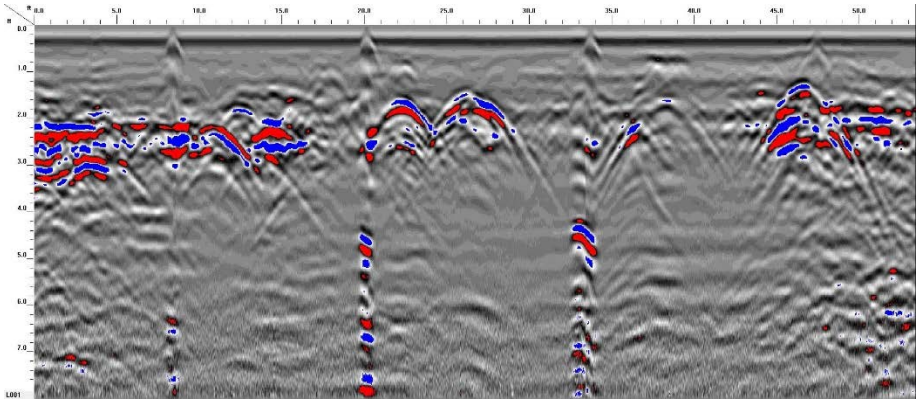

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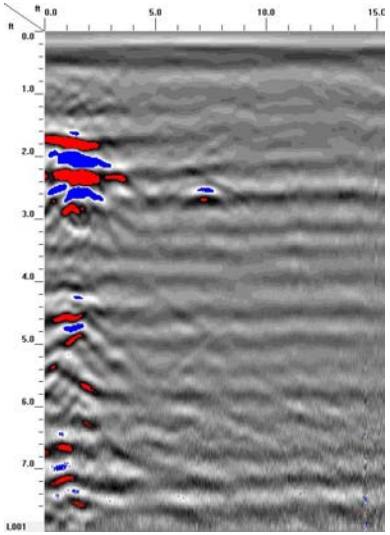
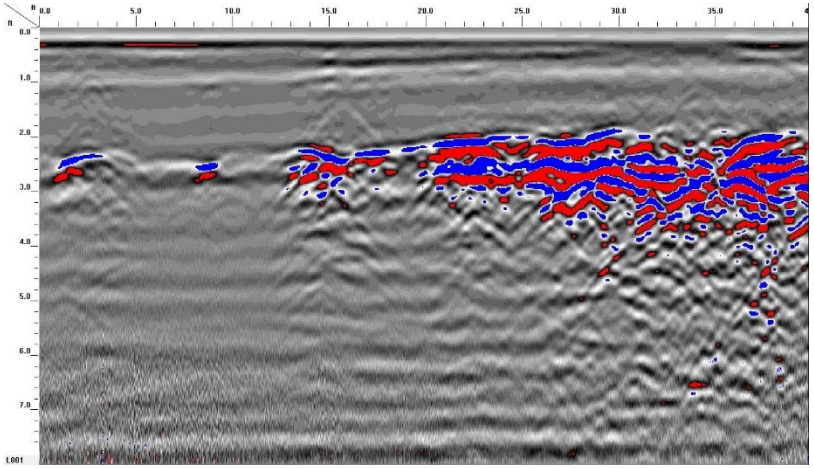


GPR TRANSECT 11



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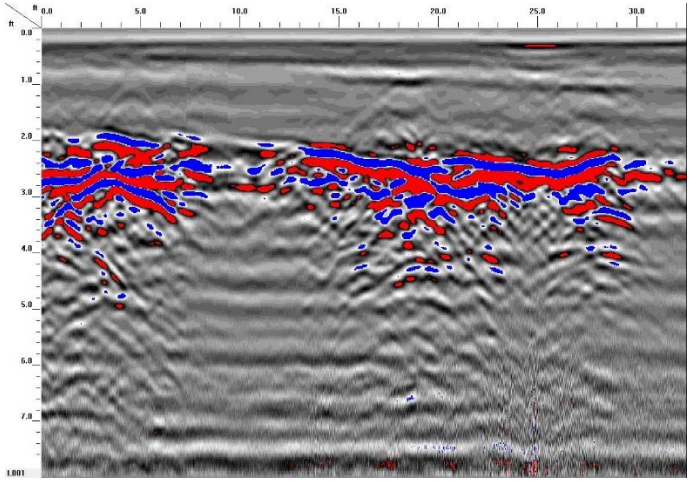

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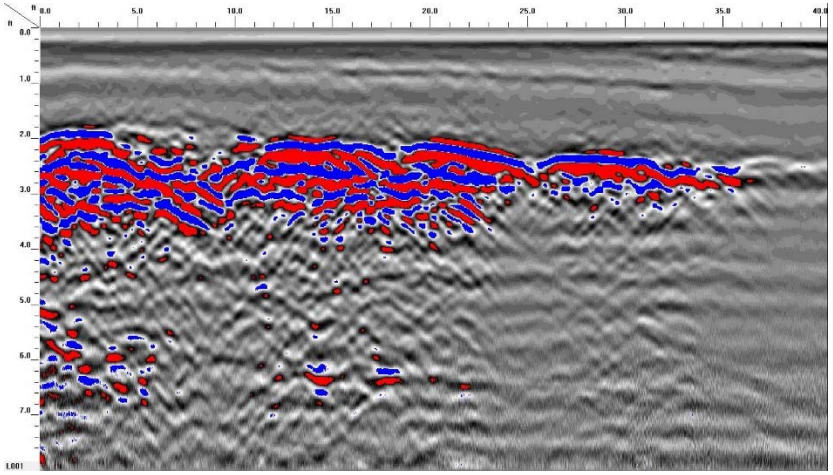

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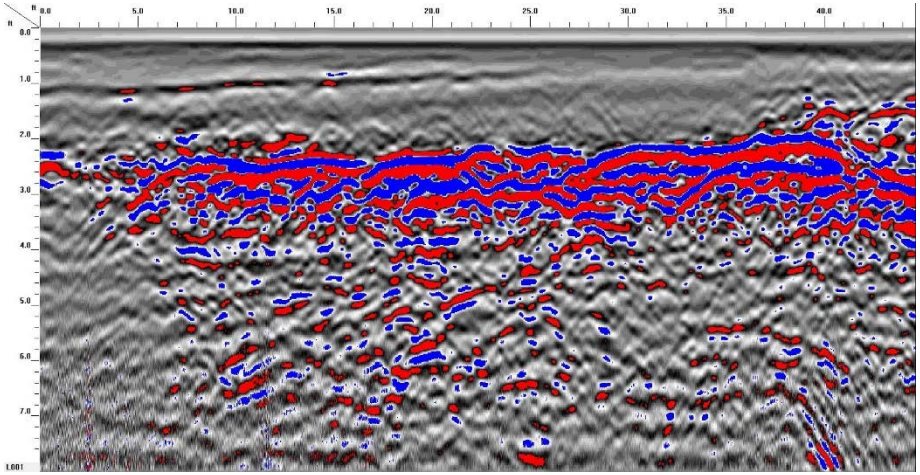

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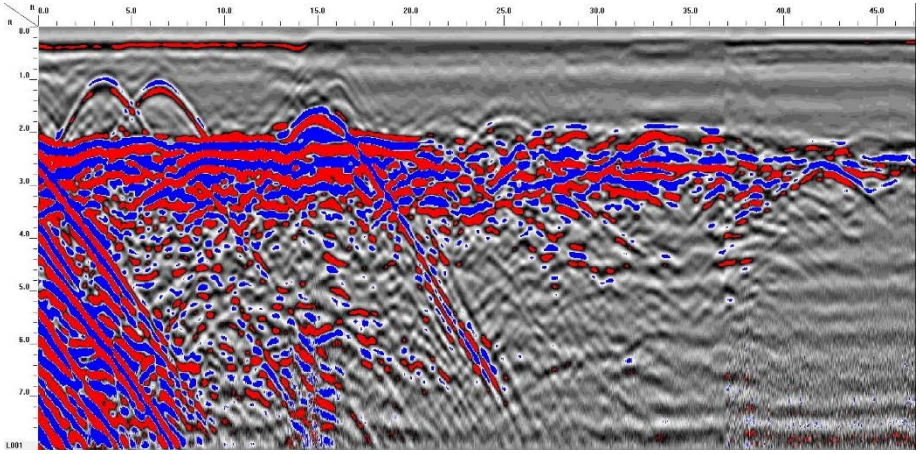

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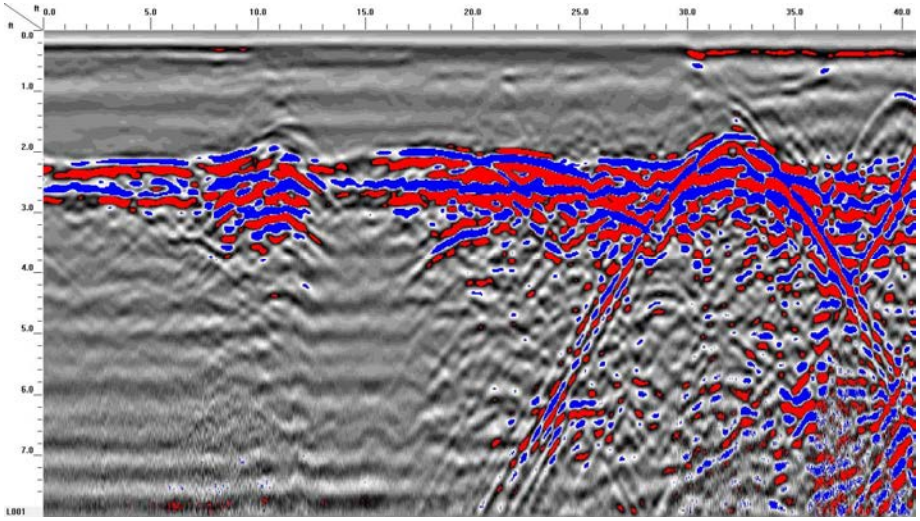

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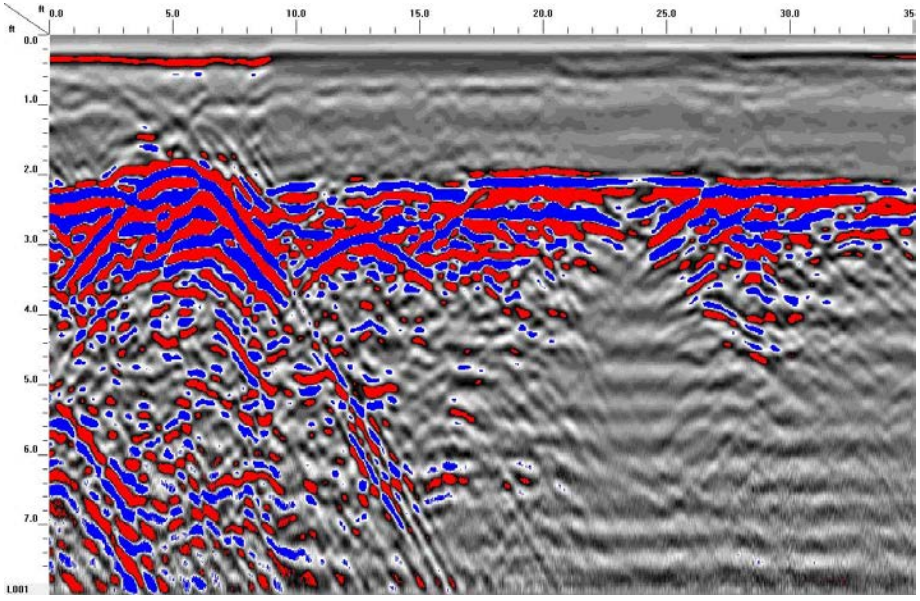

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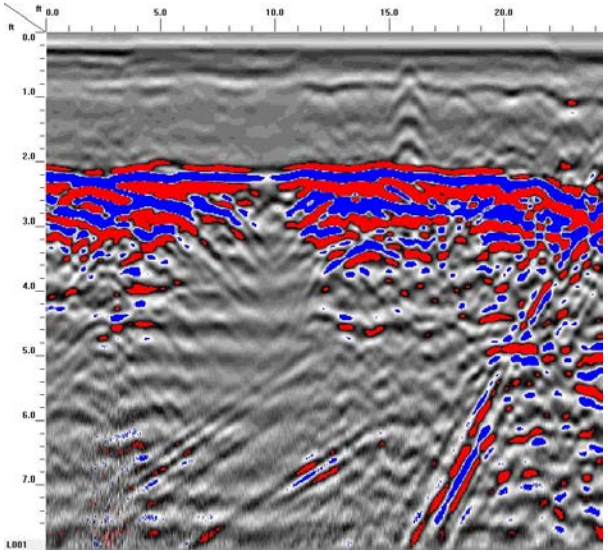

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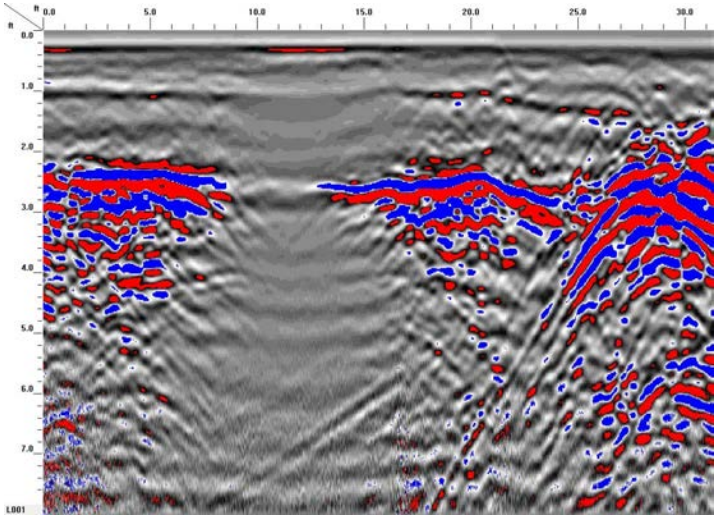

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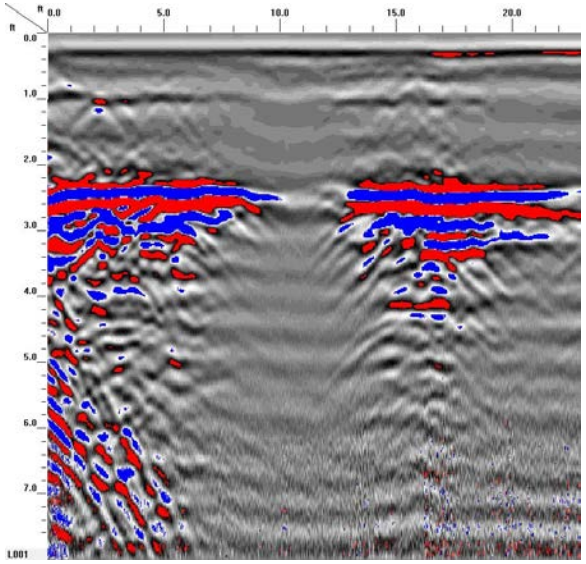

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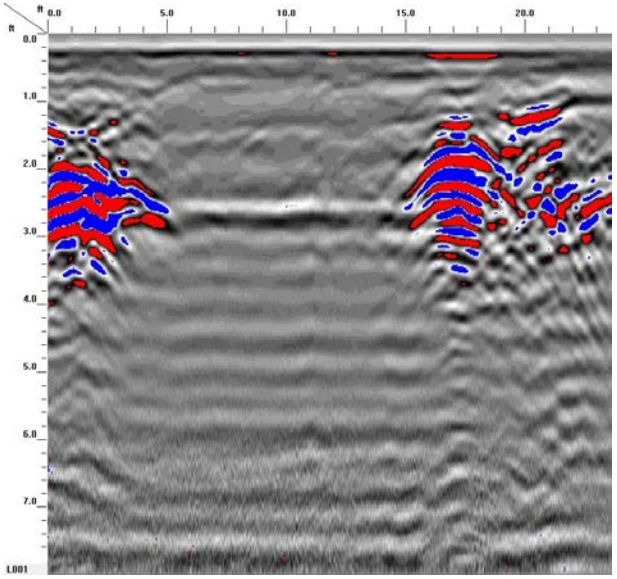


GPR TRANSECT 22

APPENDIX D

UVF HYDROCARBON ANALYTICAL RESULTS

Hydrocarbon Analysis Results

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

Contact: Helen Corley

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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	P229-B1-6-8	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B2-4-6	6.0	<0.15	<0.15	0.1	0.1	0.05	0.002	<0.001	0	67.3	32.7	V.Deg.PHC 71.6%,(FCM)
Soil	P229-B2-8-10	6.0	<0.15	<0.15	<0.06	<0.15	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B3-2-4	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B3-6-8	6.0	<0.15	<0.15	<0.06	<0.15	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B4-2-4	7.0	<0.17	<0.17	<0.07	0.008	0.008	0.001	<0.002	0	46.9	53.1	Residual HC
Soil	P229-B4-6-8	6.0	<0.15	<0.15	<0.06	<0.15	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 100.3%

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

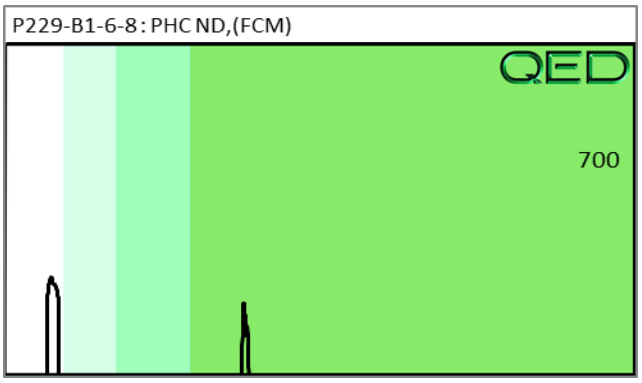
HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only : % Ratios estimated carbon number proportions : (OCR)/(Q) = Outside cal range, values and HC match estimates : ND = Not Detected

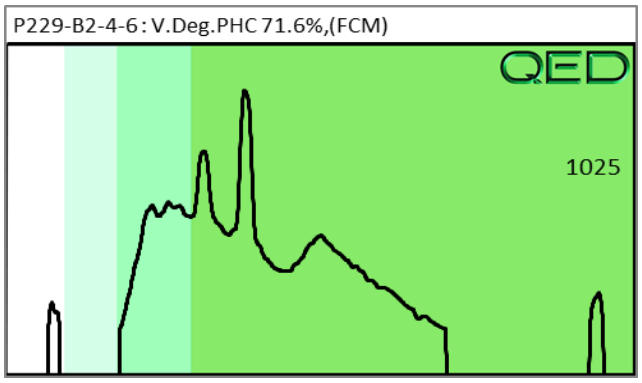
(B) = Blank Drift : (M) = Adjusted value : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : SB = sample selected as site background

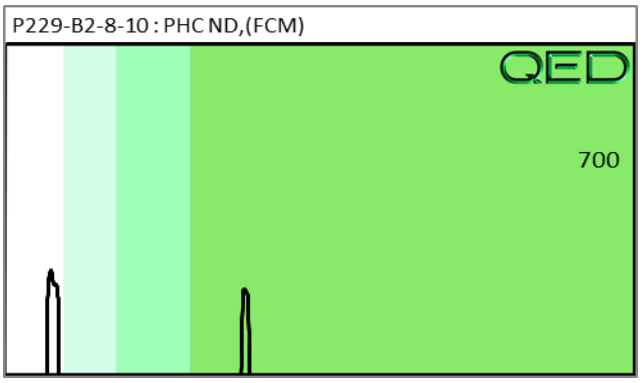
(TD) = Calibration outside limit

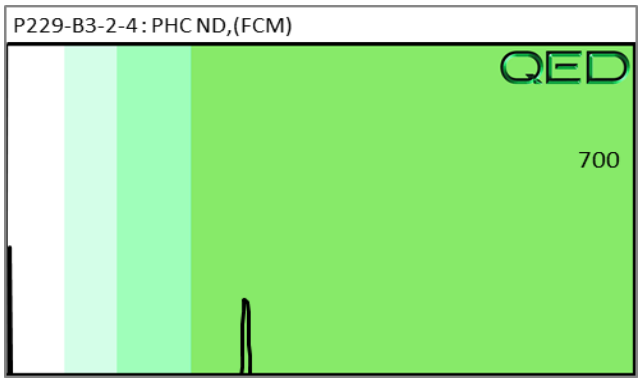
QED Hydrocarbon Fingerprints

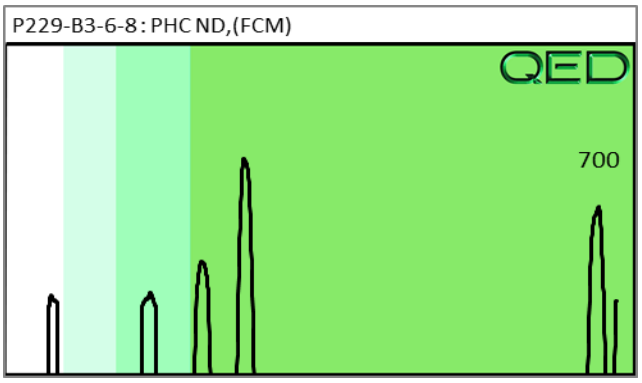
Project: P229

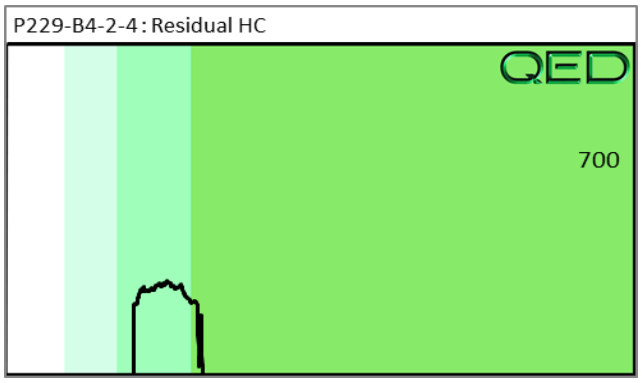


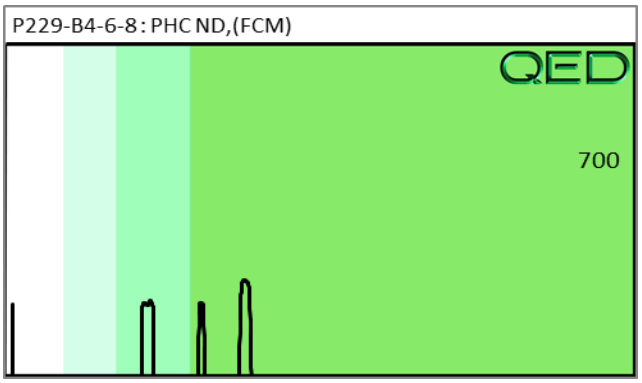












Hydrocarbon Analysis Results

Client: Wood
Address 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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:C18	% Ratios C18+	HC Fingerprint Match
Soil	P229-B5-2-4	8.0	<0.2	<0.2	0.05	0.05	0.05	0.003	<0.002	0	29	71	PHC ND,(FCM)
Soil	P229-B5-6-8	5.0	<0.12	<0.12	4.4	4.4	0.029	0.002	<0.002	0	99.2	0.8	Deg Fuel 93.2%,(FCM)
Soil	P229-B6-2-4	6.0	<0.15	<0.15	0.9	0.9	0.4	0.016	<0.001	0	87.2	12.8	V.Deg.PHC 98.7%,(FCM)
Soil	P229-B6-8-10	5.0	<0.12	<0.12	<0.05	<0.12	<0.003	<0.003	<0.002	0	100	0	Residual HC
Soil	P229-B7-0-2	6.0	<0.15	<0.15	0.4	0.4	0.21	0.01	<0.001	0	75	25	V.Deg.PHC 82.2%,(FCM)
Soil	P229-B7-6-8	5.0	<0.12	<0.12	<0.05	<0.12	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B8-2-4	5.0	<0.12	<0.12	0.1	0.1	0.05	0.003	<0.001	0	69.8	30.2	V.Deg.PHC 50.3%,(FCM)
Soil	P229-B8-8-10	5.0	<0.12	<0.12	<0.05	<0.12	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 103.1%

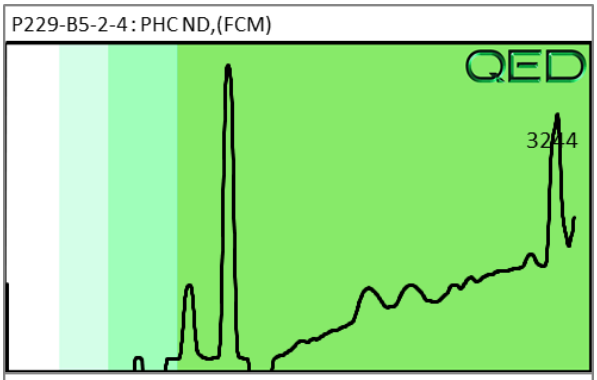
Analysis by QED HC-1 Analyser

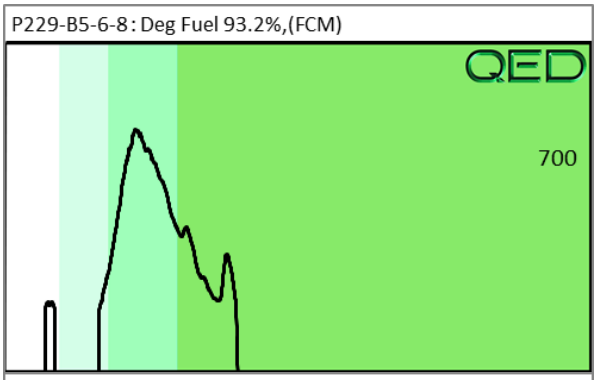
Concentration values in mg/kg for soil and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

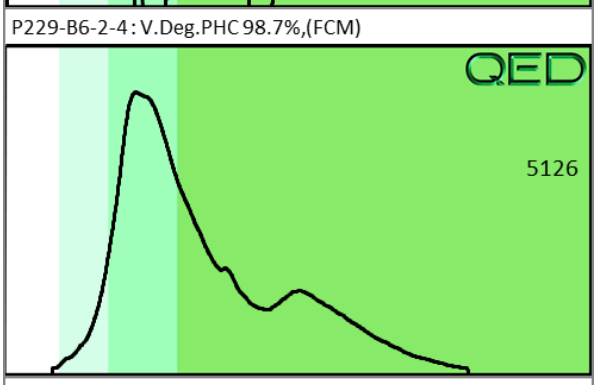
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only : % Ratios estimated carbon number proportions : (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

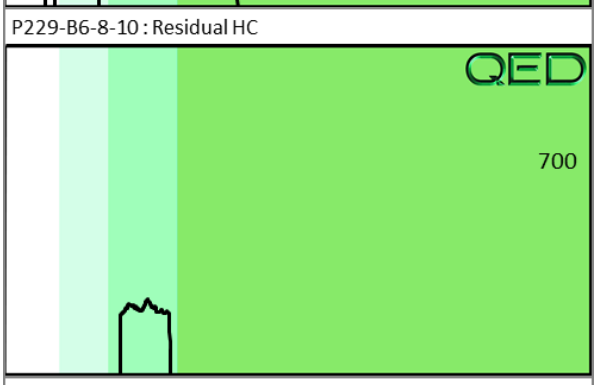
QED Hydrocarbon Fingerprints

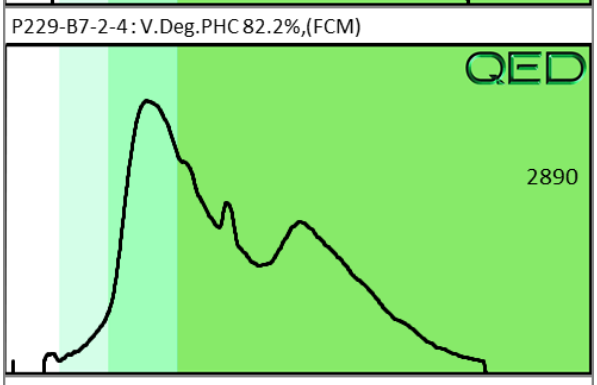
Project: P229

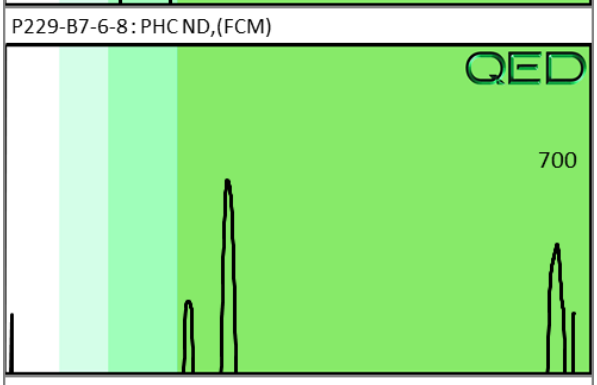


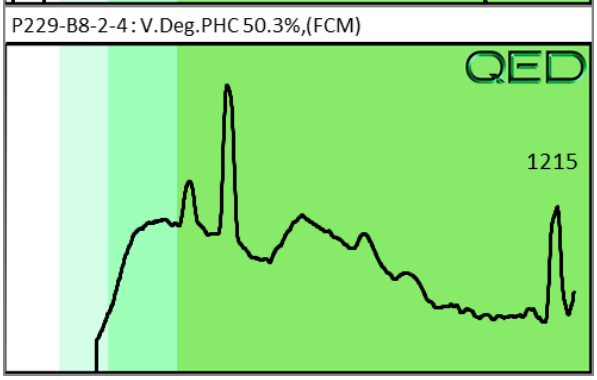


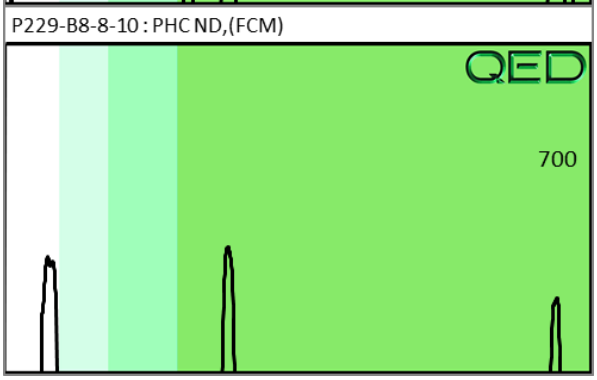












Hydrocarbon Analysis Results

Client: Wood
Address 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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	P229-B9-0-2	24.0	<0.6	<0.6	24.1	24.1	15.5	0.4	0.004	0	92.5	7.5	V.Deg.PHC 90.6%,(FCM)
Soil	P229-B9-4-6	14.0	<0.3	<0.3	<0.14	<0.3	<0.007	<0.007	<0.004	0	0	0	PHC ND,(FCM)
Soil	P229-B10-2-4	15.0	<0.3	<0.3	<0.15	<0.3	<0.008	<0.008	<0.005	0	0	0	PHC ND,(FCM)
Soil	P229-B10-6-8	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B11-2-4	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B11-4-6	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B12-2-4	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P229-B12-6-8	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 97.8%

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

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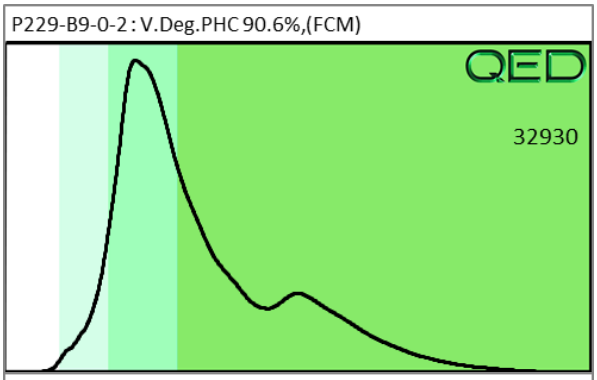
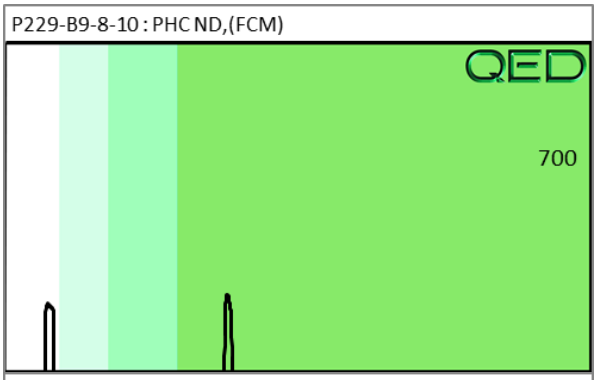
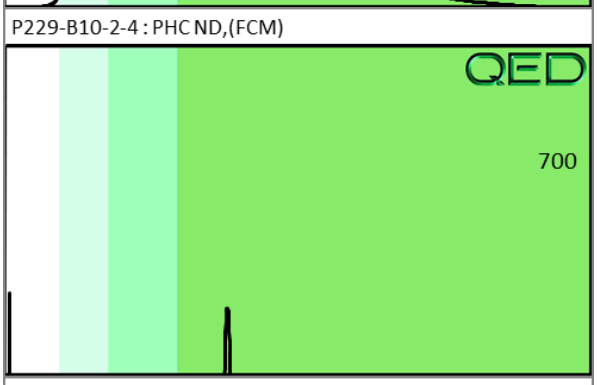
(TD) = Calibration outside limit

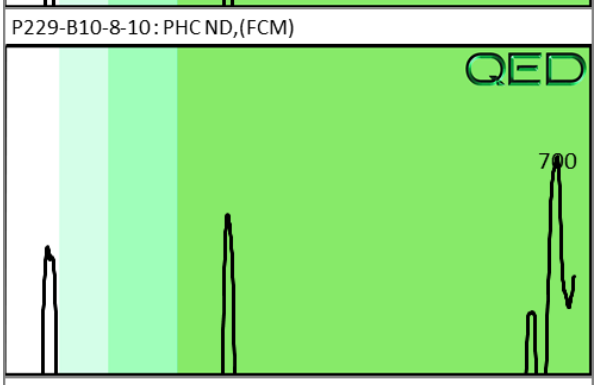
QED Hydrocarbon Fingerprints

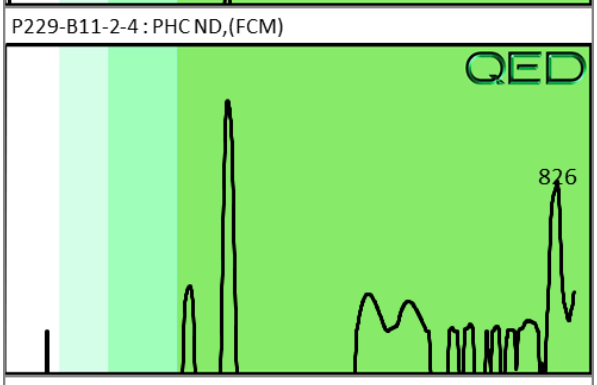
Project: P229

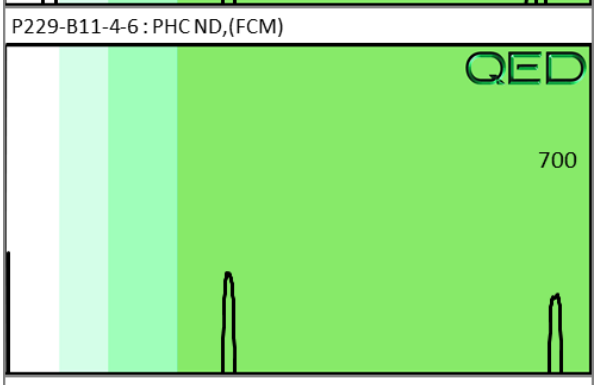


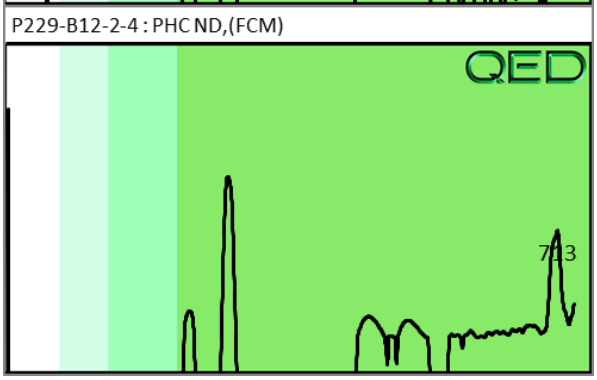


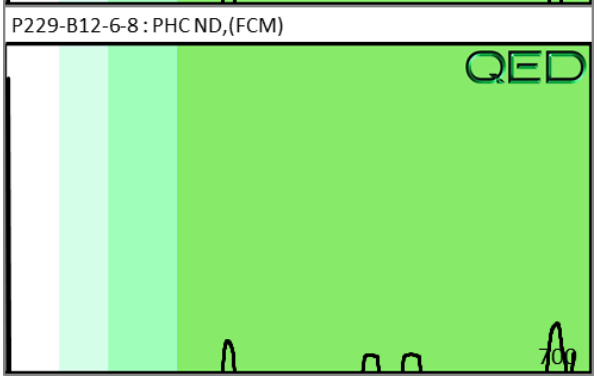












Hydrocarbon Analysis Results

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

Contact: Helen Corley

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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	P229-B13-2-4	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B13-6-8	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P229-B14-2-4	19.0	<0.4	<0.4	<0.19	<0.4	<0.01	<0.01	<0.006	0	0	0	PHC ND,(FCM)
Soil	P229-B14-6-8	5.0	<0.12	<0.12	<0.05	<0.12	<0.003	<0.003	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B15-2-4	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B15-6-8	8.0	<0.2	<0.2	<0.08	0.009	0.009	0.001	<0.002	0	54.5	45.5	Residual HC

Initial Calibrator QC check OK

Final FCM QC Check OK 97.0%

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

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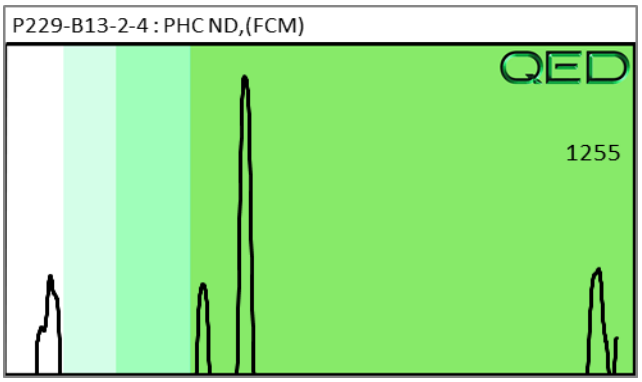
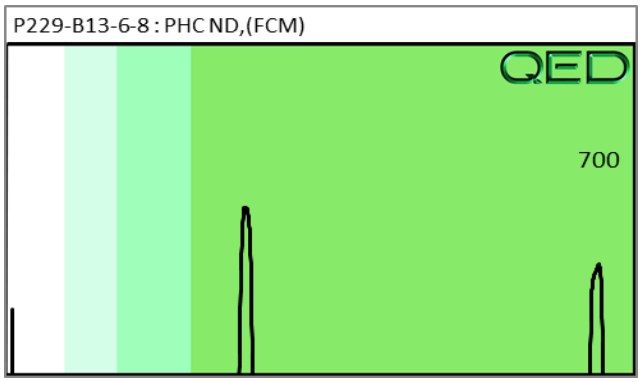
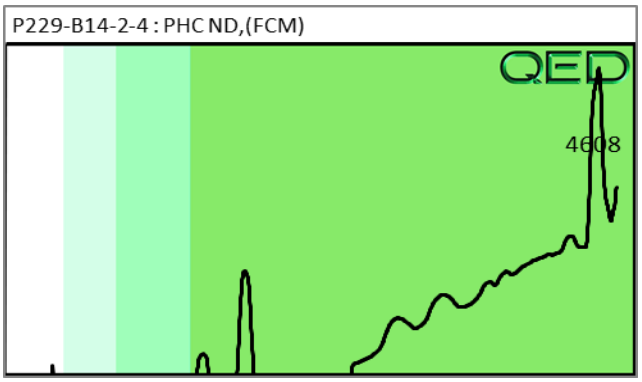
(TD) = Calibration outside limit

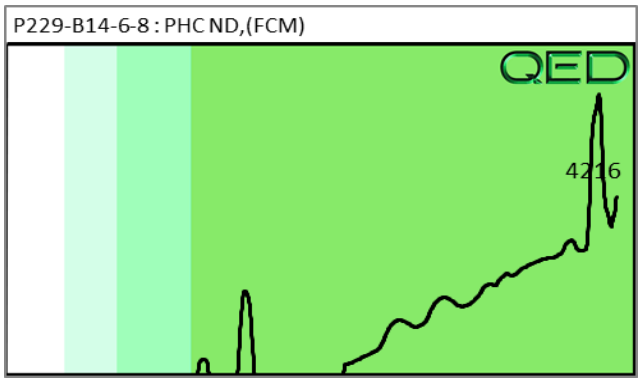
QED Hydrocarbon Fingerprints

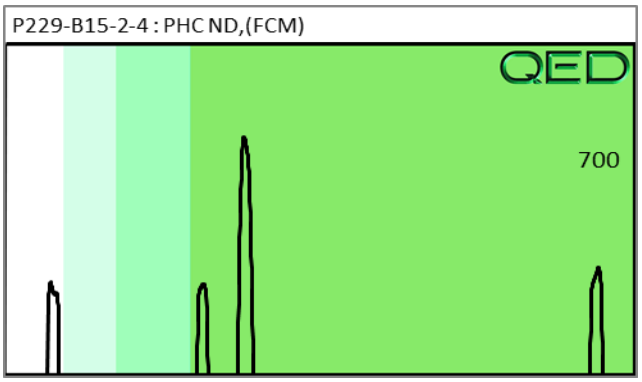
Project: P229

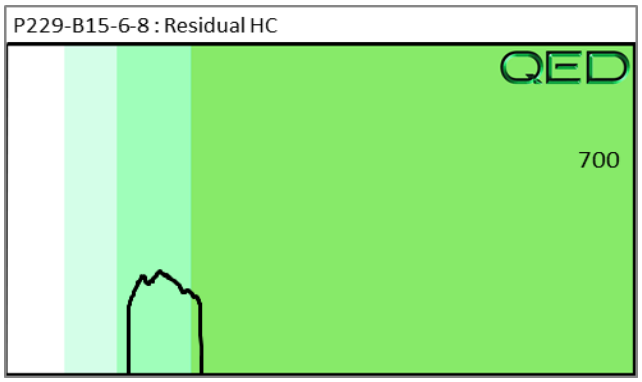












Hydrocarbon Analysis Results

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

Contact: Helen Corley

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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	P229-B16-2-4	7.0	<0.17	<0.17	0.18	0.18	0.18	0.019	<0.002	0	93.2	6.8	Residual PHC
Soil	P229-B16-4-6	7.0	<0.17	<0.17	0.08	0.08	0.05	0.001	<0.002	0	78	22	Residual HC
Soil	P229-B17-2-4	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P229-B17-6-8	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P229-B18-0-2	7.0	<0.17	<0.17	0.5	0.5	0.29	0.015	0.001	0	73.8	26.2	V.Deg.PHC 76.7%,(FCM)
Soil	P229-B18-4-6	7.0	<0.17	<0.17	<0.07	<0.17	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 101.3%

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.

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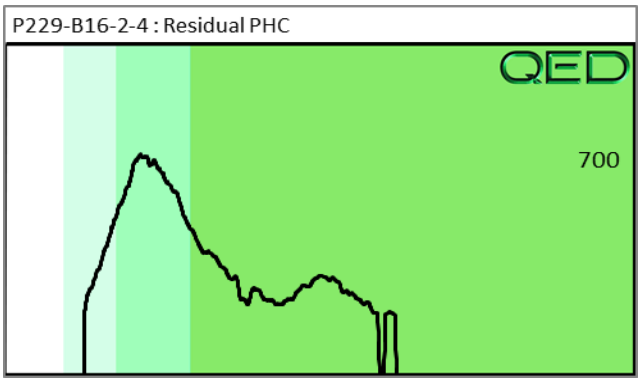
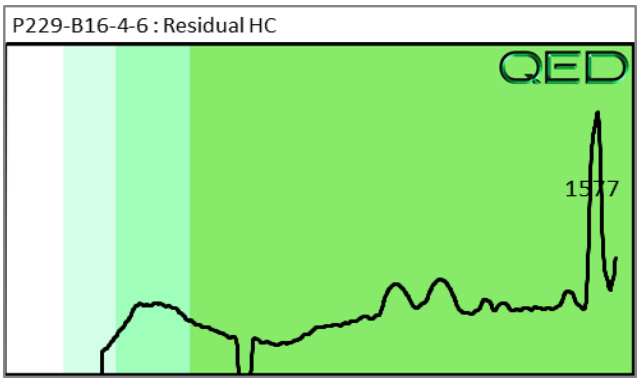
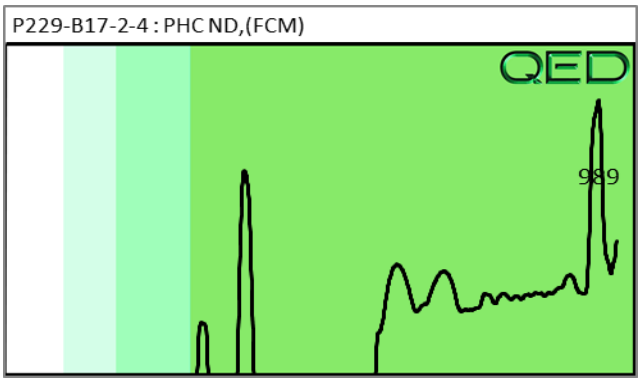
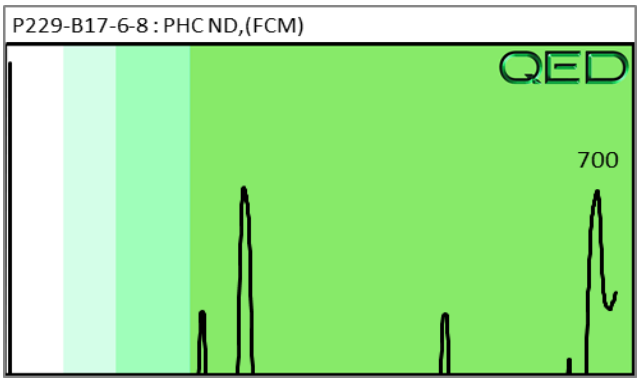
QED Hydrocarbon Fingerprints

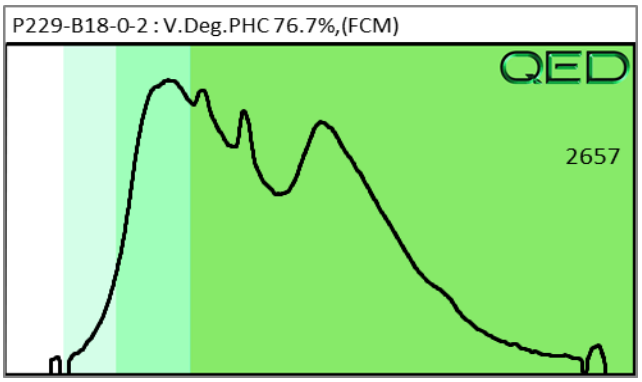
Project: P229

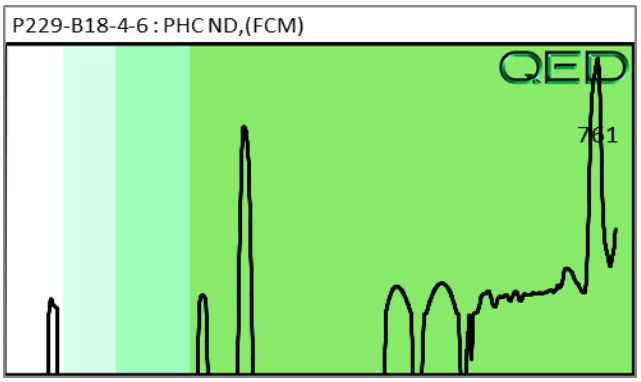












Hydrocarbon Analysis Results

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

Contact: Helen Corley,

Project: P229

Samples taken Monday, August 30, 2021
Samples extracted Monday, August 30, 2021
Samples analysed Monday, August 30, 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	P229-B1-2-4	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 100.0%

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: P229