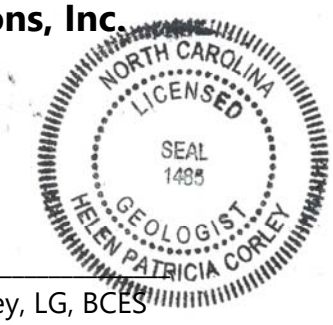
North Carolina Department of Transportation

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

Parcel 217
John & Kay Bolin Property
10531 NC 211 Hwy
Aberdeen, North Carolina
October 21, 2021

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



Andrew Frantz, REM
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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 217 (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 on the northeast side of NC 211 Hwy, as shown on the Vicinity Map, **Figure 1**. The Site, which is located at 10531 NC 211 Hwy, is currently occupied by a garage and several old vehicles and trailers. The Site is identified as Parcel 217, John & Kay Bolin Property, within the NCDOT MicroStation survey file and is in Aberdeen of Moore County, North Carolina. The area of investigation at Parcel 217 is approximately 0.50-acres as shown on **Figure 2**.

The Site was reported as a possible former gasoline station in the 2019 NCDOT Phase I Report. In addition, the Phase I noted a concrete pad was observed along the southwestern exterior of the Site building with a metal pipe protruding. Based on the location of the concrete pad and the presence of the metal pipe, it is suspected to be a former dispenser island. Wood reviewed the North Carolina Laserfiche online database and NCDEQ documentation for Parcel 217 was not present. Wood reviewed the NCDOT Historical Aerial Imagery Index, and Parcel 217 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 15 shallow soil borings (P217-B1 to P217-B15). 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 medium-grained sand overlying tan, gold, and white clay. 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 southeast. 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 garage building, a suspected dispenser island located to the southwest of the building, and several old vehicles and trailers. The garage building is suspected to have been formerly operated as a gasoline station. In addition, two suspected UST fill ports were observed along the northwestern exterior of the garage building. 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 10 and 12, 2021. Pyramid conducted a geophysical investigation using electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys on the northern and western portions of the parcel, as these areas were most likely to contain USTs. A total of seven EM anomalies were identified, the majority of which were attributed to visible cultural features at the ground surface. Of the seven EM anomalies identified, one was a large and consistent with buried structures such as USTs. The large anomaly was located along the northwestern exterior of the garage building in the same area of the suspected UST fill ports observed during the June site reconnaissance. The GPR survey of the large EM anomaly identified the presence of two probable USTs. Both probable USTs measured approximately 26 feet long by 7 feet wide. Evidence of additional buried structures associated with the six other EM anomalies was not observed. The complete Pyramid geophysics report is included as **Appendix C**.

Utility locating was performed by PUL personnel on August 24, 2021. The utility locating effort identified buried water lines, buried electrical lines, several buried telephone and communication lines and a buried natural gas line. A buried water line, several telephone and communication lines and a natural gas line were identified along the southwestern Site boundary parallel to NC 211 Hwy. Several buried electrical lines were identified extending

from the Site building to light poles located at the parcel. The service water lines for the on-Site building and off-Site buildings located further to the east were suspected to traversing the northern portion of the parcel; however, these lines were not able to be located by PUL. The service lines are likely constructed of polyvinyl chloride (PVC) and can be difficult to locate. The buried natural gas line was observed to be extending from the southern corner of the on-Site building to the southwest toward NC 211 Hwy. Overhead high-voltage power lines were identified along the southwestern Site boundary parallel to NC 211 Hwy.

3.4 Soil Sampling

On September 2, 2021, Wood and IET mobilized to the Site to advance 15 shallow soil borings (P217-B1 to P217-B15). The borings were advanced via direct-push technology to approximate depths ranging from 10 to 15 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 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 probable USTs (borings P217-B5 to B8), 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. Thirty-four soil samples were collected from the 15 borings at the Site for onsite UVF analysis.

4.0 SOIL SAMPLING RESULTS

Based on September 2, 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 15 borings advanced at the Site.

PID readings for the 15 borings ranged from not detected in borings P217-B13, B14, and B15 to 62.9 parts per million (ppm) in sample P217-B7-10-12 collected from 10 to 12 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 September 2021 investigation.

GRO or DRO detections in the 34 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 September 2, 2021.

- The Site is occupied with a garage building, a suspected dispenser island located to the southwest of the building, and several old vehicles and trailers.

- The geophysical survey identified two probable USTs located along the northwestern exterior of the Site building. Both USTs measured approximately 26 feet long by 7 feet wide and 3 feet to top of tanks.

- Fifteen soil borings were advanced to roughly 10 to 15 feet bgs in the NCDOT ROW investigation area to collect soil samples for on-Site UVF analysis. Thirty-four soil samples were collected for on-Site UVF analysis.

- UVF analysis of the 34 soil samples collected did not identify petroleum-impacted soil.

6.0 RECOMMENDATIONS

Based on these Phase II Investigation results, Wood recommends the two probable USTs identified during the geophysical survey should be removed in general accordance with the NCDEQ guidelines.

TABLES

Table 1: Summary of PID Screening Results
R-5709, Parcel 217 - John & Kay Bolin Property
Aberdeen, North Carolina
Wood Project: 20478R5709

Boring ID	Depth of Sample Interval	PID Reading
P217-B1	2-4	5.2
	6-8	4.8
P217-B2	2-4	5.7
	6-8	7.4
P217-B3	0-2	7.8
	6-8	7.7
P217-B4	0-2	7.2
	4-6	8.7
P217-B5	2-4	5.1
	6-8	5.6
	12-14	7.5
P217-B6	2-4	8.9
	6-8	7.2
	10-12	8.3
P217-B7	0-2	42.1
	6-8	11.1
	10-12	62.9
P217-B8	2-4	9.4
	4-6	10.6
	12-14	7.7
P217-B9	0-2	5.1
	6-8	6.6
P217-B10	2-4	7.9
	6-8	8.6
P217-B11	2-4	7.3
	6-8	7.9
P217-B12	2-4	5.8
	6-8	6.3
B217-B13	2-4	0.0
	4-6	0.0
B217-B14	0-2	0.0
	6-8	0.0
P217-B15	2-4	0.0
	8-10	0.0

Notes:

1. Samples collected on 9/2/21
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 217 - John & Kay Bolin 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)
P217-B1-2-4	2-4	<0.2	<0.2	<0.08	0.002
P217-B1-6-8	6-8	<0.25	<0.25	<0.1	<0.005
P217-B2-2-4	2-4	<0.17	<0.17	6.2	0.018
P217-B2-6-8	6-8	<0.27	<0.27	<0.11	<0.006
P217-B3-0-2	0-2	<0.27	<0.27	22	0.3
P217-B3-6-8	6-8	<0.2	<0.2	<0.08	<0.004
P217-B4-0-2	0-2	<0.2	<0.2	7.2	0.17
P217-B4-4-6	4-6	<0.2	<0.2	7.1	0.027
P217-B5-2-4	2-4	<0.27	35.9	0.6	0.012
P217-B5-6-8	6-8	<0.22	<0.22	<0.09	<0.005
P217-B5-12-14	12-14	<0.25	<0.25	8.8	0.014
P217-B6-2-4	2-4	<0.25	<0.25	8.8	0.006
P217-B6-6-8	6-8	<0.2	<0.2	<0.08	<0.004
P217-B6-10-12	10-12	<0.3	<0.3	4.8	0.07
P217-B7-0-2	0-2	<0.3	<0.3	0.8	0.016
P217-B7-6-8	6-8	<0.2	<0.2	0.1	0.002
P217-B7-10-12	10-12	<0.2	<0.2	2.2	0.05
P217-B8-2-4	2-4	<0.17	<0.17	1.1	0.02
P217-B8-4-6	4-6	<0.3	<0.3	0.05	0.006
P217-B8-12-14	12-14	<0.17	<0.17	6.2	0.009
P217-B9-0-2	0-2	<0.17	0.027	0.027	0.003
P217-B9-6-8	6-8	<0.25	0.25	0.25	0.025
P217-B10-2-4	2-4	<0.22	8.5	8.5	0.027
P217-B10-6-8	6-8	<0.5	<0.21	<0.5	<0.011
P217-B11-2-4	2-4	<0.2	1.8	1.8	0.05
P217-B11-6-8	6-8	<0.27	<0.11	0.015	<0.0
P217-B12-2-4	2-4	22.9	9	31.9	0.15
P217-B12-6-8	6-8	<0.22	8	8	0.011
P217-B13-2-4	2-4	<0.25	<0.25	1.3	0.04
P217-B13-4-6	4-6	<0.3	<0.3	12.7	0.019
P217-B14-0-2	0-2	<0.27	<0.27	0.9	0.025
P217-B14-6-8	6-8	<0.2	<0.2	0.04	0.004
P217-B15-2-4	2-4	<0.3	<0.3	0.6	0.016
P217-B15-8-10	8-10	<0.27	<0.27	<0.11	0.001
NC State Action Level		**N/A**	**50**	**100**	**N/A**

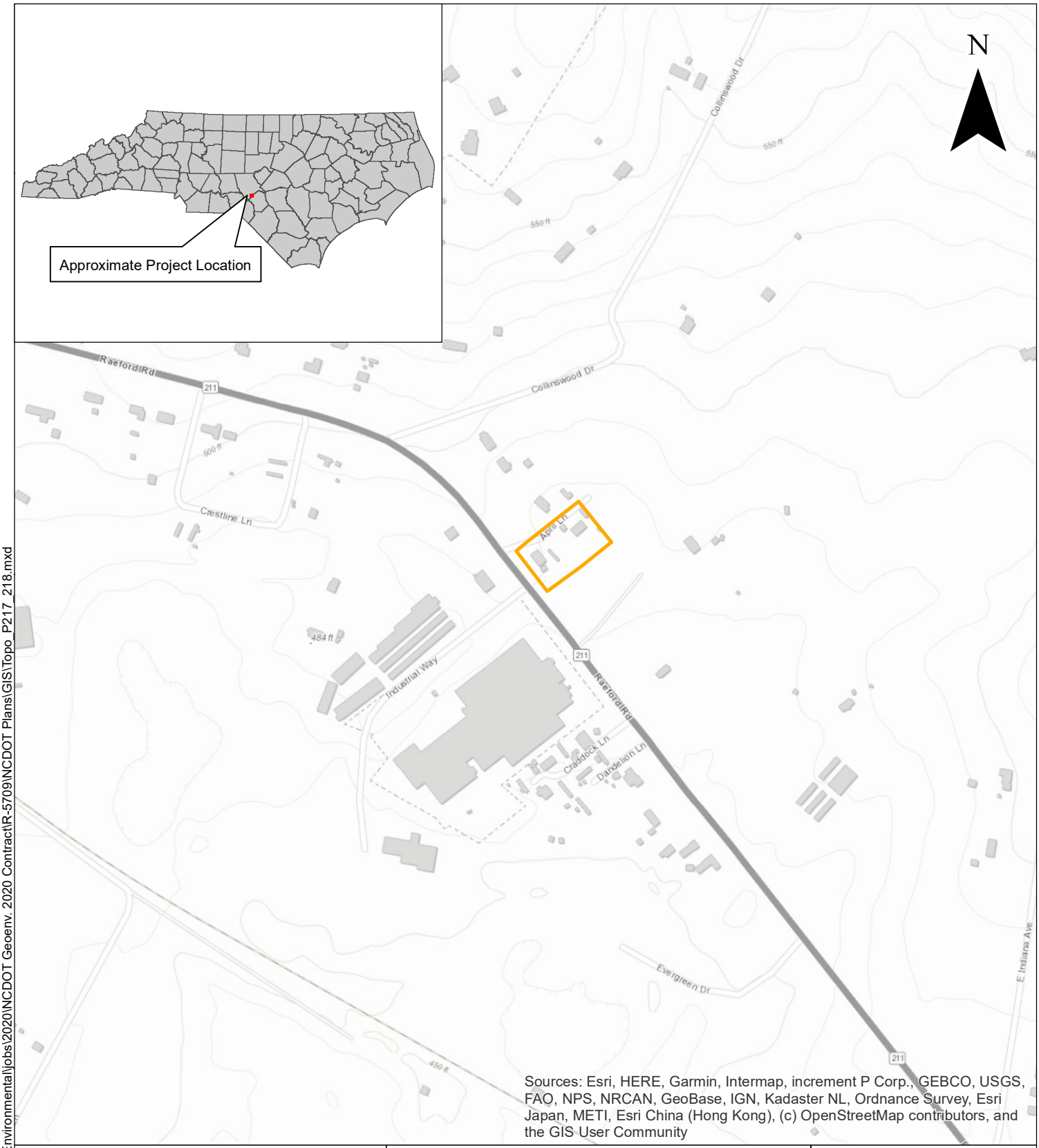
Notes:

1. Samples collected on September 2, 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 9/24/21

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 217
9849 NC 221 HWY
ABERDEEN, NORTH CAROLINA

PREPARED BY:	LMM
DATE:	10/21/2021
CHECKED BY:	HPC
DATE:	10/21/2021
PROJECT NO:	20478R5709
FIGURE:	1

Legend

Site Boundary

0 500 1,000 Feet

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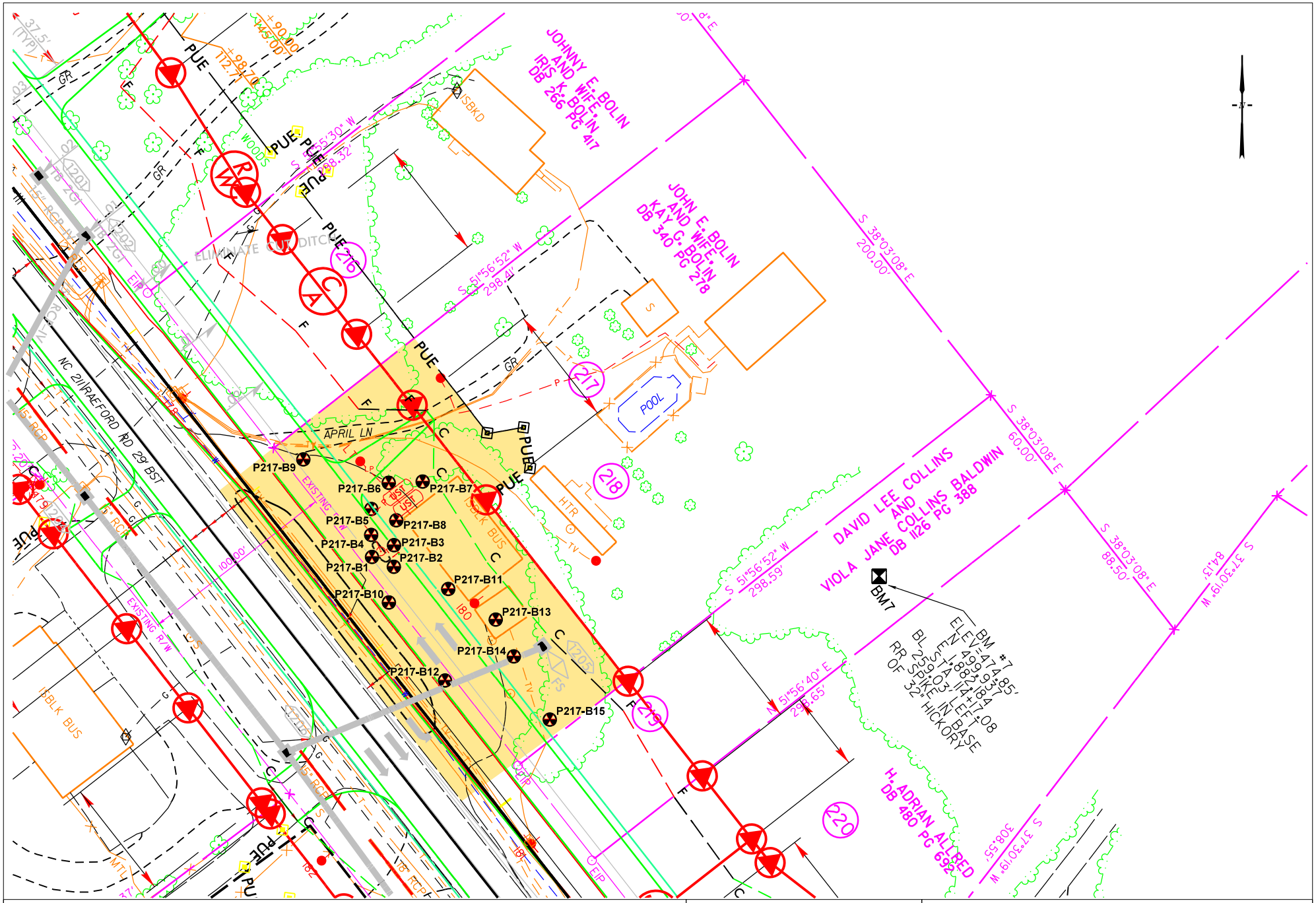


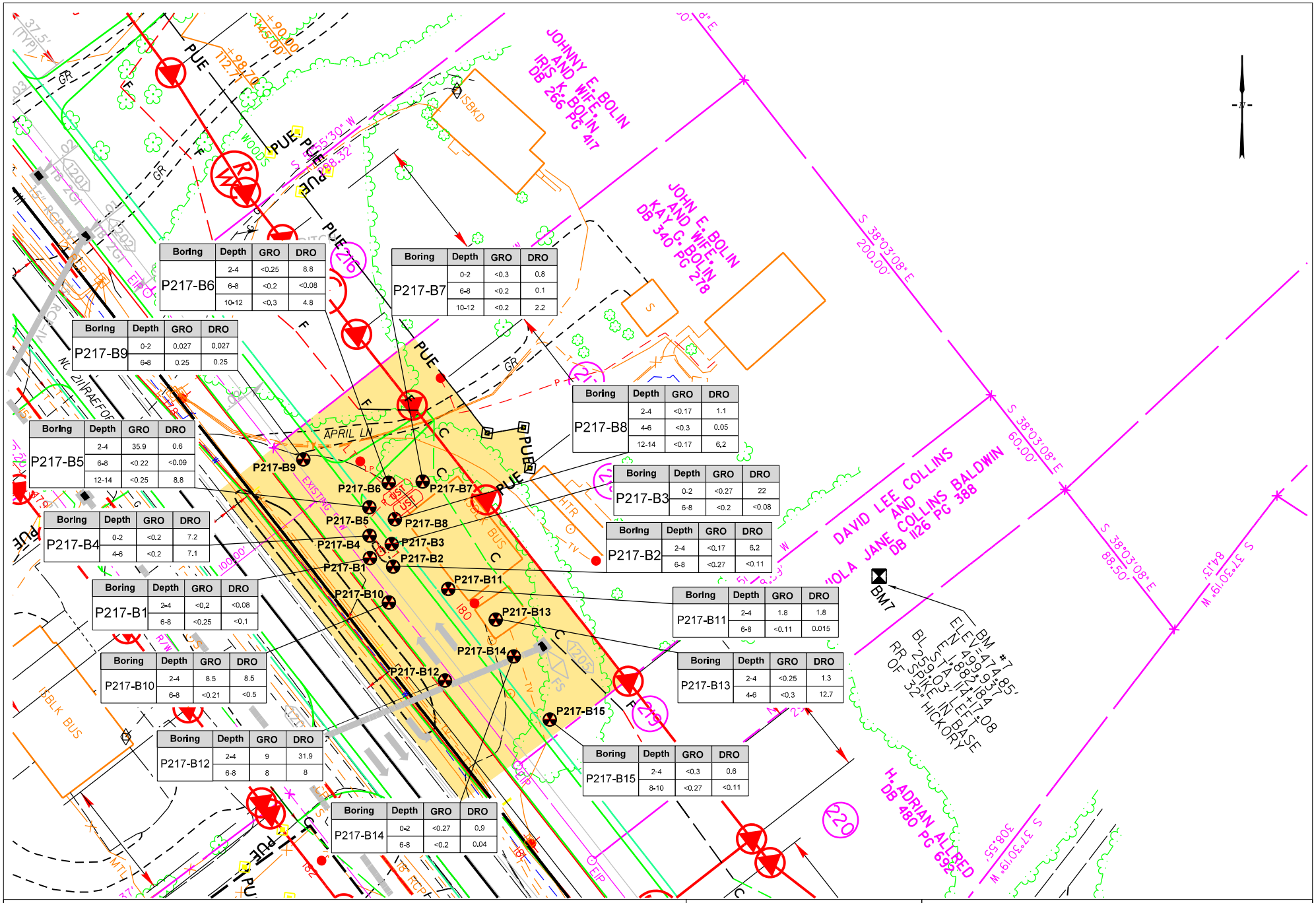
APPROXIMATE BORING LOCATION
AREA OF INVESTIGATION
UST PROBABLE UST

40' 0' 20' 40'
10'
(ENGLISH)

wood.

SITE MAP WITH BORING LOCATIONS
R-5709 - PARCEL 217
10531 NC 211 HWY
ABERDEEN, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	9/29/21	AJF	9/29/21	20478R5709	2



Boring	Depth	GRO	DRO
P217-B6	2-4	<0.25	8.8
	6-8	<0.2	<0.08
	10-12	<0.3	4.8

Boring	Depth	GRO	DRO
P217-B7	0-2	<0.3	0.8
	6-8	<0.2	0.1
	10-12	<0.2	2.2

Boring	Depth	GRO	DRO
P217-B9	0-2	0.027	0.027
	6-8	0.25	0.25

Boring	Depth	GRO	DRO
P217-B8	2-4	<0.17	1.1
	4-6	<0.3	0.05
	12-14	<0.17	6.2

Boring	Depth	GRO	DRO
P217-B5	2-4	35.9	0.6
	6-8	<0.22	<0.09
	12-14	<0.25	8.8

Boring	Depth	GRO	DRO
P217-B3	0-2	<0.27	22
	6-8	<0.2	<0.08

Boring	Depth	GRO	DRO
P217-B4	0-2	<0.2	7.2
	4-6	<0.2	7.1

Boring	Depth	GRO	DRO
P217-B2	2-4	<0.17	6.2
	6-8	<0.27	<0.11

Boring	Depth	GRO	DRO
P217-B1	2-4	<0.2	<0.08
	6-8	<0.25	<0.1

Boring	Depth	GRO	DRO
P217-B11	2-4	1.8	1.8
	6-8	<0.11	0.015

Boring	Depth	GRO	DRO
P217-B10	2-4	8.5	8.5
	6-8	<0.21	<0.5

Boring	Depth	GRO	DRO
P217-B13	2-4	<0.25	1.3
	4-6	<0.3	12.7

Boring	Depth	GRO	DRO
P217-B12	2-4	9	31.9
	6-8	8	8

Boring	Depth	GRO	DRO
P217-B15	2-4	<0.3	0.6
	8-10	<0.27	<0.11

Boring	Depth	GRO	DRO
P217-B14	0-2	<0.27	0.9
	6-8	<0.2	0.04

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

wood.

ANALYTICAL RESULTS MAP
R-5709 - PARCEL 217
10531 NC 211 HWY
ABERDEEN, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	10/14/21	AJF	10/14/21	20478R5709	3

APPENDIX A

BORING LOGS

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B1**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	2.7	Asphalt/gravel Tan/brown sand	
2			
3	5.2	Tan clayey sand	P217-B1-2-4 selected for UVF analyses
4			
5	4.3	Tan/orange/white clay	
6			
7	4.8		P217-B1-6-8 selected for UVF analyses
8			
9	3.9		
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 #	**P217-B2**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	3.3	Asphalt/gravel Tan/brown sand	
2			
3	5.7		P217-B2-2-4 selected for UVF analyses
4			
5	7.2	Tan clayey sand	
6			
7	7.4	Tan/orange/white/red clay	P217-B2-6-8 selected for UVF analyses
8			
9	7.2		
10			
11		Boring terminated at 10 feet bgs	
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Log Completed By: **AJF**

Page: **1**

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B3**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	7.8	Asphalt/gravel	
2		Tan/brown sand	P217-B3-0-2 selected for UVF analyses
3	4.3		
4			
5	6.1	Tan/brown clayey sand	
6		Tan/white clay	
7	7.7		P217-B3-6-8 selected for UVF analyses
8		Tan/orange/white/red clay	
9	7.5		
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 #	**P217-B4**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	7.2	Asphalt/gravel Tan/brown sand	P217-B4-0-2 selected for UVF analyses
2			
3	8.3	Tan/brown clayey sand	
4			
5	8.7	Tan/white clay	P217-B4-4-6 selected for UVF analyses
6			
7	8.6		
8		Tan/orange/white/red clay	
9	8.4		
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 #	**P217-B5**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	4.9	Asphalt/gravel Tan sand	
2			
3	5.1		P217-B5-2-4 selected for UVF analyses
4		Tan/brown sand	
5	5.4	Tan/brown clayey sand	
6			
7	5.6	Tan/orange/white/red clay	P217-B5-6-8 selected for UVF analyses
8			
9	4.1		
10			
11	7.2		
12			
13	7.5	Tan/white clayey sand	P217-B5-12-14 selected for UVF analyses
14			
15	7.1		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B6**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	6.6	Asphalt/gravel Tan/brown sand	
2			
3	8.9		P217-B6-2-4 selected for UVF analyses
4		Tan/brown clayey sand	
5	7.5		
6			
7	7.2	Tan/orange/white/red clay	P217-B6-6-8 selected for UVF analyses
8			
9	7.6		
10			
11	8.3	Tan/white/brown clayey sand	P217-B6-10-12 selected for UVF analyses
12			
13	7.8		
14		Tan/white sand	
15	7.4		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B7**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	42.1	Tan/brown sand, pine tree odor	P217-B7-0-2 selected for UVF analyses
2			
3	24.4	Tan/brown sand	
4			
5	9.7		
6			
7	11.1	Tan sand	P217-B7-6-8 selected for UVF analyses
8			
9	8.8	Tan/brown sand	
10			
11	62.9		P217-B7-10-12 selected for UVF analyses
12		Tan/white sand	
13	10.9		
14			
15	9.8		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B8**	BORING DEPTH (ft)	**15**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	8.2	Asphalt/gravel Tan/brown sand	
2			
3	9.4		P217-B8-2-4 selected for UVF analyses
4			
5	10.6	Tan/white clayey sand	P217-B8-4-6 selected for UVF analyses
6			
7	9.4	Tan/orange/white/red clay	
8			
9	9.5		
10			
11	3.6	Tan/white clayey sand	
12			
13	7.7		P217-B8-12-14 selected for UVF analyses
14		Tan/white sand	
15	7.1		
16		Boring terminated at 15 feet bgs	
17			
18			
19			
20			
21			

Log Completed By: **AJF**

Page: **1**

wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B9**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	5.1	Asphalt/gravel	P217-B9-0-2 selected for UVF analyses
2			
3	0.8	Tan/brown sand	
4			
5	0.3		
6			
7	6.6	Tan sand	P217-B9-6-8 selected for UVF analyses
8			
9	4.0	Tan/brown 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 #	**P217-B10**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	7.9	Asphalt/gravel Tan/brown sand	
2			
3	7.9		P217-B10-2-4 selected for UVF analyses
4			
5	8.1	Tan/white clayey sand	
6			
7	8.6	Tan/orange/white/red clay	P217-B10-6-8 selected for UVF analyses
8			
9	8.4		
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 #	**P217-B11**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	5.3	Asphalt/gravel Tan/brown sand	
2			
3	7.3		P217-B11-2-4 selected for UVF analyses
4			
5	7.0	Tan clayey sand	
6			
7	7.9	Tan/orange/white/red clay	P217-B11-6-8 selected for UVF analyses
8			
9	7.0		
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 #	**P217-B12**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	5.5	Asphalt/gravel Tan/brown sand	
2			
3	5.8	Tan clayey sand	P217-B12-2-4 selected for UVF analyses
4			
5	5.3	Tan/orange/white clay	
6			
7	6.3		P217-B12-6-8 selected for UVF analyses
8			
9	5.1		
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 #	**P217-B13**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Ashpalt/gravel Tan/brown sand	
2			
3	0.0		P217-B13-2-4 selected for UVF analyses
4		Tan/white/red clayey sand	
5	0.0		P217-B13-4-6 selected for UVF analyses
6			
7	0.0	Tan/white/orange/red clay	
8			
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 #	**P217-B14**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Asphalt/gravel	P217-B14-0-2 selected for UVF analyses
2		Tan/brown sand	
3	0.0	Brown sand	
4		Tan/brown clayey sand	
5	0.0		
6			
7	0.0	Tan/white/orange/red clay	P217-B14-6-8 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			

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wood.

SOIL BORING FIELD WORKSHEET

BORING #	**P217-B15**	BORING DEPTH (ft)	**10**	NUMBER OF PAGES	**1**
PROJECT #	**20478R5709**			PROJECT NAME	**NCDOT R-5709**
DATE DRILLED	**9/2/2021**			WEATHER CONDITIONS	**Partly cloudy, 85°F**
DRILLING SUB-CONTRACTOR	**IET**			DRILL RIG	**AMS PowerProbe**

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	0.0	Gravel	
2		Tan sand	
3	0.0		P217-B15-2-4 selected for UVF analyses
4		Tan/brown sand	
5	0.0		
6		Tan sand	
7	0.0		
8		Tan/brown clayey sand	
9	0.0		P217-B15-8-10 selected for UVF analyses
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 building and suspected dispenser island at parcel 217, looking north.

Photograph 2:
Old vehicles located at parcel 217, facing northeast.

Photograph 3:
View of area with probable USTs (brown pine straw covered area), facing northeast.

Photograph 4:
View of IET advancing direct push soil sampler at parcel 217.

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

APPENDIX C

GEOPHYSICAL REPORT

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2021-201)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 217
NCDOT PROJECT R-5709 (50205.1.1)

10531 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: _____
Eric C. Cross, P.G.
NC License #2181

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C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 217 - 10531 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 217, located at 10531 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 was designed to extend from the existing edge of pavement into the proposed ROW and/or proposed easements, whichever distance was greater. Conducted from August 10-12, 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 seven EM anomalies were identified. Several of the EM anomalies were directly attributed to visible cultural features at the ground surface. One large EM feature was characteristic of buried structures such as USTs. GPR was performed across the significant unknown buried metal anomaly as well as around all sources of significant metallic interference to confirm that the interference did not obscure any significant structures such as USTs. Two probable USTs were identified at the location of the significant metallic anomaly. Both probable USTs were approximately 26 feet long and 7 feet wide. No evidence of additional buried structures such as USTs was observed.

Collectively, the geophysical data recorded evidence of two probable USTs at Parcel 217.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Wood, PLC at Parcel 217, located at 10531 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 was designed to extend from the existing edge of pavement into the proposed ROW and/or proposed easements, whichever distance was greater. Conducted from August 10-12, 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 and grass surfaces. An apparent former pump island was visible in front of the building. 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	Metal Barrels	
2	**Two Probable USTs**	✓
3	Surface Metal Debris	✓
4	Building and Metal Doors	✓
5	Trailers, Vehicles, Lights	✓
6	Surface Metal Debris	
7	Pump Island	✓

Several of the EM anomalies were directly attributed to visible cultural features at the ground surface, including metal barrels, surface metallic debris, the building and doors, trailers, vehicles, lights, and the apparent pump island. EM Anomaly 2 was a significant buried metallic feature that was suggestive of USTs and was investigated by GPR. GPR was also performed around the building, trailers/vehicles, metal on the ground, and across the pump island to confirm that the metallic interference did not obscure any significant structures such as USTs.

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 fifteen formal GPR transects were performed at the site.

GPR Transects 1-3 were performed across EM Anomaly 2. These transects recorded two discreet, high-amplitude hyperbolic reflectors and two distinct lateral reflectors that were characteristic of USTs. These features have been characterized as two probable USTs. Both probable USTs were approximately 26 feet long and 7 feet wide. **Figure 4** provides the locations and sizes of the two probable USTs, overlain on an aerial, along with ground-level photographs. The remaining transects showed evidence of possible buried utilities and/or debris. No evidence of additional buried structures such as USTs was observed.

Collectively, the geophysical data recorded evidence of two probable USTs at Parcel 217. **Figure 5** provides an overlay of the metal detection results and the two probable USTs on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 217 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.
- Several of the EM anomalies were directly attributed to visible cultural features at the ground surface. One large EM feature was characteristic of buried structures such as USTs.
- GPR was performed across the significant unknown buried metal anomaly as well as around all sources of significant metallic interference to confirm that the interference did not obscure any significant structures such as USTs.
- Two probable USTs were identified at the location of the significant metallic anomaly. Both probable USTs were approximately 26 feet long and 7 feet wide. No evidence of additional buried structures such as USTs was observed.
- Collectively, the geophysical data recorded evidence of two probable USTs at Parcel 217.

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 Southeast)

N

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PROJECT: PARCEL 217 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 217 - 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 TWO PROBABLE 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 12, 2021.

EM61 Metal Detection Response (millivolts)

N

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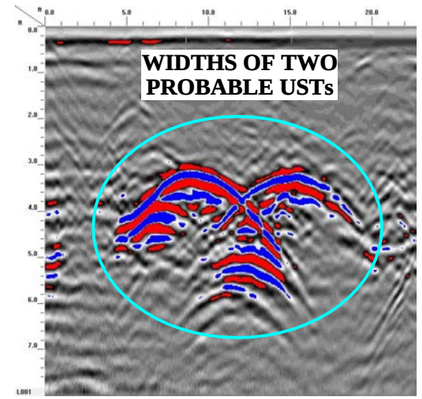
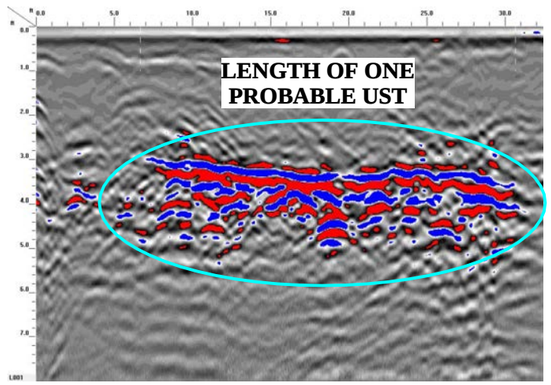
CLIENT	Wood, PLC			**FIGURE 2**

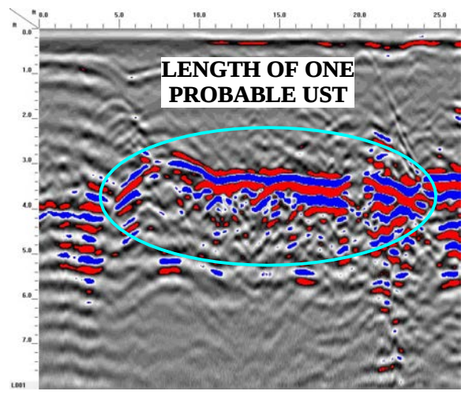
GPR TRANSECT LOCATIONS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)

N

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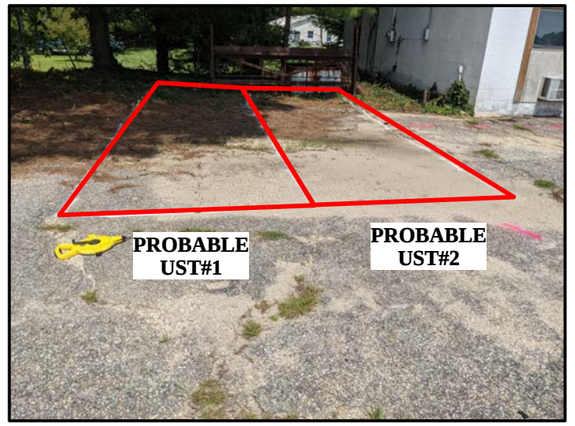
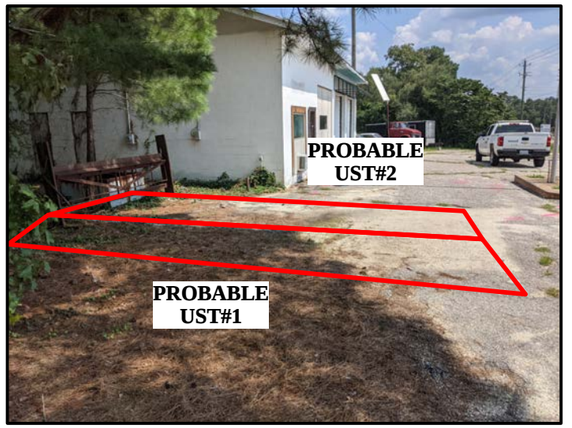
PROJECT: PARCEL 217 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 217 - GPR TRANSECT LOCATIONS AND SELECT IMAGES	DATE: 8/16/2021 PYRAMID PROJECT #: 2021-201	CLIENT: Wood, PLC **FIGURE 3**

LOCATIONS OF TWO PROBABLE USTs



View of Two Probable USTs
(Facing Approximately Northeast)



View of Two Probable USTs
(Facing Approximately Southeast)

N

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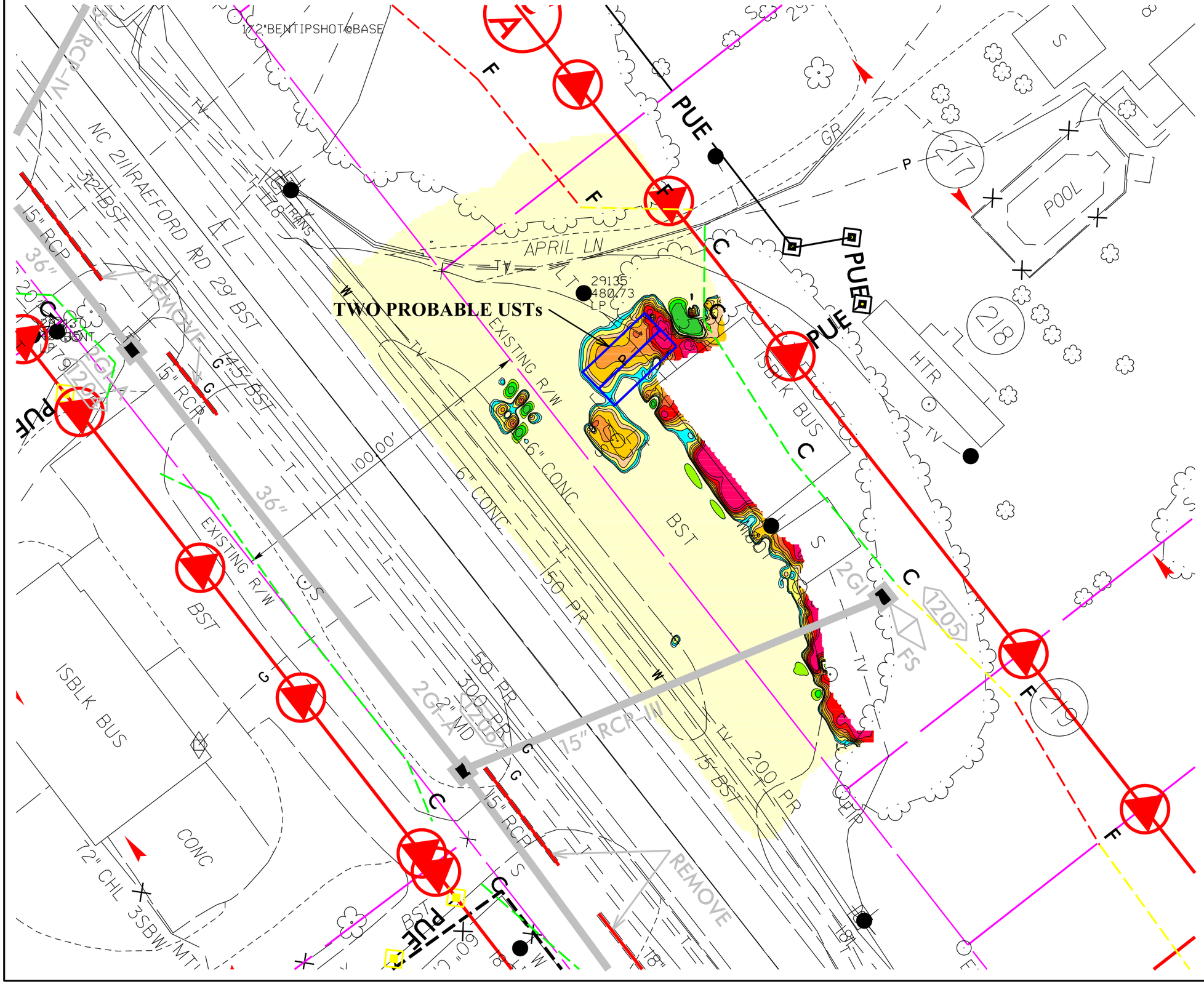
PROJECT: PARCEL 217 ABERDEEN, NORTH CAROLINA NCDOT PROJECT R-5709	TITLE: PARCEL 217 - LOCATIONS AND SIZES OF TWO PROBABLE USTs	DATE: 8/16/2021 PYRAMID PROJECT #: 2021-201	CLIENT: Wood, PLC **FIGURE 4**



TITLE

OVERLAY OF METAL DETECTION RESULTS
AND TWO PROBABLE USTs
ON NCDOT ENGINEERING PLANS

PROJECT

PARCEL 123
ABERDEEN, NORTH CAROLINA
NCDOT PROJECT R-5709

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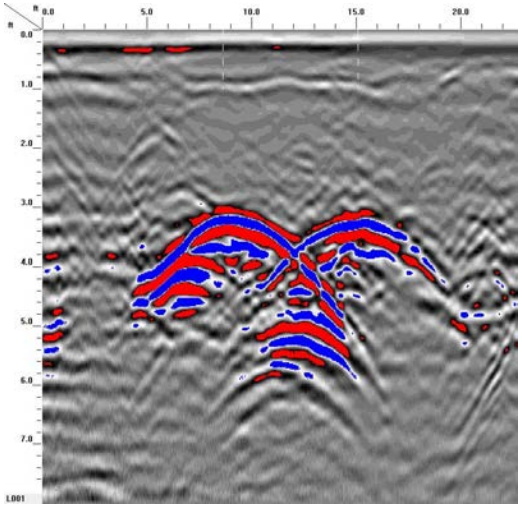
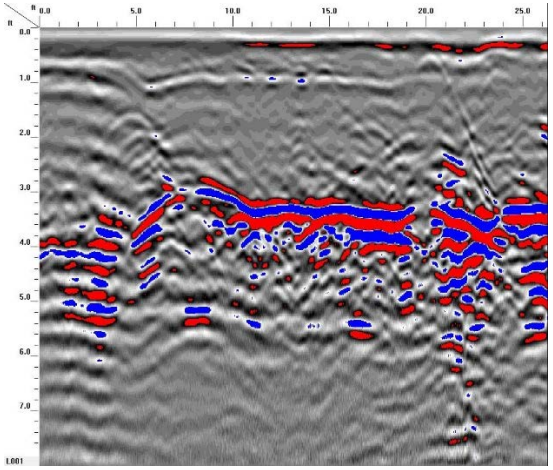
DATE: 08-18-2021	REVISION NO. 0
PYRAMID PROJECT NO. 2021-201	FIGURE NO. 5

Appendix A – GPR Transect Images



GPR TRANSECT 1



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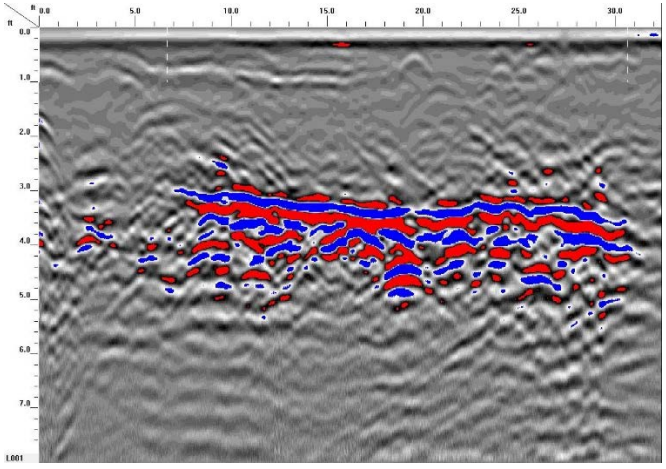

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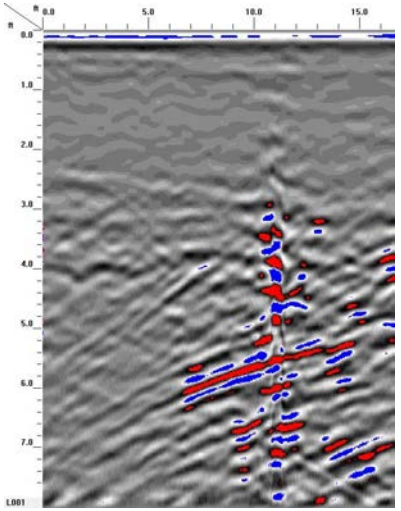

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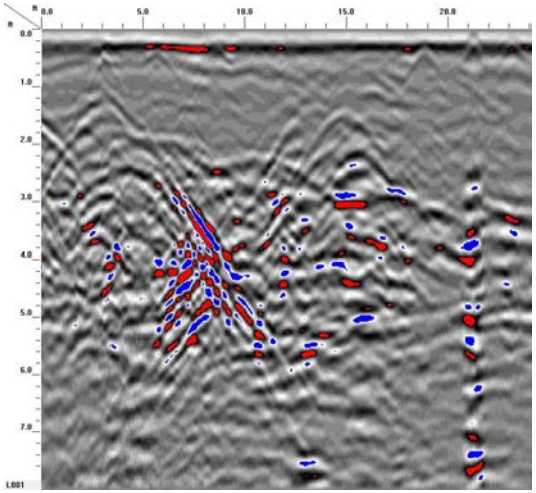
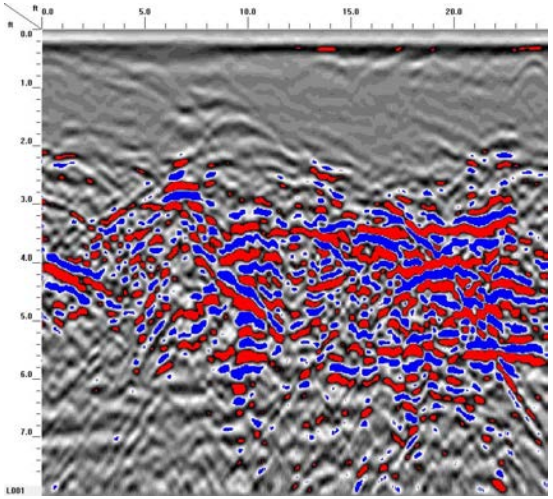


GPR TRANSECT 5



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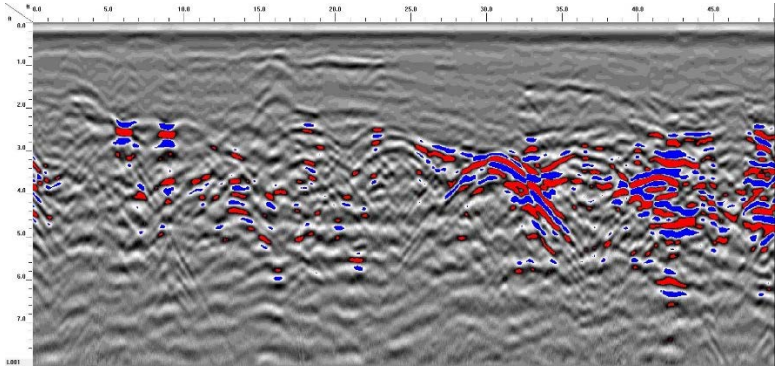
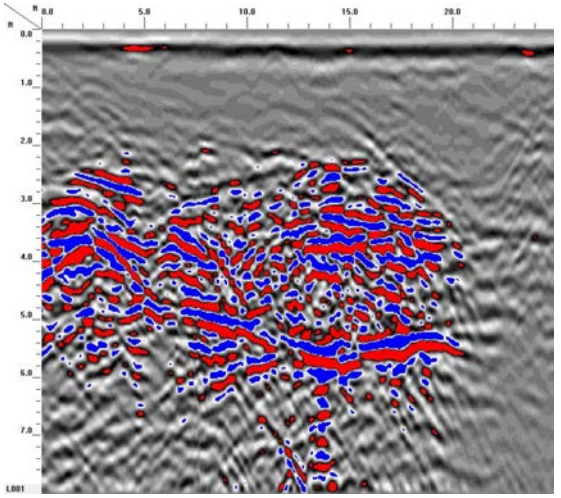
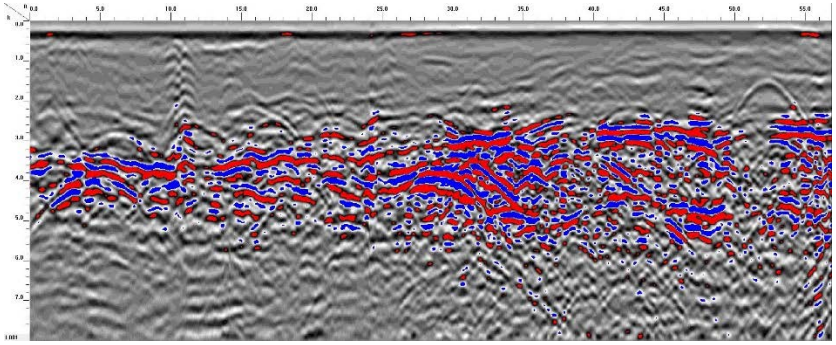


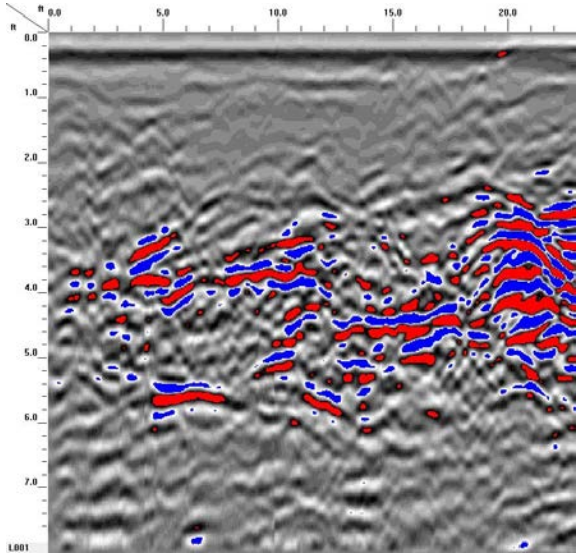
GPR TRANSECT 6



GPR TRANSECT 9



GPR TRANSECT 7



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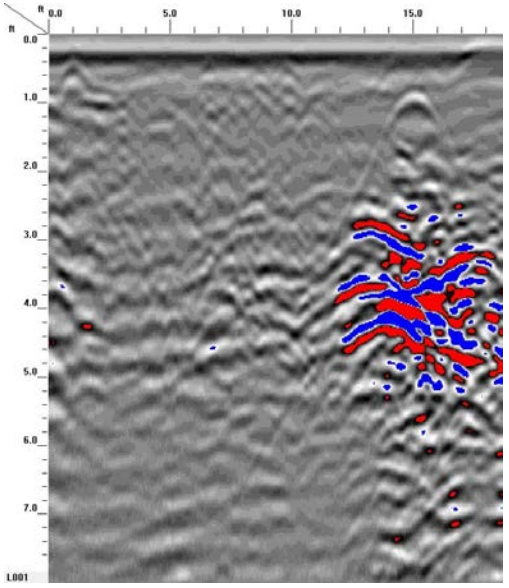

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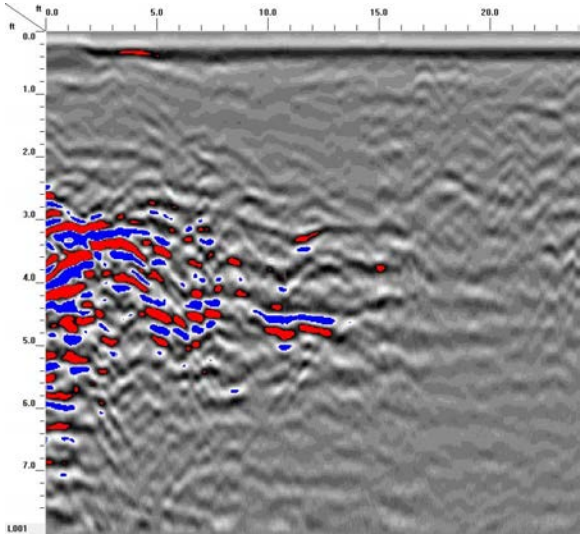
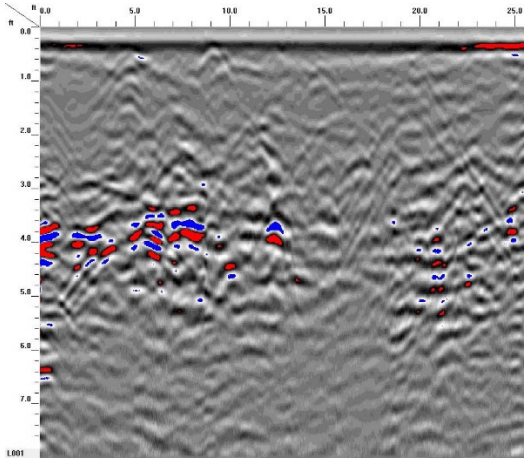


GPR TRANSECT 11



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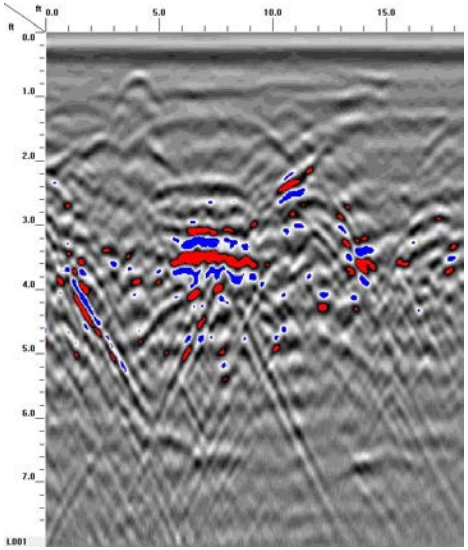
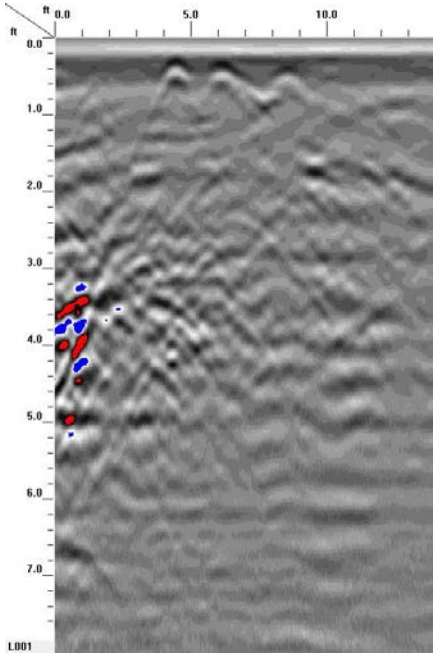


GPR TRANSECT 14



GPR TRANSECT 15

APPENDIX D

UVF HYDROCARBON ANALYTICAL RESULTS

Hydrocarbon Analysis Results

Client: Wood
Address: 2801 Yorkmont Road
Charlotte, NC

Contact: Helen Corley

Project: P217

Samples taken Thursday, September 2, 2021
Samples extracted Thursday, September 2, 2021
Samples analysed Thursday, September 2, 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	P217-B1-2-4	8.0	<0.2	<0.2	<0.08	0.007	0.007	0.002	<0.0	0	53.9	46.1	Residual HC
Soil	P217-B1-6-8	10.0	<0.25	<0.25	<0.1	<0.25	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P217-B2-2-4	7.0	<0.17	<0.17	6.2	6.2	0.3	0.018	<0.001	0	89.8	10.2	Deg Fuel 76.7%,(FCM)
Soil	P217-B2-6-8	11.0	<0.27	<0.27	<0.11	<0.27	<0.006	<0.006	<0.003	0	0	0	PHC ND,(FCM)
Soil	P217-B3-0-2	11.0	<0.27	<0.27	22	22	7.4	0.3	0.007	0	85.1	14.9	V.Deg.Light Fuel 89.9%,(FCM)
Soil	P217-B3-6-8	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P217-B4-0-2	8.0	<0.2	<0.2	7.2	7.2	2.7	0.17	0.001	0	91.2	8.8	Deg Fuel 80.6%,(FCM)
Soil	P217-B4-4-6	8.0	<0.2	<0.2	7.1	7.1	0.4	0.027	<0.0	0	92.3	7.7	Deg Fuel 90.9%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 96.6%

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

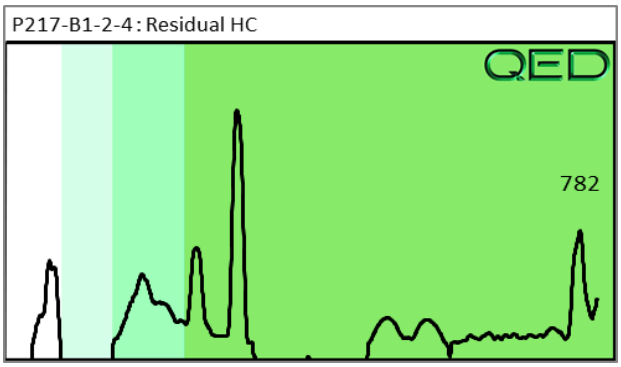
HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only : % Ratios estimated carbon number proportions : (OCR)/(Q) = Outside cal range, values and HC match estimates : ND = Not Detected

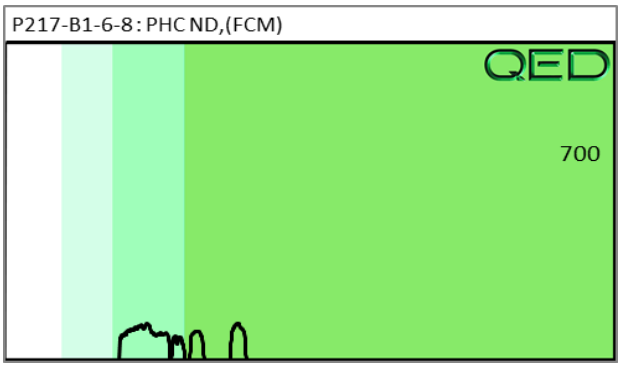
(B) = Blank Drift : (M) = Adjusted value : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : SB = sample selected as site background

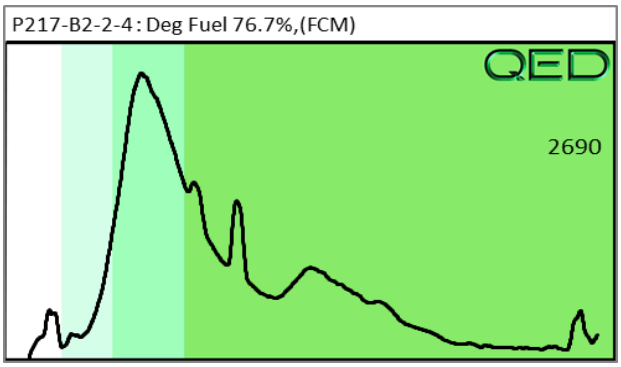
(TD) = Calibration outside limit

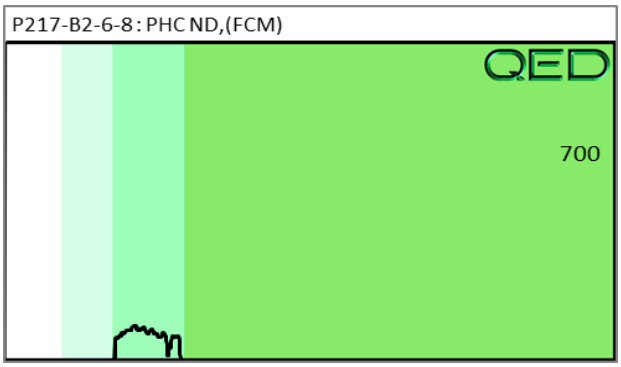
QED Hydrocarbon Fingerprints

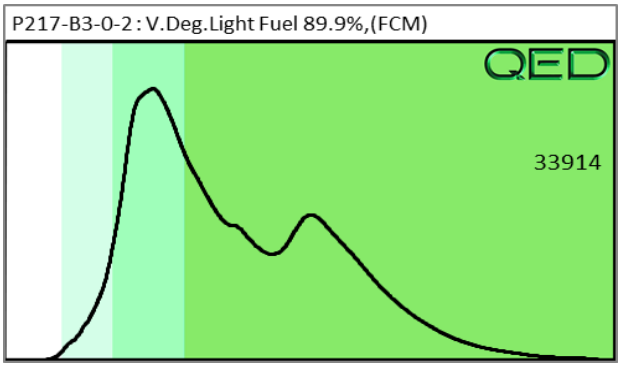
Project: P217

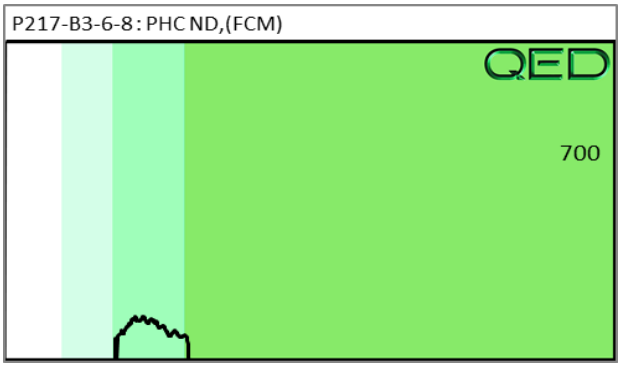


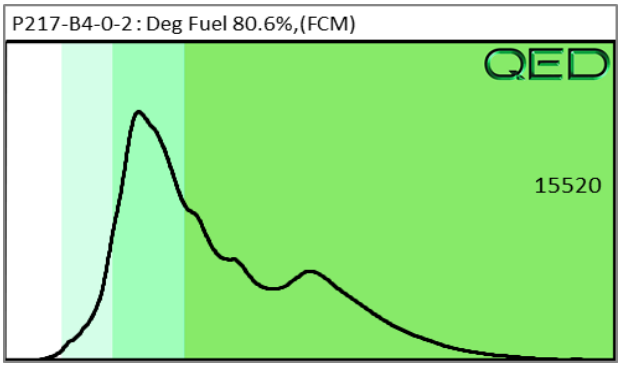


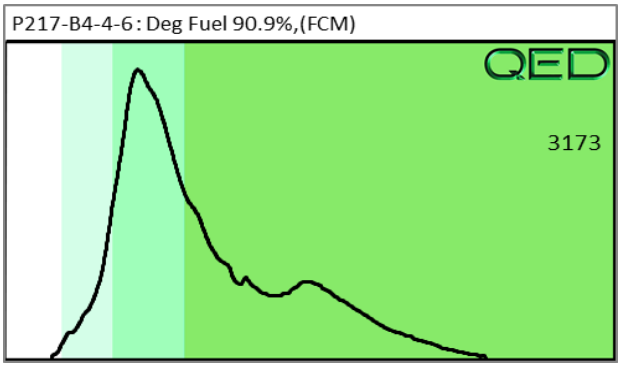












Hydrocarbon Analysis Results

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

Contact: Helen Corley

Project: P217

Samples taken Thursday, September 2, 2021
Samples extracted Thursday, September 2, 2021
Samples analysed Thursday, September 2, 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	P217-B5-2-4	11.0	<0.27	35.9	0.6	36.57	0.4	0.012	<0.006	99	0.9	0.1	V.Deg.PHC 98.5%,(FCM)
Soil	P217-B5-6-8	9.0	<0.22	<0.22	<0.09	<0.22	<0.005	<0.005	<0.003	0	0	0	PHC ND,(FCM)
Soil	P217-B5-12-14	10.0	<0.25	<0.25	8.8	8.8	0.25	0.014	<0.003	0	91.2	8.8	Deg Fuel 84%,(FCM)
Soil	P217-B6-2-4	10.0	<0.25	<0.25	8.8	8.8	0.14	0.006	<0.003	0	95.2	4.8	Deg Fuel 91.8%,(FCM)
Soil	P217-B6-6-8	8.0	<0.2	<0.2	<0.08	<0.2	<0.004	<0.004	<0.002	0	0	0	PHC ND,(FCM)
Soil	P217-B6-10-12	12.0	<0.3	<0.3	4.8	4.8	2.6	0.07	0.001	0	91.8	8.2	V.Deg.PHC 93.7%,(FCM)
Soil	P217-B7-0-2	12.0	<0.3	<0.3	0.8	0.8	0.4	0.016	<0.001	0	84.7	15.3	V.Deg.PHC 74.7%,(FCM)
Soil	P217-B7-6-8	8.0	<0.2	<0.2	0.1	0.1	0.04	0.002	<0.002	0	81	19	V.Deg.PHC 87.1%,(FCM)
Soil	P217-B7-10-12	8.0	<0.2	<0.2	2.2	2.2	1	0.05	0.001	0	82.3	17.7	V.Deg.Light Fuel 90%,(FCM)
Soil	P217-B8-2-4	7.0	<0.17	<0.17	1.1	1.1	0.4	0.02	0.001	0	86.5	13.5	V.Deg.PHC 96%,(FCM)

Initial Calibrator QC check OK Final FCM QC Check OK 96.4%

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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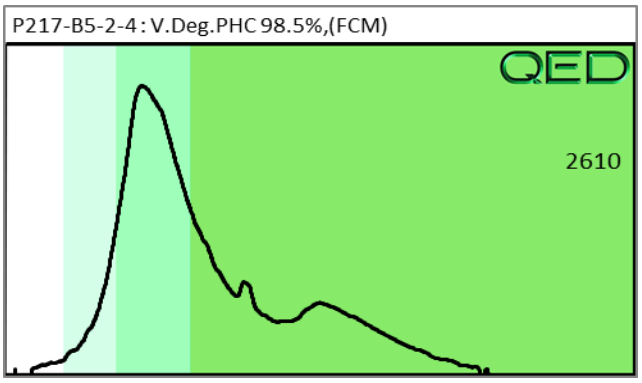
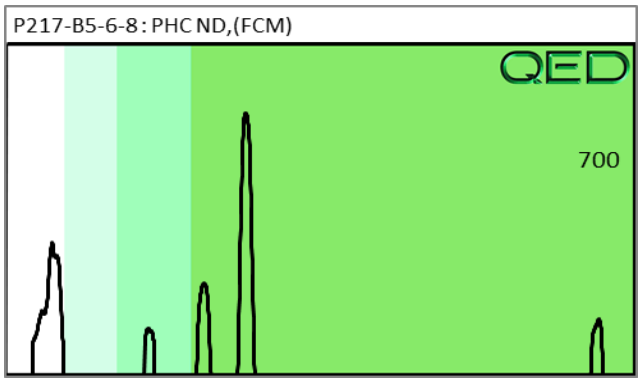
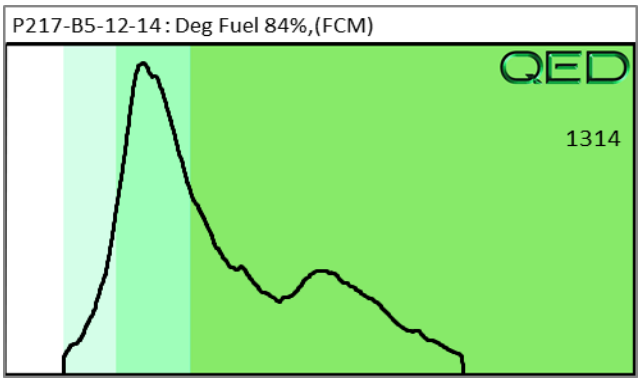
(TD) = Calibration outside limit

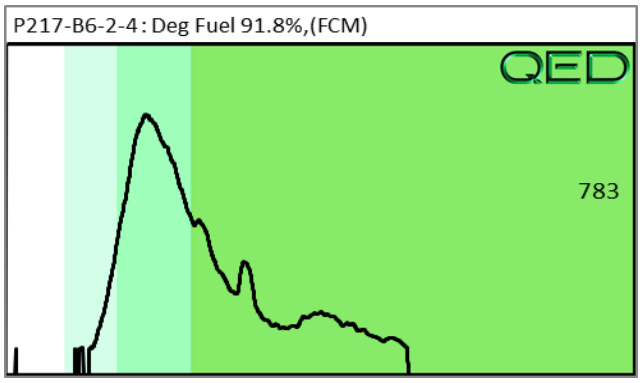
QED Hydrocarbon Fingerprints

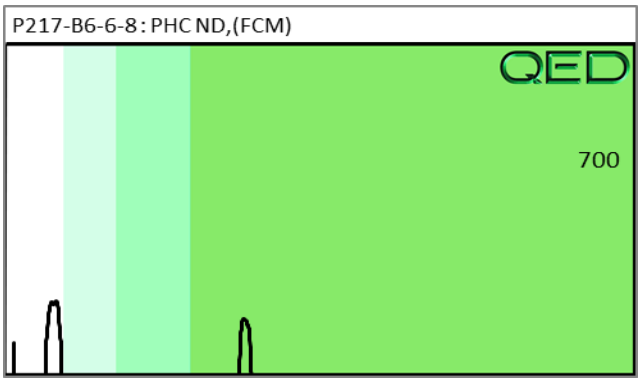
Project: P217

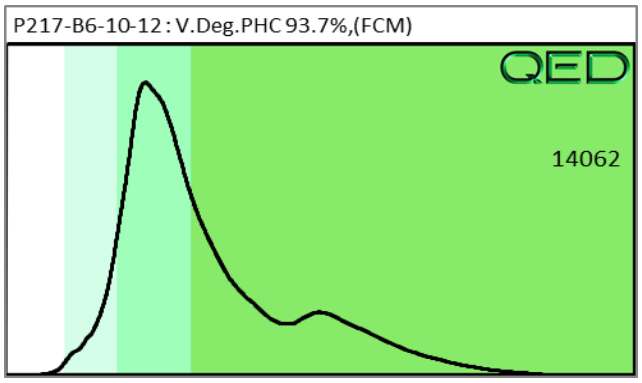


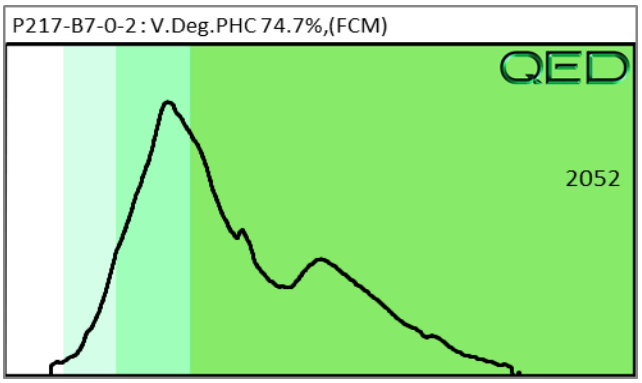


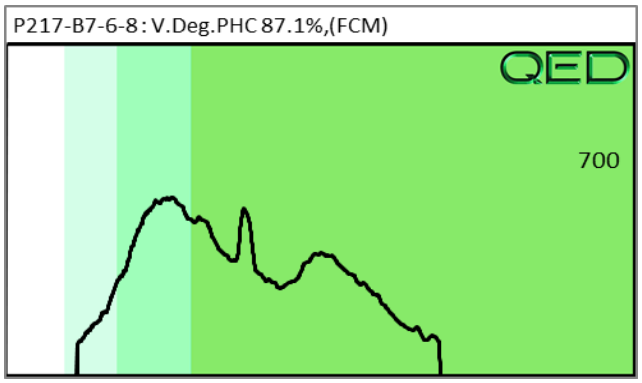


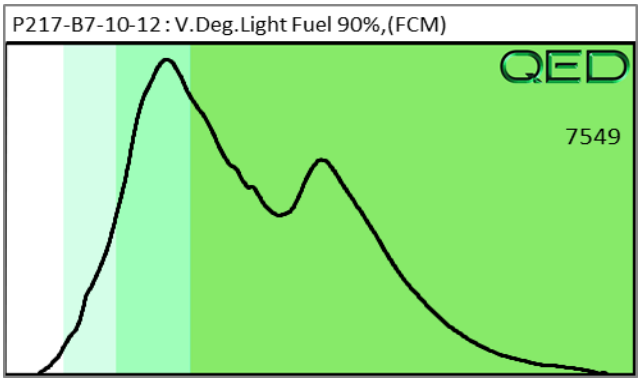


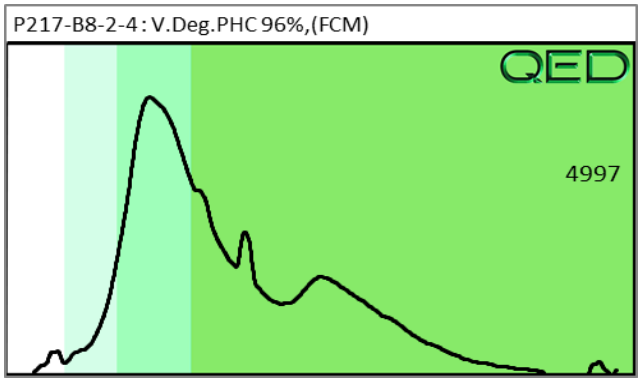












Hydrocarbon Analysis Results

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

Contact: Helen Corley

Project: P217

Samples taken Thursday, September 2, 2021
Samples extracted Thursday, September 2, 2021
Samples analysed Thursday, September 2, 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	P217-B8-4-6	12.0	<0.3	<0.3	0.05	0.05	0.05	0.006	<0.004	0	84.4	15.6	Residual HC
Soil	P217-B8-12-14	7.0	<0.17	<0.17	6.2	6.2	0.15	0.009	<0.002	0	93.3	6.7	Deg Fuel 96.5%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 100.9%

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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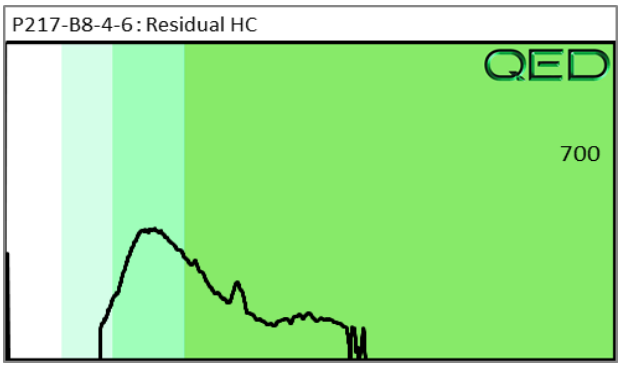
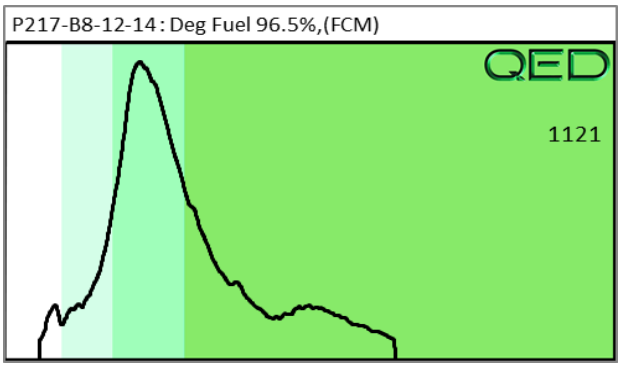
QED Hydrocarbon Fingerprints

Project: P217





Hydrocarbon Analysis Results

Client: Wood
Address 2801 Yorkmont Road
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Project: P217

Samples taken Thursday, September 2, 2021
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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	P217-B9-0-2	7.0	<0.17	<0.17	0.027	0.027	0.025	0.003	<0.002	0	76	24	Residual HC
Soil	P217-B9-6-8	10.0	<0.25	<0.25	0.25	0.25	0.24	0.025	<0.003	0	84.9	15.1	Residual PHC
Soil	P217-B10-2-4	9.0	<0.22	<0.22	8.5	8.5	0.5	0.027	<0.006	0	87	13	V.Deg.Light Fuel 89.7%,(FCM)
Soil	P217-B10-6-8	21.0	<0.5	<0.5	<0.21	<0.5	<0.011	<0.011	<0.006	0	0	0	PHC ND,(FCM)
Soil	P217-B11-2-4	8.0	<0.2	<0.2	1.8	1.8	0.9	0.05	0.001	0	77.9	22.1	V.Deg.PHC 79.5%,(FCM)
Soil	P217-B11-6-8	11.0	<0.27	<0.27	<0.11	0.015	0.015	<0.0	<0.003	0	34	66	PHC ND,(FCM),(BO)
Soil	P217-B12-2-4	7.0	<0.17	22.9	9	31.9	2.8	0.15	0.002	90.7	8.2	1	No Match found
Soil	P217-B12-6-8	9.0	<0.22	<0.22	8	8	0.18	0.011	<0.003	0	93.4	6.6	Deg Fuel 77.1%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 99.9%

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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QED Hydrocarbon Fingerprints

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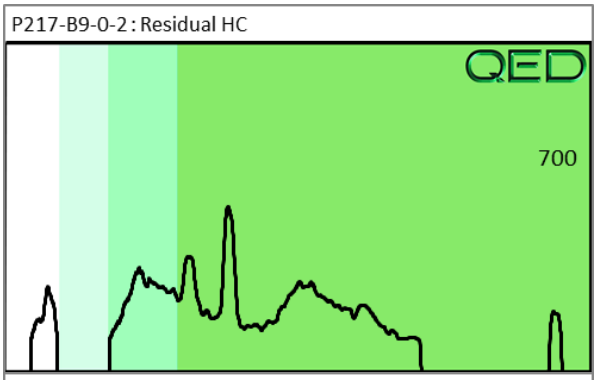

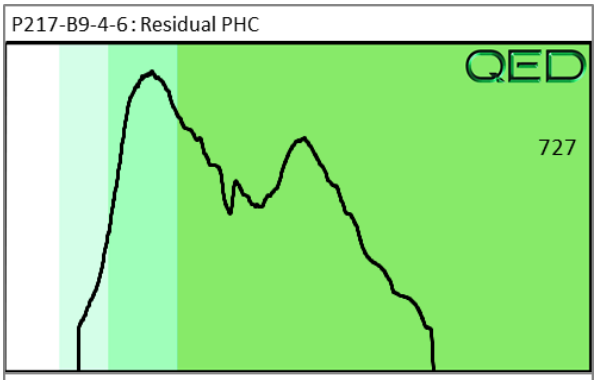

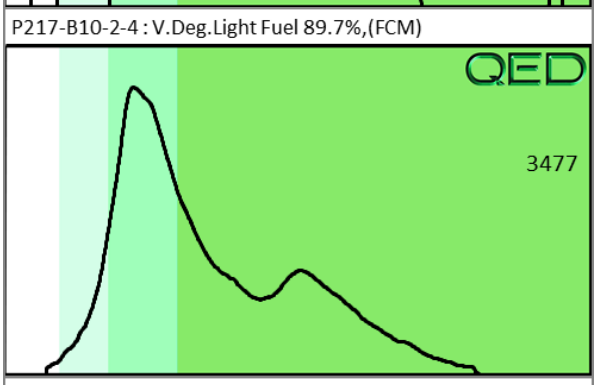

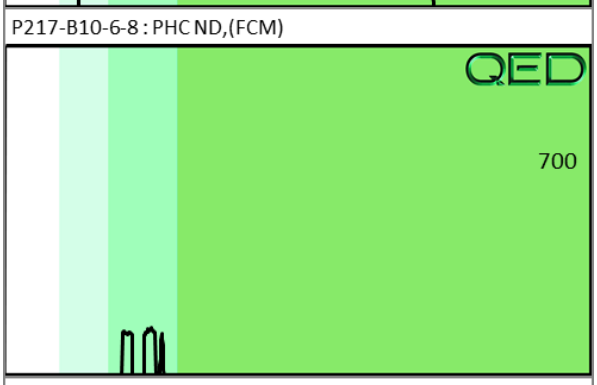

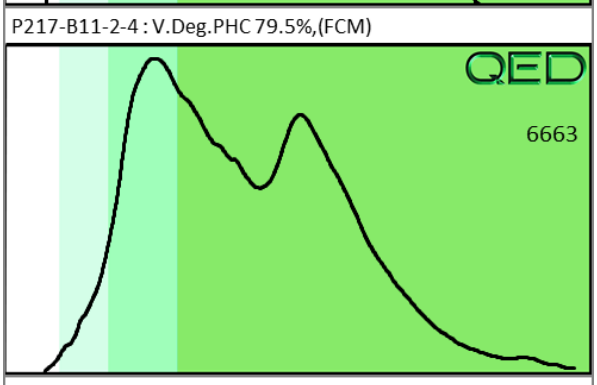

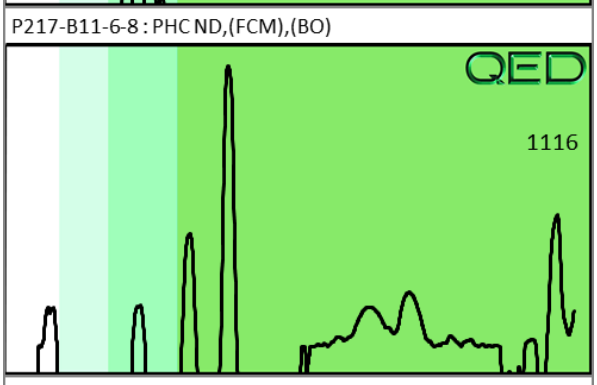

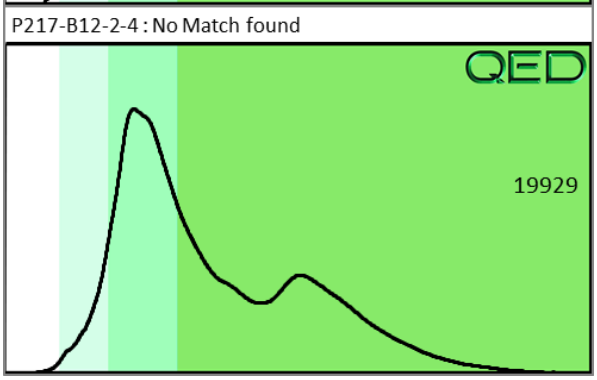

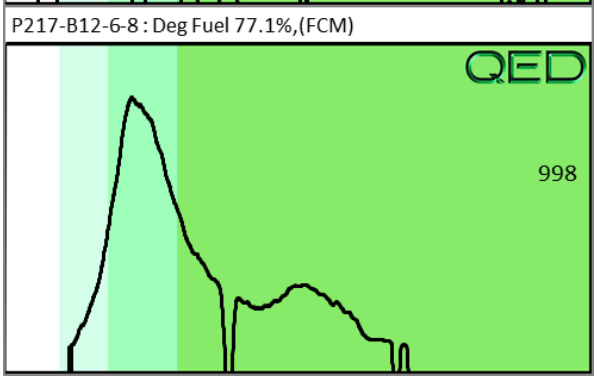

Hydrocarbon Analysis Results

Client: Wood
Address 2801 Yorkmont Rd
Charlotte, NC 28208

Contact: Helen Corley

Project: P217

Samples taken Thursday, September 2, 2021
Samples extracted Thursday, September 2, 2021
Samples analysed Thursday, September 2, 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	P217-B13-2-4	10.0	<0.25	<0.25	1.3	1.3	0.7	0.04	0.001	0	64.6	35.4	V.Deg.PHC 58.8%,(FCM)
Soil	P217-B13-4-6	14.0	<0.3	<0.3	12.7	12.7	0.3	0.019	<0.004	0	90.3	9.7	V.Deg.Light Fuel 98%,(FCM)
Soil	P217-B14-0-2	11.0	<0.27	<0.27	0.9	0.9	0.4	0.025	0.001	0	70.2	29.8	V.Deg.PHC 63.9%,(FCM)
Soil	P217-B14-6-8	8.0	<0.2	<0.2	0.04	0.04	0.03	0.004	<0.002	0	84.5	15.5	Residual HC
Soil	P217-B15-2-4	12.0	<0.3	<0.3	0.6	0.6	0.3	0.016	0.001	0	75.9	24.1	V.Deg.PHC 76.6%,(FCM)
Soil	P217-B15-8-10	11.0	<0.27	<0.27	<0.11	0.008	0.008	0.001	<0.003	0	0	100	Residual HC

Initial Calibrator QC check OK

Final FCM QC Check OK 96.9%

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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