

Prepared for:

**North Carolina Department of Transportation**

**Geotechnical Engineering Unit**

**GeoEnvironmental Section**

**1589 Mail Service Center**

**Raleigh, North Carolina, 27699-1589**

# Preliminary Site Assessment Report

Myra Lee Hammonds Property

Parcel # 10

407 South J.K. Powell Blvd.

Whiteville, Columbus County, North Carolina

US 701 Bypass (Madisson St-Powell Blvd) from SR 1437 (Virgil Ave) to US 74/76

TIP Number: R-5020B

WBS Element: 41499.1.3




**Apex Companies, LLC**

**(dba Apex Engineering, PC)**

**10610 Metromont Parkway, Suite 206**

**Charlotte, North Carolina 28269**

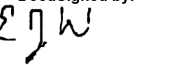
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**November 21, 2018**

*not considered final unless all signatures are completed*

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## 1.0 INTRODUCTION

This report presents the results of a Preliminary Site Assessment (PSA) for the North Carolina Department of Transportation (NCDOT) Parcel 10 performed by Apex Companies, LLC (Apex) (dba Apex Engineering, PC) on behalf of the NCDOT. The subject site of this PSA report will be affected by the widening of J.K. Powell Blvd. (US 701 Bypass) from Virgil Ave. to US 74/76. The Site is comprised of one parcel and is located at 407 South J.K. Powell Boulevard and is identified as Parcel 10, Myra Lee Hammonds Property, within the NCDOT R-5020B design project. The property is located at the southeast corner of the intersection of South J.K. Powell Boulevard and West Columbus Street in Whiteville, Columbus County, North Carolina, as shown in the attached Site Location Map (**Figure 1**). The site investigation was conducted in accordance with Apex Company's Technical and Cost proposal dated May 15, 2018.

NCDOT contracted Apex to perform the PSA within the proposed right-of-way (ROW) and/or easement of the Parcel 10 Property due to the potential presence of contamination at the site and the fact that excavation and grading may occur within the area. The PSA was performed to evaluate if soils have been impacted as a result of past and present uses of the property within the proposed investigation area, if buried underground storage tanks (USTs) are present in the area of investigation, and if groundwater is impacted.

The following report presents the results of an electromagnetic (EM) and ground penetrating radar (GPR) geophysical survey to identify potential USTs in the investigation area and describes the subsurface field investigation conducted. The report includes the evaluation of field screening, as well as field analyses with regards to the presence or absence of soil and groundwater contamination within the area of investigation across Parcel 10. **Appendix A** includes a Photograph log for the site.

### 1.1 Site History

Parcel 10 has been identified with the address of 407 South J.K. Powell Boulevard. Based on a search of the North Carolina Department of Environmental Quality (NCDEQ) UST database registry, no registered tanks were identified for the 407 South J.K. Powell Boulevard site. Additionally, the geophysical survey did not identify evidence of USTs on site. Apex personnel also reviewed the NCDEQ Incident Management Database and no groundwater incidents are associated with this parcel.

### 1.2 Site Description

The site is located in a mixed commercial and residential area of Columbus County, Whiteville, North Carolina. The property is currently vacant and is developed with a one-story building with wood siding located in the south-eastern portion of the parcel. The rest of the parcel is covered

with paved asphalt and grass. West Columbus Street borders the parcel to the north with The Treasure Chest and Flea Market commercial buildings are located just beyond. Columbus Flower Shop and Friendship Baptist Church border the site east. The property is bordered by J.K. Powell Boulevard to the west followed by the residential properties. Additional residential properties are located to the south. The geophysical surveyor, Pyramid Environmental & Engineering, PC, (Pyramid) identified four EM anomalies on site. No evidence of larger structures such as USTs were observed beneath the suspected buried metallic debris found on the southern portion of the site. Pyramid concluded the geophysical data did not indicate the presence of metallic USTs on Parcel 10.

## 2.0 GEOLOGY

### 2.1 Regional Geology

Parcel 10, the Myra Lee Hammonds Property, is located within the Coastal Plain Physiographic Province. The Coastal Plain is the largest physiographic province in the state, covering about 45% of the land area. According to the US Geological Survey Hydrogeological framework of the North Carolina coastal plain, the geology consists of eastward-dipping and eastward-thickening series of sedimentary strata which range in age from Holocene to Cretaceous. The most common type of sediment types are sand and clay, although a significant amount of limestone occurs in the southern part of the coastal plain. The Site overlies surficial sediments (to approximately 30 to 40 feet bls), the PeeDee Confining unit (approximately 10 feet thick in this area), and the Late Cretaceous age Peedee Formation. The Peedee Formation is named for exposures along the great Peedee River, it preserves belemnites and foraminifera fossils dating from the Late Cretaceous. It generally consists of marine sand, clayey sand and clay (M.D. Winner Jr. and R.W. Coble, 1996, *Hydrogeologic Framework of the North Carolina Coastal Plain, Regional Aquifer-System Analysis – Northern Atlantic Coastal Plain*, USGS Professional Paper 1404-I).

### 2.2 Site Geology

Site geology was observed through the drilling and sampling of six direct push technology (DPT) soil borings (SB) onsite. **Figure 2** presents the boring locations and site layout. Borings did not exceed a total depth of five below ground surface (bgs) since that depth was the maximum excavation depth for proposed drainage features. Soil consisting predominantly of yellow to black sandy, clayey silt was observed across the parcel. The soils were unconsolidated and as a result the borings often collapsed. Borings on the site intercepted water at approximately three to five feet bgs. According to the topographical maps found on the Columbus County Geographic Information System (GIS) site, the parcel slopes from north to south suggesting that

the direction of groundwater flow generally flows to the south towards Soules Swamp. Boring logs are presented in **Appendix B**.

## 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 prepared to include the site-specific health and safety information necessary for the field activities. North Carolina-One Call was contacted on May 25, 2018 to report the proposed drilling activities and notify affected utilities. Apex subcontracted Pyramid to locate subsurface utilities and other subsurface drilling hazards as well as to perform a geophysical survey. Carolina Soil Investigations, LLC (CSI) of Olin, North Carolina was retained by Apex to perform the direct push sampling for soil borings. REDLAB, LLC (REDLAB) provided an ultraviolet fluorescence (UVF) Hydrocarbon Analyzer and Eastern Solutions provided a calibrated Flame Ionization/Photoionization Detector (FID/PID). Boring locations were strategically placed in a pattern within the area of investigation to maximize the opportunity to encounter potentially contaminated soil.

### 3.2 Site Reconnaissance

Apex personnel performed a site reconnaissance on June 7, 2018. During the site reconnaissance, the area was visually examined for the presence of potential USTs or areas/obstructions that could potentially affect the subsurface investigation. The proposed boring locations were marked based on the site inspection and geophysical survey results. Apex personnel also used the site visit as an opportunity to contact the property manager/owner to inform them of upcoming field activities.

### 3.3 Geophysics Survey Results

The geophysical survey of the site was conducted from May 30, 2018 to June 5, 2018. Pyramid performed an electromagnetic (EM) induction metal survey followed by a GPR survey. A copy of the Geophysical Report is presented in **Appendix C**. A total of four EM anomalies were identified. Two EM anomalies were directly attributed to visible cultural features at the ground surface. Two EM anomalies were associated with suspected buried metallic debris. GPR found evidence consistent with buried metallic debris on the southern portion of the site. No evidence of larger structures such as USTs were observed beneath the suspected buried metallic debris. Pyramid concluded the geophysical data did not record any evidence of metallic USTs on Parcel 10.

### 3.4 Well Survey

No water supply or groundwater monitoring wells were observed on Parcel 10.

### 3.5 Soil Sampling

Apex conducted drilling activities at the site on June 7, 2018. The purpose of soil sampling was to determine if a petroleum release has occurred within the investigation area, and if so, to estimate the volume of impacted soil that might require special handling during construction activities. Apex drilling subcontractor, CSI, advanced six direct push soil borings within the proposed investigation area. These six boring locations were placed in a pattern to maximize the likelihood of identifying potential soil contamination. **Figure 2** presents the Site Map with soil boring locations and site structures.

Soil sampling was performed utilizing hand auger and direct push methods accompanied by field screening of organic vapors with the FID/PID unit and onsite quantitative analyses with the UVF Hydrocarbon Analyzer. One to two intervals of the soil boring, exhibiting the most elevated FID/PID readings, were selected for onsite quantitative analysis of total petroleum hydrocarbons (TPH) in soil using the REDLAB UVF Hydrocarbon Analyzer. The analysis was performed onsite by Mr. Thomas Fisher, a certified REDLAB UVF technician with Apex. The UVF results were generated concurrent with soil boring activities so that rapid assessment could be utilized for strategic boring placement.

### 3.6 Groundwater Sampling

Groundwater was encountered on site at a depth ranging from four to five feet bgs. However, contamination was not evident based on FID/PID field screening or UVF hydrocarbon analysis of soil sampling within the smear zone. There is no evidence of significant petroleum hydrocarbon contamination of groundwater onsite, within the area of investigation. However, as described below, there was very limited concentrations of TPH-DRO measured in soils collected below the water table at borings P10-SB3 and P10-SB4.

## 4.0 SAMPLING RESULTS

Based on FID/PID field screening and onsite UVF hydrocarbon analysis from the June 2018 soil sampling there is no evidence of significant petroleum hydrocarbon contamination onsite, within the area of investigation.

Elevated PID readings were not observed above ten parts per million (ppm). PID readings ranged from non-detect to 3.5 ppm (P10-SB3). Elevated FID readings above ten parts per million (ppm), were observed in borings P10-SB2 and P10-SB3. Concentrations were the

highest in P10-SB3 with FID readings of 49.6 ppm above the water table and 121 ppm within the water table smear zone. The FID/PID field screening results are provided on the boring logs in **Appendix B**.

Soil samples which exhibited the highest PID and/or FID concentrations were field analyzed using the UVF instrument for the presence of TPH gasoline range organics (GRO) and diesel range organics (DRO). The UVF analytical results for TPH-GRO and TPH-DRO are presented in **Table 1**. The UVF instrument generated tables and chromatographs in **Appendix D**. **Figure 3** presents the TPH-GRO and TPH-DRO results at each boring.

Based on the UVF analyses, TPH-GRO was not identified on Parcel 10 above detection limits. However, TPH-DRO was identified in soils on Parcel 10 at borings P10-SB3 and P10-SB4. TPH-DRO concentrations ranged from below detectable levels to 9.4 mg/kg (P-10-SB-3) in soils located above the smear zone and TPH-DRO concentrations ranged from below detectable levels to 1.4 mg/kg (P10-SB3) in soils located below the smear zone. TPH-GRO concentrations did not exceed the regulatory action level of 50 mg/kg and the TPH-DRO concentrations did not exceed the regulatory action level of 100 mg/kg.

## 5.0 CONCLUSIONS

Based on site observations and onsite UVF analysis, petroleum-impacted soil contamination was not identified above the NCDEQ Action level of 50 mg/kg for TPH-GRO and was not identified above the NCDEQ Action level of 100 mg/kg for TPH-DRO.

The following bulleted summary is based upon Apex's evaluation of field observations and onsite quantitative analyses of samples collected from the Site on June 7, 2018.

- Results of the geophysical survey did not produce evidence of anomalies characteristic of USTs.
- Six soil borings were advanced onsite. Soil samples collected from each boring were analyzed in the field using a REDLAB UVF Hydrocarbon Analyzer.
- Soil samples analyzed using the UVF did not contain TPH-GRO concentrations above their respective NCDEQ Action levels of 50 mg/kg. Soil samples analyzed using the UVF did not contain TPH-DRO concentrations above their respective NCDEQ Action levels of 100 mg/kg.
- Groundwater was encountered on site at depths ranging from three to five feet bgs. However, elevated FID readings and low levels of TPH-DRO less than 10 mg/Kg were

observed in borings P10-SB3 and P10-SB4. The levels are below the screening levels and may indicate minor impact in this area.

- The parcel is in a fill section of the design project. No drainage features are located near P10-SB3 or P10-SB4, the area of low impact.

## **6.0 RECOMMENDATIONS**

Based on these PSA results, Apex does not recommend further assessment or soil sampling in the area of investigation.

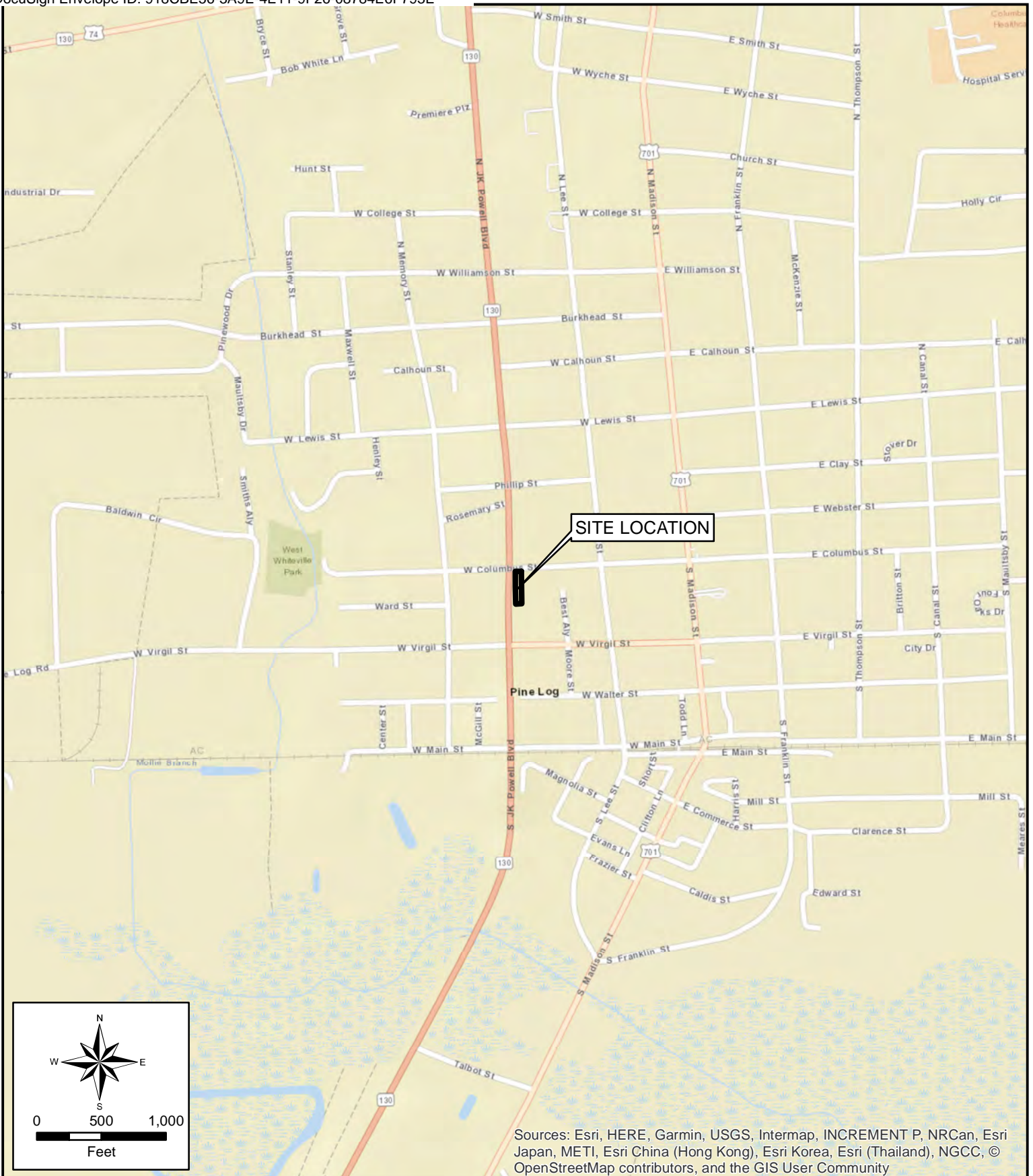


## **TABLES**

**Table 1**  
**UVF Onsite Hydrocarbon Analytical Soil Data from June 2018**  
**R-5020B, Parcel Myra Lee Hammonds**  
**Whiteville, Columbus County, North Carolina**

Sample ID Number	Sample Date	Sample Depth (ft bgs)	GRO (mg/kg) (C5-C10)	DRO (mg/kg) (C10-C35)
<b>SOIL</b>				
<b>NCDEQ Action Level in mg/kg</b>			<b>50</b>	<b>100</b>
P-10-SB-1	6/7/2018	1.5 - 2	<0.65	<0.65
P-10-SB-1	6/7/2018	4 - 5	<0.65	<0.65
P-10-SB-2	6/7/2018	2 - 3	<0.57	<0.57
P-10-SB-2	6/7/2018	4 - 5	<0.64	<0.64
P-10-SB-3	6/7/2018	2 - 3	<0.65	9.4
P-10-SB-3	6/7/2018	4 - 5	<0.59	1.4
P-10-SB-4	6/7/2018	2 - 3	<0.63	0.63
P-10-SB-4	6/7/2018	4 - 5	<0.65	0.65
P-10-SB-5	6/7/2018	2 - 3	<0.56	<0.56
P-10-SB-5	6/7/2018	4 - 4.5	<0.62	<0.62
P-10-SB-6	6/7/2018	2.5 - 3	<0.68	<0.68
P-10-SB-6	6/7/2018	4 - 5	<0.61	<0.61
<b>NOTES:</b> (mg/kg) = Milligrams per kilogram GRO = Gasoline Range Organics DRO = Diesel Range Organics ft bgs = feet below ground surface TPH - GRO values in exceedance of NCDEQ Action Level of 50 mg/kg are shown in Bold TPH - DRO values in exceedance of NCDEQ Action Level of 100 mg/kg are shown in Bold				

## FIGURES

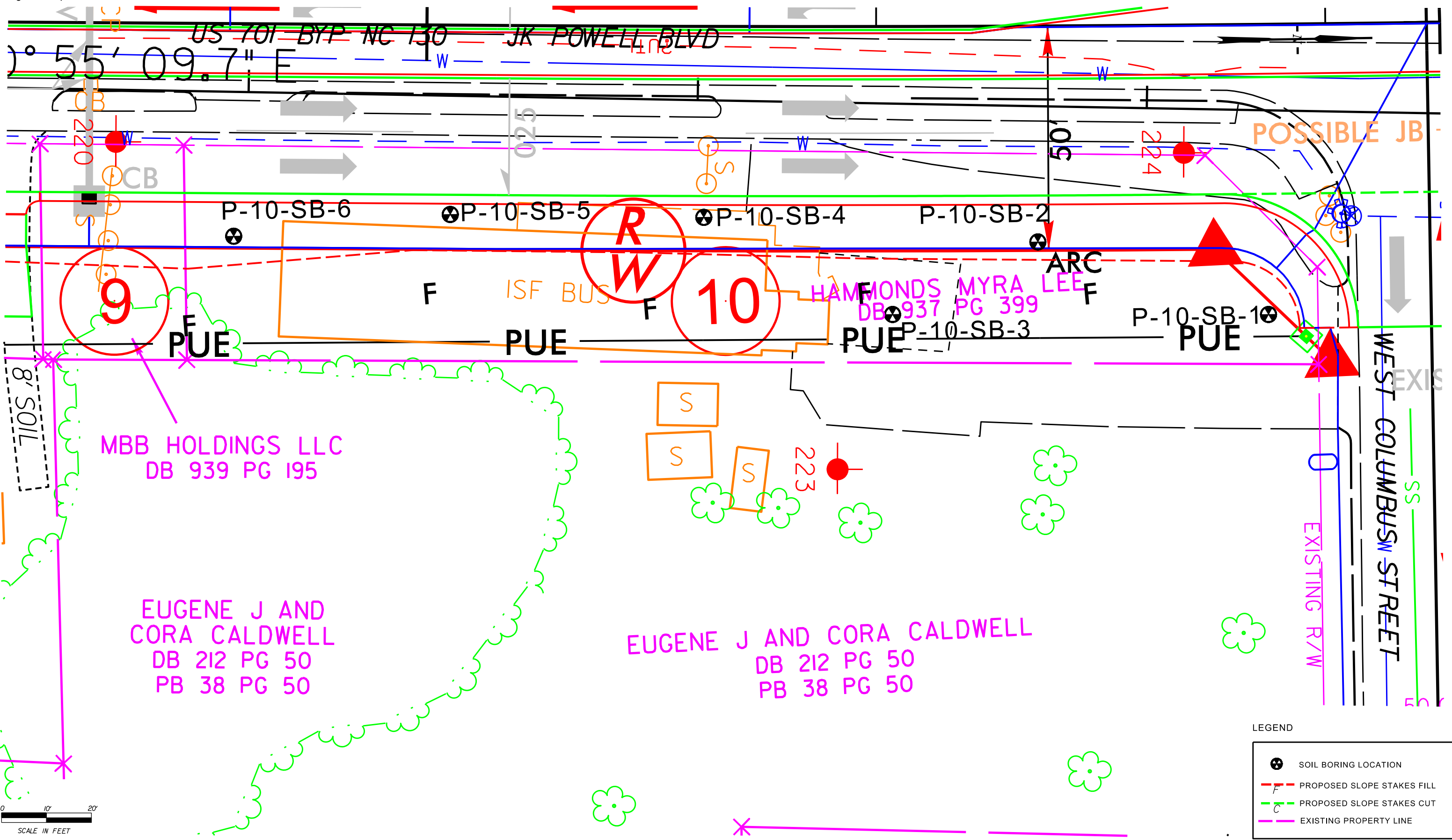


CHECK BY: TH
DRAWN BY: SP
DATE: 7/6/2018
SCALE: AS SHOWN
CAD NO.: NCDOT-001
PRJ NO.: NCDOT-001

**SITE LOCATION MAP**  
  
**PARCEL #10**  
**407 S. JK POWELL BOULEVARD**  
**WHITEVILLE, NORTH CAROLINA**



FIGURE  
  
**1**



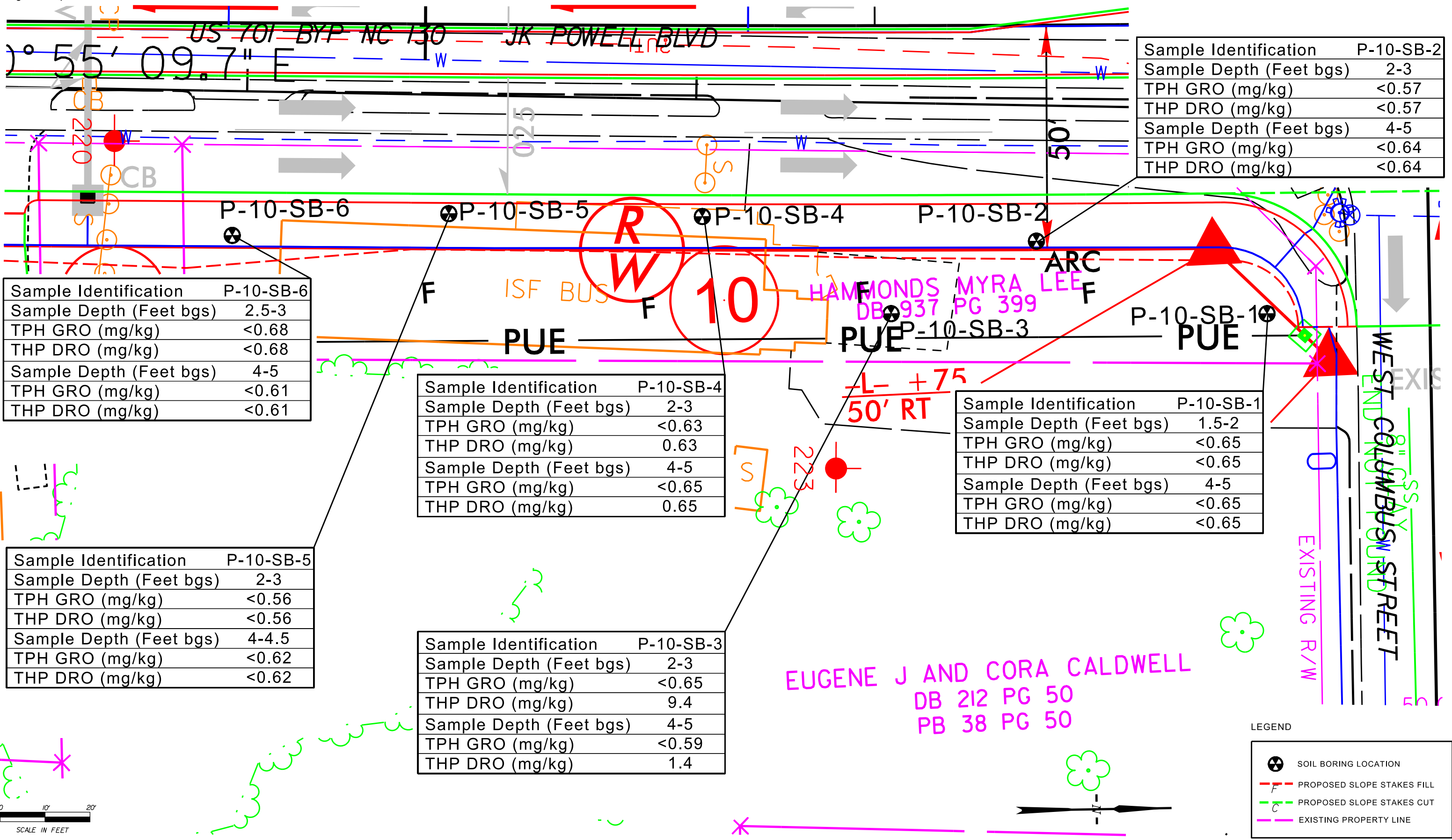
0 10' 20'  
SCALE IN FEET

LEGEND	
	SOIL BORING LOCATION
	PROPOSED SLOPE STAKES FILL
	PROPOSED SLOPE STAKES CUT
	EXISTING PROPERTY LINE



FIGURE 2  
PARCEL 010  
407 S. JK. POWELL BLVD.  
SITE MAP WITH SOIL BORING  
LOCATIONS

Date:	6/6/18	R-5020B US 701 BYPASS COLUMBUS COUNTY
Proj. #	NCDOT-001	
pc_010_fig 2.dgn		Project Title:
CAD File:		Client:
Approx. Scale:	1" = 20'	Drawn by:
		MJO
		NC DOT



Sample Identification	P-10-SB-2
Sample Depth (Feet bgs)	2-3
TPH GRO (mg/kg)	<0.57
THP DRO (mg/kg)	<0.57
Sample Depth (Feet bgs)	4-5
TPH GRO (mg/kg)	<0.64
THP DRO (mg/kg)	<0.64

Sample Identification	P-10-SB-6
Sample Depth (Feet bgs)	2.5-3
TPH GRO (mg/kg)	<0.68
THP DRO (mg/kg)	<0.68
Sample Depth (Feet bgs)	4-5
TPH GRO (mg/kg)	<0.61
THP DRO (mg/kg)	<0.61

Sample Identification	P-10-SB-4
Sample Depth (Feet bgs)	2-3
TPH GRO (mg/kg)	<0.63
THP DRO (mg/kg)	0.63
Sample Depth (Feet bgs)	4-5
TPH GRO (mg/kg)	<0.65
THP DRO (mg/kg)	0.65

Sample Identification	P-10-SB-1
Sample Depth (Feet bgs)	1.5-2
TPH GRO (mg/kg)	<0.65
THP DRO (mg/kg)	<0.65
Sample Depth (Feet bgs)	4-5
TPH GRO (mg/kg)	<0.65
THP DRO (mg/kg)	<0.65

Sample Identification	P-10-SB-5
Sample Depth (Feet bgs)	2-3
TPH GRO (mg/kg)	<0.56
THP DRO (mg/kg)	<0.56
Sample Depth (Feet bgs)	4-4.5
TPH GRO (mg/kg)	<0.62
THP DRO (mg/kg)	<0.62

Sample Identification	P-10-SB-3
Sample Depth (Feet bgs)	2-3
TPH GRO (mg/kg)	<0.65
THP DRO (mg/kg)	9.4
Sample Depth (Feet bgs)	4-5
TPH GRO (mg/kg)	<0.59
THP DRO (mg/kg)	1.4

EUGENE J AND CORA CALDWELL  
 DB 212 PG 50  
 PB 38 PG 50

LEGEND

	SOIL BORING LOCATION
	PROPOSED SLOPE STAKES FILL
	PROPOSED SLOPE STAKES CUT
	EXISTING PROPERTY LINE

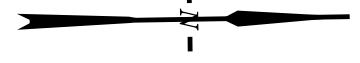
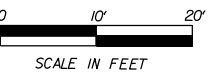


FIGURE 3  
 PARCEL 010  
 407 S. JK. POWELL BLVD.  
 ONSITE UVF HYDROCARBON ANALYSIS RESULTS - SOIL  
 6/7/18

Date:	6/6/18	R-5020B US 701 BYPASS COLUMBUS COUNTY
Proj. #	NCDOT-001	
pc_010_fig 2.dgn		Project Title:
CAD File:		1" = 20'
Approx. Scale:		Drawn by: MJO
		Client: NC DOT

**APPENDIX A**  
**PHOTOGRAPH LOG**



**Photo 1**

Overview of site prior to preliminary site assessment activities.



**Photo 2**

View shows CSI clearing for utilities prior to drilling.

10610 Metromont Pkwy  
Suite 206  
Charlotte, NC 28269



WBS 41499.1.3  
PROCESSED TLH  
DATE June 2018

PHOTOGRAPHIC LOG  
PSA Field Activities  
Parcel 10  
Myra Lee Hammonds Property  
Whiteville, NC



**APPENDIX B**  
**BORING LOGS**



# Apex Companies, LLC

## Boring Log

<b>Boring/Well No.:</b> P-10-SB-1	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

Depth (ft) BLS)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1	<0.1	<0.1		0-3' Tan sandy <b>SILT</b>
2				
3				
4	<0.1	<0.1		3'-5 Yellow clayey <b>SILT</b>
5				
6	<0.1	<0.1		5'-10' Orange and white marbled clayey <b>SILT</b> saturated at 5'
7				
8				
9				
10				
11				
12				
13				
14				

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:



# Apex Companies, LLC

## Boring Log

<b>Boring/Well No.:</b> P-10-SB-2	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

Depth (ft) BLS)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1	28	1.5		0-2' Black SILT
2				
3	46.5	3.2		2'-5' Black sandy SILT
4				
5				
6				Boring terminated at 5 feet.
7				
8				
9				
10				
11				
12				
13				
14				

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:



# Apex Companies, LLC

## Boring Log

<b>Boring/Well No.:</b> P-10-SB-3	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

Depth (ft) BLS)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1	49.6	1.9		0-3' Black sandy <b>SILT</b>
2				
3				
4	121	3.5		3'-5' Black clayey sandy <b>SILT</b> saturated at 4'.
5				
6				Boring terminated at 5 feet.
7				
8				
9				
10				
11				
12				
13				
14				

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:



# Apex Companies, LLC

## Boring Log

<b>Boring/Well No.:</b> P-10-SB-4	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

Depth (ft) BLS)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1	1.2	<0.1		0-3' Black clayey <b>SILT</b>
2				
3				
4	2.4	0.7		3'-5' Yellow clayey <b>SILT</b> saturated at 3'.
5				
6				Boring terminated at 5 feet.
7				
8				
9				
10				
11				
12				
13				
14				

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:



# Apex Companies, LLC

## Boring Log

<b>Boring/Well No.:</b> P-10-SB-5	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

Depth (ft) BLS)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1	1.1	0.3		0.3' Black clayey <b>SILT</b>
2				
3				
4	0.8	0.3		3'-5' Yellow clayey sandy <b>SILT</b> saturated at 3'.
5				
6				Boring terminated at 5 feet.
7				
8				
9				
10				
11				
12				
13				
14				

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:



## Apex Companies, LLC

### Boring Log

<b>Boring/Well No.:</b> P-10-SB-6	<b>Site Name:</b> Parcel 10
<b>Date:</b> 6/7/18	<b>Location:</b> Whiteville, Columbus County, NC
<b>Job No.:</b> NCDOT-001	<b>Sample Method:</b> Hand Auger and Direct Push
<b>Apex Rep:</b> Thomas Fisher	<b>Drilling Method:</b> Hand Auger and Direct Push
<b>Drilling Company:</b> Carolina Soil Investigations	<b>Driller Name/Cert #:</b> Danny Summers/2579

**Remarks:**

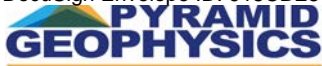
Depth BLS)	(ft)	FID Reading (ppm)	PID Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
1		2.1	0.4		0-2.5' Orange clayey <b>SILT</b>
2					
3		1.9	0.8		2.5'-5' Black clayey sandy <b>SILT</b>
4					
5					
6					Boring terminated at 5 feet.
7					
8					
9					
10					
11					
12					
13					
14					

**WELL CONSTRUCTION DETAILS (If Applicable)**

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

**APPENDIX C**  
**GEOPHYSICAL REPORT**





PYRAMID GEOPHYSICAL SERVICES  
(PROJECT 2018-139)

# GEOPHYSICAL SURVEY

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METALLIC UST INVESTIGATION:  
PARCEL 10  
NCDOT PROJECT R-5020B (41499.1.3)

407 S. JK POWELL BLVD., WHITEVILLE, NC

JUNE 20, 2018

Report prepared for: Katie Lippard  
Apex Companies, LLC  
1071 Pemberton Hill Rd., Suite 203  
Apex, NC 27502

Prepared by: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "E. Cross".

Eric C. Cross, P.G.  
NC License #2181

Reviewed by: \_\_\_\_\_

A handwritten signature in black ink, appearing to read "Doug Canavello".

Douglas A. Canavello, P.G.  
NC License #1066

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406

P: 336.335.3174 F: 336.691.0648

C257: GEOLOGY C1251: ENGINEERING

**GEOPHYSICAL INVESTIGATION REPORT**  
**Parcel 10 – 407 S. JK Powell Blvd.**  
**Whiteville, Columbus County, North Carolina**

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- Figure 2 – Parcel 10 EM61 Results Contour Map
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- Figure 4 – Overlay of Geophysical Survey Boundaries on NCDOT Engineering Plans

## LIST OF ACRONYMS

CADD .....	Computer Assisted Drafting and Design
DF .....	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS .....	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW .....	Right-of-Way
UST .....	Underground Storage Tank

## EXECUTIVE SUMMARY

---

**Project Description:** Pyramid Environmental conducted a geophysical investigation for Apex Companies, LLC at Parcel 10, located at 407 S. JK Powell Blvd., in Whiteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5020B). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from May 30 – June 5, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

**Geophysical Results:** The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of four EM anomalies were identified. Two of the EM anomalies were directly attributed to visible cultural features at the ground surface. Two EM anomalies (Anomalies 3 and 4) were associated with suspected buried metallic debris and were further investigated with GPR. GPR recorded evidence consistent with buried metallic debris on the southern portion of the site. No evidence of larger structures such as USTs was observed beneath the suspected buried metallic debris. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 10.

## INTRODUCTION

---

Pyramid Environmental conducted a geophysical investigation for Apex Companies, LLC at Parcel 10, located at 407 S. JK Powell Blvd., in Whiteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5020B). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from May 30 – June 5, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included an apparent former restaurant building surrounded by asphalt and grass surfaces. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

---

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. 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 June 5, 2018, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid’s classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks on NCDOT Projects			
High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> 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.	<b>Possible UST</b> 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**

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*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**

<b>Metallic Anomaly #</b>	<b>Cause of Anomaly</b>	<b>Investigated with GPR</b>
1	Hydrant/Poles	
2	Building	
3	Suspected Metallic Debris	✓
4	Suspected Metallic Debris	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a hydrant, poles, and the building. Two medium-amplitude EM anomalies (Anomalies 3 and 4), on the southern portion of the site, were associated with suspected buried metallic debris and were further investigated with GPR.

*Discussion of GPR Results*

**Figure 3** presents the locations of the formal GPR transects performed at the property, as well as the transect images. A total of three GPR transects were performed at the site. GPR Transects 1 – 3 were performed across EM Anomalies 3 and 4. These transects recorded evidence of isolated, small hyperbolic reflectors that were suggestive of buried metallic debris. No evidence of a larger structure such as a UST was observed in this area.

Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 10. **Figure 4** provides an overlay of the geophysical survey onto the NCDOT MicroStation engineering plans for reference.

## SUMMARY & CONCLUSIONS

---

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 10 in Whiteville, 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.
- Two of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- Two EM anomalies (Anomalies 3 and 4) were associated with suspected buried metallic debris and were further investigated with GPR.
- GPR recorded evidence consistent with buried metallic debris on the southern portion of the site. No evidence of larger structures such as USTs was observed beneath the suspected buried metallic debris.
- Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 10.

## LIMITATIONS

---

Geophysical surveys have been performed and this report was prepared for Apex Companies, LLC in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.



### APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area  
(Facing Approximately South)



View of Survey Area  
(Facing Approximately North)



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PROJECT  
**PARCEL 10**  
WHITEVILLE, NORTH CAROLINA  
NCDOT PROJECT R-5020B

TITLE  
**PARCEL 10 - GEOPHYSICAL SURVEY**  
BOUNDARIES AND SITE PHOTOGRAPHS

DATE  
5/30/2018

PYRAMID PROJECT #:  
2018-139

CLIENT  
Apex Companies, LLC

**FIGURE 1**

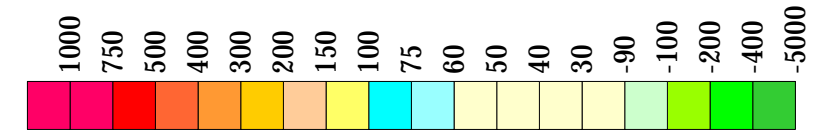
## EM61 METAL DETECTION RESULTS



**NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED.**

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on May 30, 2018, using a Geonics EM61 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on June 5, 2018.

EM61 Metal Detection Response  
(millivolts)



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PROJECT  
**PARCEL 10**  
WHITEVILLE, NORTH CAROLINA  
NCDOT PROJECT R-5020B

TITLE  
**PARCEL 10 - EM61 METAL DETECTION  
CONTOUR MAP**

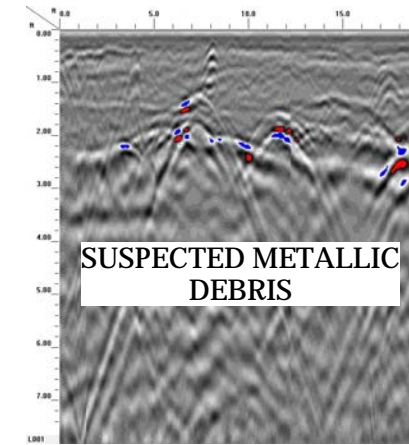
DATE  
5/30/2018

PYRAMID PROJECT #:  
2018-139

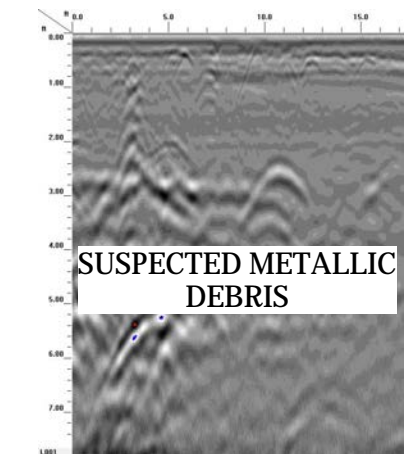
CLIENT  
Apex Companies, LLC

**FIGURE 2**

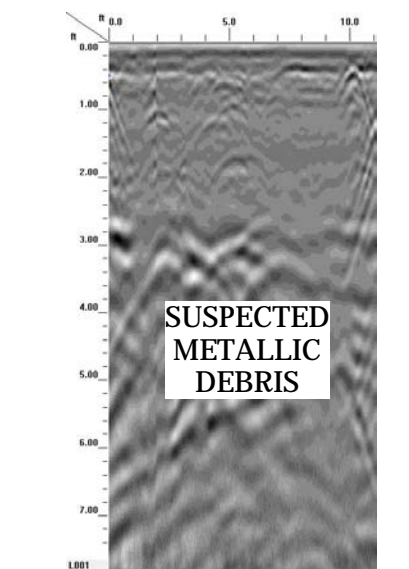
## LOCATIONS OF GPR TRANSECTS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



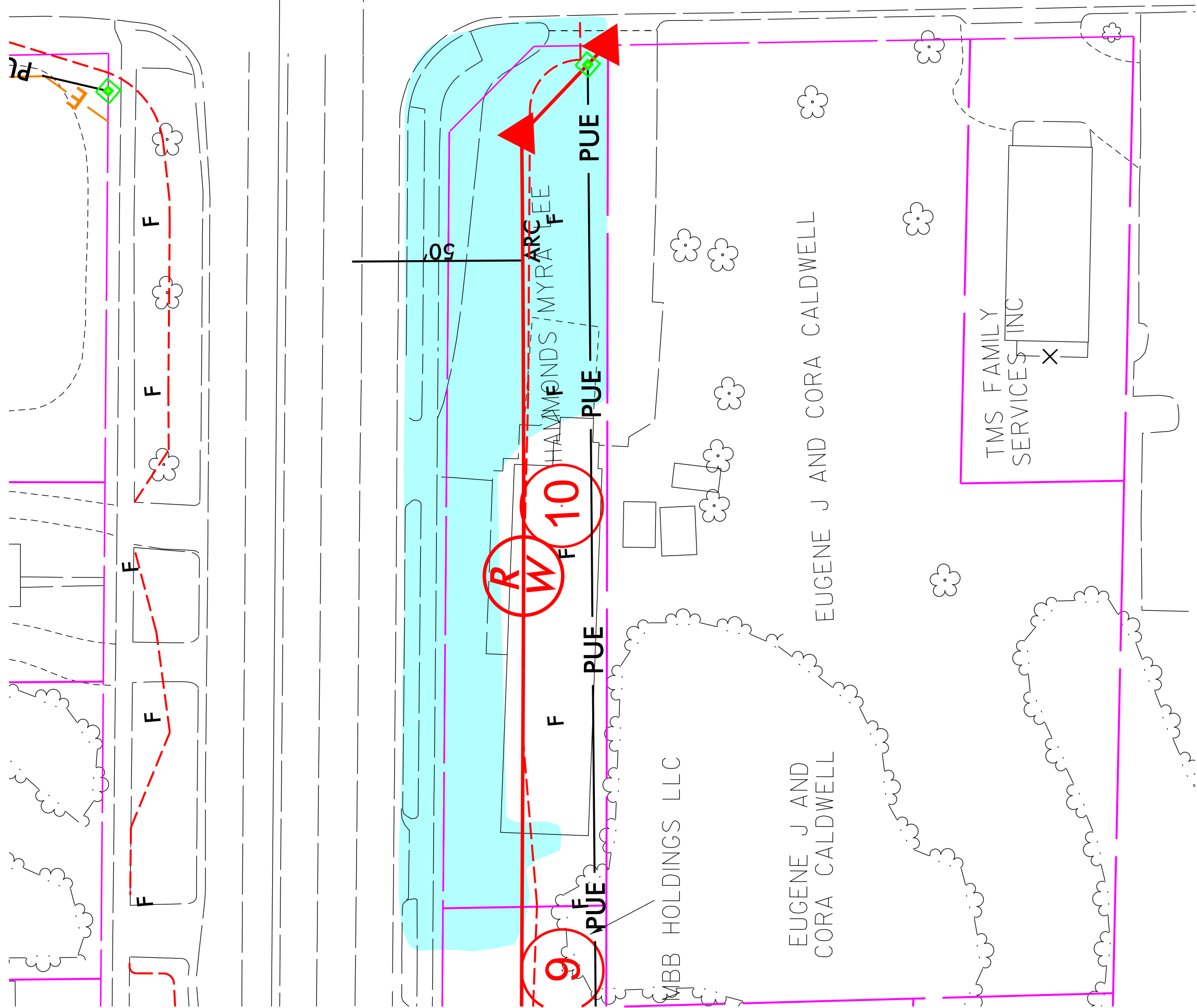
503 INDUSTRIAL AVENUE  
GREENSBORO, NC 27460  
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PROJECT  
**PARCEL 10**  
WHITEVILLE, NORTH CAROLINA  
NCDOT PROJECT R-5020B

TITLE  
**PARCEL 10 - GPR TRANSECT LOCATIONS  
AND IMAGES**

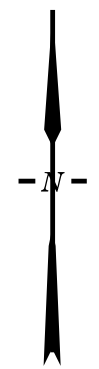
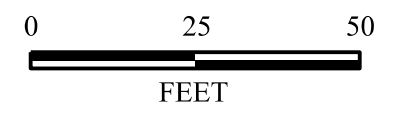
DATE  
6/5/2018  
PYRAMID  
PROJECT #:  
2018-139

CLIENT  
Apex Companies, LLC  
**FIGURE 3**



**LEGEND**

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



TITLE <b>OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES                  ON NCDOT ENGINEERING PLANS</b>	
PROJECT <b>PARCEL 10                  WHITEVILLE, NORTH CAROLINA                  NCDOT PROJECT W-5020B</b>	
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology
DATE: 06-26-2018	REVISION NO. 0
PYRAMID PROJECT NO. 2018-139	FIGURE NO. 4

**APPENDIX D**  
**HYDROCARBON ANALYSIS RESULTS**



### Hydrocarbon Analysis Results

**Client:** NCDOT  
**Address:** Parcel 10

**Samples taken**  
**Samples extracted**  
**Samples analysed**

Thursday, June 7, 2018  
Thursday, June 7, 2018  
Thursday, June 7, 2018

**Contact:** Craig Haden

**Operator**

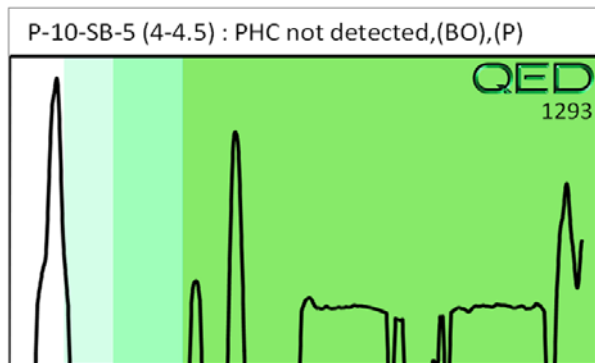
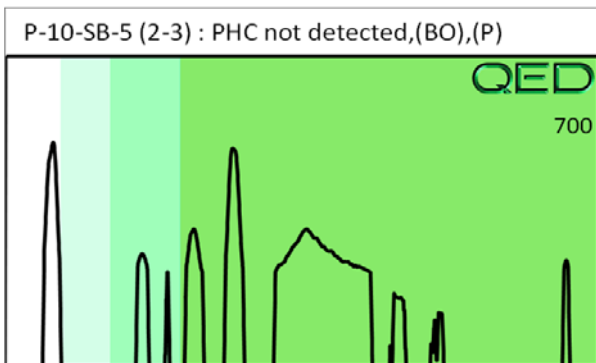
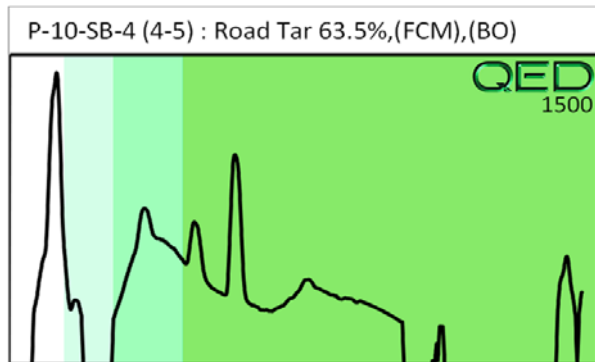
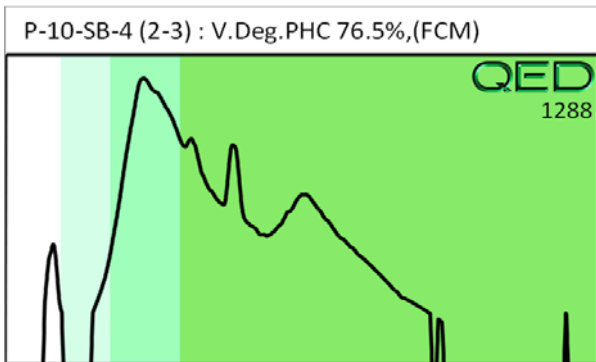
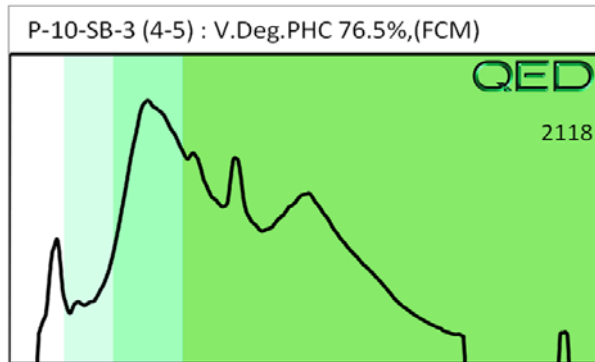
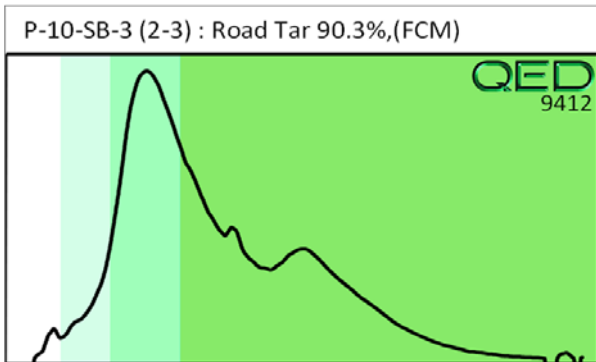
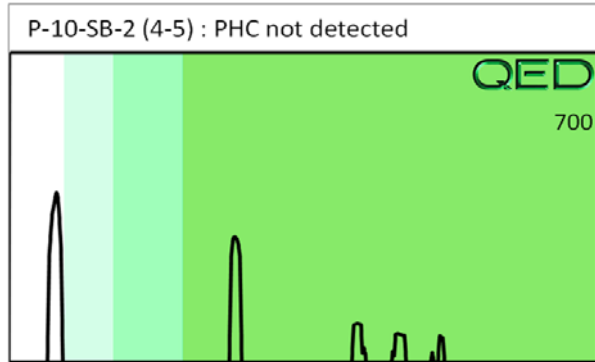
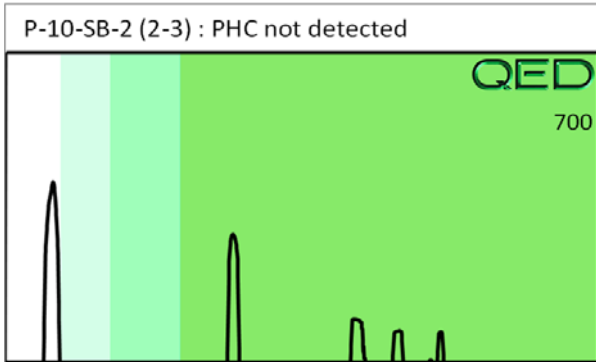
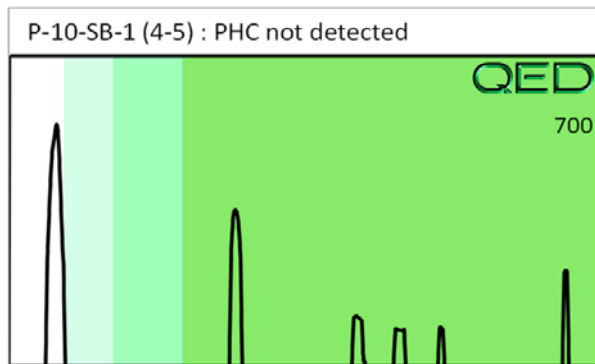
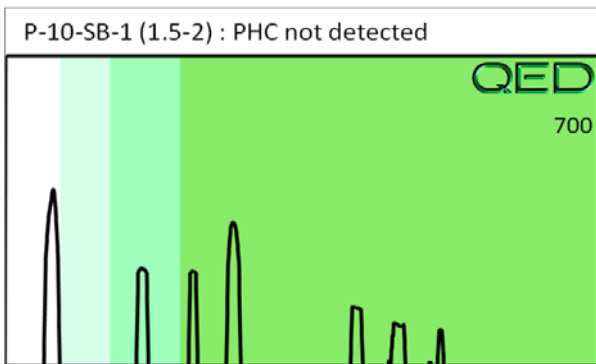
Thomas Fisher

**Project:** R-5020B Whiteville

										F03640			
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
										% light	% mid	% heavy	
s	P-10-SB-1 (1.5-2)	26.0	<0.65	<0.65	<0.65	<0.65	<0.13	<0.21	<0.026	0	0	0	PHC not detected
s	P-10-SB-1 (4-5)	26.0	<0.65	<0.65	<0.65	<0.65	<0.13	<0.21	<0.026	0	0	0	PHC not detected
s	P-10-SB-2 (2-3)	22.6	<0.57	<0.57	<0.57	<0.57	<0.11	<0.18	<0.023	0	0	0	PHC not detected
s	P-10-SB-2 (4-5)	25.5	<0.64	<0.64	<0.64	<0.64	<0.13	<0.2	<0.025	0	0	0	PHC not detected
s	P-10-SB-3 (2-3)	26.0	<0.65	<0.65	9.4	9.4	4.5	0.51	<0.026	0	78.2	21.8	Road Tar 90.3%,(FCM)
s	P-10-SB-3 (4-5)	23.6	<0.59	<0.59	1.4	1.4	0.92	<0.19	<0.024	0	70	30	V.Deg.PHC 76.5%,(FCM)
s	P-10-SB-4 (2-3)	25.2	<0.63	<0.63	0.63	0.63	0.49	<0.2	<0.025	0	72	28	V.Deg.PHC 76.5%,(FCM)
s	P-10-SB-4 (4-5)	26.0	<0.65	<0.65	0.65	0.65	0.71	<0.21	<0.026	0	70.5	29.5	Road Tar 63.5%,(FCM),(BO)
s	P-10-SB-5 (2-3)	22.4	<0.56	<0.56	<0.56	<0.56	<0.11	<0.18	<0.022	0	0	100	PHC not detected,(BO),(P)
s	P-10-SB-5 (4-4.5)	24.8	<0.62	<0.62	<0.62	<0.62	<0.12	<0.2	<0.025	0	0	100	PHC not detected,(BO),(P)
Initial Calibrator QC check			OK			Final FCM QC Check			OK			102.6 %	

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present





**Hydrocarbon Analysis Results**

**Client:** NCDOT  
**Address:** Parcel 10

**Samples taken** Thursday, June 7, 2018  
**Samples extracted** Thursday, June 7, 2018  
**Samples analysed** Thursday, June 7, 2018

**Contact:** Craig Haden

**Operator** Thomas Fisher

**Project:** Whiteville

										F03640			
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
										% light	% mid	% heavy	
s	P-10-SB-6 (2.5-3)	27.4	<0.68	<0.68	<0.68	<0.68	<0.14	<0.22	<0.027	0	0	0	PHC not detected,(BO)
s	P-10-SB-6 (4-5)	24.3	<0.61	<0.61	<0.61	<0.61	<0.12	<0.19	<0.024	0	0	0	PHC not detected
Initial Calibrator QC check			OK			Final FCM QC Check			OK			99.2 %	

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content  
 Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library  
 (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present



