

## **Preliminary Site Assessment Report**

**November 20, 2018**  
**WBS Element: 44625.1.1**  
**State Project: U-5888**  
**Haywood County**

at  
**Clifford Gould LLC Property**  
**Parcel #008**  
**783 N Main Street, Waynesville, NC 28786**  
**PIN #: 8615-59-6508**  
**Facility ID No.: N/A**  
**Groundwater Incident No.: 41466**

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## TABLE OF CONTENTS

SECTION	PAGE
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<b>1.0 INTRODUCTION.....</b>	<b>3</b>
1.1 General Site Background Information.....	3
<b>2.0 SCOPE OF WORK.....</b>	<b>3</b>
2.1 Background Research.....	3
2.2 Plates 1, 2 and 3 – Photos of Parcel #008.....	5
2.3 Geophysical Surveys.....	8
2.4 Soil Sampling and Analyses .....	8
<b>3.0 RESULTS OF INVESTIGATION .....</b>	<b>9</b>
3.1 Geophysical Surveys.....	9
3.2 Soil Borings, Sampling and Laboratory Results.....	11
3.3 Volume and Extent of Soil Contamination.....	12
3.4 Conclusions.....	13
3.5 Recommendations.....	13

### Appendix A – Tables and Figures

Table 1 – Soil Boring Data
Table B-3 – Summary of Soil Sampling Results
Figure 1 – Site Location Map
Figure 2 – Site Plan
Figure 3 – Site Plan with Soil Boring Locations
Figure 4 – Site Plan with Grid and GPR Transect Locations
Figure 5 – Magnetometer Survey Results
Figure 6 – Shallow GPR Depth Slices
Figure 7 – Intermediate GPR Depth Slices
Figure 8 – Deep GPR Depth Slices
Figure 9 – GPR Profiles 1-6
Figure 10 – Soil Analytical Results
Figure 11 – Approximate Extent of Soil Contamination
Figure 12 – Cross-Sections A-A` and B-B`
Figure 13 – Cross-Sections C-C` and D-D`
Figure 14 – Cross Section E-E`

### Appendix B – Laboratory Reports and Chain of Custody Records

### Appendix C – Documents From NCDEQ Incident Files

## **1.0 Introduction**

### **1.1 General Site Background Information**

Seramur & Associates, PC was contracted to complete a Preliminary Site Assessment (PSA) at:

Clifford Gould LLC Property  
Parcel #008  
PIN #: 8615-59-6508  
783 N. Main Street, Waynesville, NC 28786  
Facility ID No.: N/A  
Groundwater Incident No.: 41466

This property is a triangular parcel bounded to the north by Walnut Street, to the southeast by North Main Street and to the southwest by Marshall Street. It is located in downtown Waynesville (Figure 1). The property is currently developed with one commercial building (former restaurant) and one partially demolished former auto repair shop. It is our understanding that the entire property will be taken for a traffic circle being built to replace the current intersection (Figure 2).

## **2.0 Scope of Work**

The PSA scope of work included completing a geophysical survey at the property to investigate the potential for underground storage tanks. Following the geophysical survey, soil sampling and analyses were performed to assess soil quality and estimate the volume of potentially contaminated soil at the site (Figure 3).

### **2.1 Background Research**

According to Haywood County Tax Administration records, the property is currently owned by Clifford Gould LLC. A review of historic aerial photographs showed that the property was developed in the 1950's. Haywood County Tax Administration records indicate that the former restaurant building was built in 1948 and the former auto repair shop was built in 1940. There is no Facility I.D. Number associated with the property. There is an Incident Number (41466) associated with this property.

The former auto-repair shop had been partially demolished at the time of our assessment work. The garage bays had been demolished and the auto lifts and other auto repair equipment remained scattered around the building footprint. A fence had been erected around the building. Four one-inch monitoring well vaults were observed in the area surrounding this structure. A damaged, two-inch monitoring well was also observed on the property. The vault cover was missing, the PVC pipe was broken and the vault was filled with soil and debris. This well was east of the restaurant building along North Main Street (Figure 11).

Seramur and Associates personnel spoke with a few locals during our assessment work and they indicated that the restaurant building had many code violation issues and has been vacant for

many years. During our drilling work on October 24<sup>th</sup>, 2018, the property manager made a site visit and gave us a summary of the site history. He indicated that the restaurant building would be difficult to bring up to code due to the state that it was in at the time of its closure. Another local was aware that the basement had flooded with sewage in the past.

The property manager informed us that the auto-repair shop was partially demolished after a truck crashed into the building. In April, 2018, a man had a medical issue while driving through the intersection east of the building. He lost control of his vehicle and crashed into the south side of the building. After this incident, the property owner and occupants determined the property had become too much trouble to deal with and turned it over to an insurance company to handle.

The property manager also informed us during his visit that the auto-repair shop formerly operated as a Phillips 66 fuel station in the mid 1900's. The station operated prior to NCDEQ UST regulations and the tanks were never registered. The property manager was not aware of exactly when the tanks were removed.

Seramur and Associates personnel was able to obtain the latest sampling results from the groundwater incident associated with the property. This included some laboratory reports from soil sampling as well as groundwater analysis from monitoring well sampling. These analytical results indicated that groundwater at the site contains petroleum constituents above the NCDEQ Groundwater Standards. A Notice of Residual Petroleum was placed on the deed to the property and a Notice of No Further Action was also issued (Appendix C).

Two buckets of oil were observed on the property near the northeast parcel corner where the traffic signal box is located (Plate 2). These had overflowed in the recent rains and a puddle of oil formed on the pavement. Seramur & Associates personnel called the Town of Waynesville to inform them of the situation. The Town of Waynesville sent over a police officer who contacted the last occupants of the auto-repair shop. The occupants arrived on site and transferred the oil into the ASTs on the west side of the building. They did not clean up the puddle of oil that had spilled onto the asphalt.

Seramur and Associates personnel made a pedestrian reconnaissance of the property during the initial site visit on September 25, 2018. A storage shed is located at the northwest corner of the property. This shed appears to have been used to store materials for the restaurant. Several buckets of "Quick Dry Rinse Aid" were observed in the shed. The material safety data sheet on one of these buckets described the material as C10-C16 ethoxylated alcohol (Plate 3).

The proposed work area was marked with white paint for utility locating purposes. A utility locate request was initiated with the North Carolina 811 system on October 14, 2018, approximately one week before commencing with drilling.

**2.2 Plates 1, 2 and 3 – Photos of Parcel #008**

**Plate 1 - Photos of Parcel #008 (10/10/18)**



1. Tools and equipment left outside of the remnants of the auto-repair shop at Parcel #008.

2. Building footing and remaining half of building at Parcel #008. Former restaurant building visible in background.



3. View along north side of property from the northwest corner.

**Plate 2 - Photos of Parcel #008 (10/10/18)**



1. Buckets of oil at the northeast property corner near the traffic signal. Oil has spilled from both buckets after overflowing during rain event.



2. Magnetic anomaly A near reported location of former heating oil UST off west corner of building. Natural gas line runs into building to the north of this anomaly .



3. Magnetic anomaly C north of the auto-repair shop. Appears to be a utility under newer pavement.

**Plate 3 - Photos of Parcel #008 (10/10/18)**



1. View of west side of Parcel #008 showing the back of the restaurant building. Location of magnetic anomalies A & B are shown.



2. Storage shed along western property boundary. Inset A shows one of the buckets stored in the building. Inset B shows MSD sheet for buckets



3. Stream at bridge abutment showing storm water drain (lower right) and PVC utility line that extend onto the property. Bridge abutment forms the northwest footing of the storage shed.

## **2.3 Geophysical Surveys**

Seramur & Associates set up seven grids for a geophysical survey at Parcel #008 (Figures 4 through 7). Grid 1 ran along the northeast side of the former restaurant building, perpendicular to North Main Street. Grid 2 extended from the northeast corner of Grid 1, west of the former auto-repair shop, perpendicular to Walnut Street. Grid 3 was located west of Grid 2 off of the northwest side of the former restaurant building. Grid 4 was located off the west corner of the former restaurant building, approximately parallel to Marshall Street. Grid 5 was located off of the southwest side of the former restaurant building continuing off of the south side of Grid 4. Grid 6 was located off of the southeast side of the building running parallel to North Main Street. Grid 7 was located in the northeast corner of the property near the light pole and utility boxes. The GPR and magnetometer were used to survey areas outside of the two grids that were areas of possible concern on the property. Geophysical data were collected along transects at a 2-foot spacing.

The Magnetometer survey was completed with a MF-1 Fluxgate magnetometer. The MF-1 Fluxgate magnetometer is designed to measure changes in the Earth's magnetic field associated with larger ferrous objects. It does not respond to smaller objects such as nails or wire, but responds well to variations in the Earth's magnetic field produced by manholes, steel pipe, buried drums and tanks. The sensitivity level is well suited for detecting buried USTs at commercial and industrial facilities. Magnetometer data was compiled in an Excel spreadsheet and a contour map with hill shade was drafted using Golden Software's Surfer® modeling program (Figure 4).

A Ground Penetrating Radar (GPR) survey was completed across the grids using Geophysical Survey Systems, Inc. 400 MHz antenna and a SIR-3000 Single Channel Data Acquisition System with a calibrated survey wheel. The GPR data was downloaded and saved onto a computer. The GPR grid data has been processed and modeled using GPR Slice® software. The GPR data processing included adjusting time zero, completing a background removal and adjusting the time variable gain to enhance deep reflections. Additional GPR transects (e.g. across magnetic anomalies) collected during our survey of the property were processed using Radan® software.

Three-dimensional models of the GPR grid data were produced with the GPR Slice® software. Three time slices (or depth slices) were imaged in each of the two grids at depths of 0.3 to 0.8 feet, 1.3 to 1.9 feet and 3.2 to 3.7 feet (Figures 6 through 8). Each depth slice is a horizontal slice or plan view of the reflections across a 0.5 to 0.6-foot thickness of the subsurface. For example, the shallow GPR depth slices for Grids 1 through 7 show reflections in the radar data between depths of 0.3 and 0.8 feet.

## **2.4 Soil Sampling and Analyses**

Carolina Soil Investigations, LLC mobilized to the site on October 24<sup>th</sup>, 2018 to drill Geoprobe borings and collect soil samples. Our project design called for collecting a shallow and deep soil sample from each boring (Figure 3). The purpose of collecting samples at a depth of ~3.0 feet is



to test for petroleum releases related to surface spills and releases from product lines. The purpose of collecting samples at a depth of ~9.0 feet is to test for petroleum releases related to underground storage tanks. Soil samples were collected at other depths within the Geoprobe cores if soil staining or petroleum vapors were observed or if limited core recovery occurred. Soil borings were drilled across the property with a particular focus on areas thought to be more likely to contain petroleum impacted soil (Figure 3).

A track-mounted Geoprobe rig was used to drill a total of twenty-seven (27) soil borings. A new pair of Nitrile gloves was worn while collecting each soil sample. A representative portion of each soil sample was placed in a zip lock bag and allowed to rest for a period of time to allow volatile vapors to accumulate in the headspace of the bag. A calibrated Photoionization detector (PID) was used to screen the headspace in each bag and the concentration of volatile petroleum vapors was measured and recorded (Table 1). The texture and type of soil material in the Geoprobe cores was described and recorded. Table 1 lists the soil boring data including sample number, depth, PID reading, lithology and type of soil material.

Samples were collected and shipped on ice to REDLab, LLC, in Wilmington, NC for laboratory analyses. REDLab analyzed the soil samples for petroleum constituents by Ultra-Violet Fluorescence using a QED HC-1 analyzer. The analytical results are reported as Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) and Total Petroleum as Hydrocarbons (TPH). REDLab provides a hydrocarbon spectrum with each of the sample results. This spectrum is used for a tentative identification of the type of hydrocarbon detected by the analytical method. A hydrocarbon fingerprint is interpreted by REDLab for each sample using a library search of spectra for known hydrocarbon types and concentrations. The laboratory reports and fingerprint spectra are included in Appendix B.

### **3.0 Results of Investigation**

Parcel #008 contains a former restaurant building near the center of the property and a former auto-repair shop near the northeast corner of the property. The former auto-repair shop building has been partially demolished after a truck crashed into the building. A groundwater incident (#41466) has been issued for this site. A Notice of Residual Petroleum has been placed on the deed to the property and a Notice of No Further Action has been issued (Appendix C).

#### **3.1 Geophysical Surveys**

##### **Magnetometer Survey**

Two small magnetic anomalies were detected in Grid 2 (Figure 5). These were localized anomalies and the GPR profiles did not show reflection characteristics typical of a UST. One small magnetic anomaly was detected in Grid 3 (Figure 5). This was also a localized anomaly. The GPR profiles show an area of soil disturbance at this location and the reflection characteristics are not typical of a UST.

Two magnetic anomalies were detected in Grid 4. Anomaly A was detected at the reported

location of a former heating oil UST. The property manager had stated that the UST was removed and we could identify the former location by the patched asphalt. This anomaly appeared smaller than what would be expected for a UST. Access to the GPR was limited as the anomaly was partially located under a sidewalk that ran along the building. Two perpendicular GPR profiles were collected across Anomaly A (Figure 5). These show a distinct set of reflections indicating some type of reflective material. It is possible that the GPR and magnetometer are picking up remnant piping and asphalt or concrete dumped into the heating oil UST excavation. It is also possible that a heating oil UST remains under the sidewalk. The 2.4-2.9 GPR depth slice shows a reflection at this location that could represent a UST (Figure 5).

Anomaly B was located in the northwestern portion of the parcel near the edge of the parking lot. This anomaly was larger, but the GPR profiles do not show reflection characteristics typical of a UST. This anomaly appears to be a point reflector on the GPR profiles and the 1.1-1.6 foot GPR depth slice (Figure 5).

Several small magnetic anomalies were detected in Grid 7 (Figure 5). These were localized anomalies and the GPR profiles did not show reflection characteristics typical of a UST. This area appears disturbed on the GPR profiles. This was also the location of some of the highest concentrations of petroleum constituents detected in soil samples. The magnetic anomalies detected in Grid 7 are interpreted to be remnant infrastructure from the former UST system on Parcel #008.

Two magnetic anomalies (C & D) were recorded outside of our grid locations (Figure 5). GPR Profiles 1 and 2 were collected across anomaly C (Figure 4). GPR Profile 1 shows a hyperbola that could be interpreted as a UST, but Profile 2 shows that this reflector is too small to be a UST (Figure 9). There is an irregular shaped asphalt patch at this location and the water line runs along this side of the road. This anomaly is interpreted to be related to a utility.

GPR Profiles 3 and 4 were collected across Anomaly D (Figure 4). These profiles show evidence of soil disturbance but no reflections characteristic of a UST (Figure 9).

### **Shallow GPR Depth Slice**

The 0.3-0.8 GPR depth slices shows an electric line extending across Grid 6 between the restaurant building a sign (Figure 6). This is about the only buried infrastructure that can be seen in these depth slices.

### **Intermediate GPR Depth Slice**

The 1.3-1.9 GPR depth slices show utility lines extending across Grids 2, 5 and 6 (Figure 7).

### **Deep GPR Depth Slice**

The 3.2-3.7 GPR depth slices show a couple of high amplitude reflections in Grid 7, but these reflections are between the magnetic anomalies detected in this grid (Figure 7). The high

amplitude reflection at magnetic anomaly A in Grid 4 can be seen adjacent to the restaurant building in these depth slices.

Two GPR profiles (P5 and P6) were collected around the former auto repair shop (Figure 4). These profiles did not show any reflections characteristic of a UST (Figure 9).

### **3.2 Soil Borings, Sampling and Laboratory Results**

The soil type at Parcel #008 consisted of a fill material, saprolite and alluvium. The lithologies were primarily sandy silt and silty sand. Some cores were gravelly (Table 1). Cross-sections A-A' through E-E' show interpretations of the lithology and locations of soil borings (Figures 12-14). Groundwater was not encountered in any of the soil borings, though some of the cores contained moist soil.

Borings B-31 through B-41 were drilled in a circular, counter-clockwise direction around the auto-repair building. The soil sample collected near the AST system was collected just east of Boring B-37 on the west side of the building. Borings B-42 through B-46 were drilled between the two buildings from the north side of the property to the south. Boring B-46 was drilled to the west of Boring B-45. Boring B-47 was drilled just off of the north corner of the restaurant building. Boring B-48 was drilled north of B-47 near the telephone pole and water meter along Walnut Street. Borings B-49 through B-51 were drilled in the parking area northwest of the restaurant building. Boring B-52 was drilled adjacent to the storage shed on the far west side of the property near the creek. B-53 was drilled in the reported location of a former heating oil UST and B-54 was drilled west of this to delineate the contamination discovered in B-53. Borings B-55 and B-56 were drilled southwest of the restaurant building. Finally, Boring B-57 was drilled east of the restaurant building to the north of the landscape area that holds the remnants of the restaurant business sign.

The PID detected elevated concentrations of petroleum vapors (>50 ppm) in seven of the 27 Geoprobe cores (Table 1). Petroleum constituents were detected in all but six of the 55 soil samples sent to the laboratory (Table B-3). Petroleum constituents were detected above the NCDEQ Action Levels for GRO and/or DRO constituents (50 ppm and 100 ppm, respectively) in soil samples S-61, S-64, S-65, S-67, S-69, S-71, S-74, S-78 and S-106 (Table B-3). Soil sample S-61 was collected from Boring B-31. Samples S-64 and S-65 were collected from Boring B-34. Sample S-67 was collected from Boring B-33. Sample S-69 was collected from Boring B-35 and Sample S-71 was collected from Boring B-36. Sample S-74 was the surficial sample collected under the AST system. Sample S-78 was collected from Boring B-39 and

These borings were drilled around the former gas station auto repair shop. The only area of shallow contamination detected was at boring B-34. This was probably drilled in the vicinity of the former dispenser islands. The former USTs were probably located on the east side of the former auto repair shop. We could not collect GPR grid data in this area because of fencing and equipment being stored there. We did survey the area with the magnetometer.

Sample S-106 was collected from Boring B-53 (Figure 3). This was collected in the vicinity of the former heating oil UST.

### 3.3 Volume and Extent of Soil Contamination

Contaminated soil defined as GRO concentrations above 50 ppm and DRO concentrations above 100 ppm was detected in soil samples collected at Parcel #008. The sources of this soil contamination are suspected to be the UST systems that previously operated at this facility as well as the AST system which is still in place.

An estimate of the volume of contaminated soil in the vicinity of borings B-31, B-33, B-34, B-35 B-36, B-39 and the surficial sample collected from under the ASTs can be calculated using an estimated average thickness of contaminated soil and the horizontal extent (Figure 9). Soil contamination was detected in both the shallow and deep soil samples only in boring B-34. Other borings had contamination in only the deep sample and the AST sample was collected between a depth of 0.0 feet and 0.2 feet. Therefore, an estimated average soil contamination thickness of five feet will be used in our calculations. The area of contaminated soil is approximately 6,050 square feet (Figure 11). The estimated volume of contaminated soil in this area is calculated as follows:

$$\begin{aligned} 5 \text{ ft.} \times 6,050 \text{ ft}^2 &= 30,250 \text{ ft}^3 \\ 30,250 \text{ ft}^3 / 27 \text{ ft}^3/\text{yd}^3 &= 1,120.4 \text{ yd}^3 \\ 1,120.4 \text{ yd}^3 \times 1.5 \text{ tons}/\text{yd}^3 &= 1,680.6 \text{ tons} \end{aligned}$$

An estimate of the volume of contaminated soil in the vicinity of boring B-53 can be calculated using an estimated average thickness of contaminated soil and the horizontal extent (Figure 9). Soil contamination was detected in only the deep soil sample from boring B-53. This boring was drilled in the location of a former heating oil UST and we estimate that the base of the tank was about five feet below the ground surface. Therefore, an estimated soil contamination thickness of five feet will be used in our calculation. The area of contaminated soil is approximately 500 square feet (Figure 11). The estimated volume of contaminated soil in the vicinity of boring B-53 is calculated as follows:

$$\begin{aligned} 5 \text{ ft.} \times 500 \text{ ft}^2 &= 2,500 \text{ ft}^3 \\ 2,500 \text{ ft}^3 / 27 \text{ ft}^3/\text{yd}^3 &= 92.6 \text{ yd}^3 \\ 92.6 \text{ yd}^3 \times 1.5 \text{ tons}/\text{yd}^3 &= 138.9 \text{ tons} \end{aligned}$$

In total, Seramur & Associates estimates that 1,213 cubic yards or approximately 1,819.5 tons of contaminated soil would be encountered at the property to a depth of 10 feet. Approximate extent of soil contamination is interpreted throughout cross-sections A-A' and E-E' (Figures 12-14)

### **3.4 Conclusions**

The heating oil UST behind the restaurant was reportedly removed and the asphalt in this area has been patched. However, the geophysical survey did detect Magnetic anomaly A in Grid 4 adjacent to the reported UST location. GPR profiles show reflection characteristics that could be interpreted as a UST. The GPR depth slices show an anomaly of the size and shape of a buried UST. The magnetic anomaly and GPR reflections could be related to debris placed in the excavation or could be a UST. Based on the NCDOT UST Level of Confidence ranking, the evidence would indicate that this should be considered a “possible UST”.

The property manager informed us that the auto-repair shop formerly operated as a Phillips 66 gas station. Contaminated soil defined as GRO/DRO concentrations above NCDEQ Action Levels was detected in eight borings around the auto repair shop. Shallow soil contamination was detected under the existing ASTs and in the vicinity of Boring B-34. Contaminated soil was also detected in the vicinity of a former heating oil UST. The total volume of contaminated soil detected at Parcel #008 is estimated to be 422.2 yd<sup>3</sup> or 633.3 tons. There is an estimated 1,213 cubic yards or 1,819.5 tons of contaminated soil below the pavement at Parcel #008.

Four 1-inch monitoring wells are located on Parcel #008. One damaged 2-inch monitoring well is located on the property. Groundwater was not encountered above 10 feet at the property. Groundwater should not be encountered during the proposed construction.

### **3.5 Recommendations**

SAPC recommends that the possible UST adjacent to the restaurant building be investigated further. If a UST is confirmed at this location, then a licensed engineer or geologist should supervise the UST closure.

Contaminated soil was detected at a depth of 3.0 feet in boring B-34. A drop inlet and 15” RCP storm drain is shown on the CAD files adjacent to Boring B-34. Contaminated soil was detected in a surface sample below the existing ASTs. These areas of contaminated soil will be encountered during grading activities and installation of the storm drain.

Contaminated soil around the ASTs covers an area of 300 ft<sup>2</sup>. The upper foot of soil should be removed from this location. Contaminated soil around the proposed storm drain extends across an area of about 180 ft<sup>2</sup>. Contaminated soil will need to be excavated to a depth of about 3 feet in this area. The total volume of contaminated soil that needs to be removed in order to safely complete grading and install the storm drain is estimated to be about 30 yards.

SAPC recommends that a licensed geologist or engineer supervise the excavation and removal of contaminated soil in the vicinity of boring B-34 and the ASTs. This work could be completed at the same time that the possible UST is investigated. Contaminated soil removed from Parcel #008 should be sent to a remediation facility.

SAPC recommends that a licensed well driller properly abandon the four 1-inch monitoring wells and the damaged 2-inch monitoring well at Parcel #008.

## **Appendix A**

### **Tables and Figures**

Table 1. Soil Boring Data - Parcel #008 - Clifford Gould LLC Property						
Boring No.	Depth (ft)	Lithology	Soil type	Soil Sample	PID ppm	Comments
B-31	0.0 to 5.0	Sandy Silt	Saprolite	S-60	0.0	Sample at 3.0 feet.
B-31	5.0 to 10.0	Sandy Silt	Saprolite	S-61	633.0	Sample at 9.5 feet.
B-32	0.0 to 5.0	Sandy Silt	Saprolite	S-62	0.0	Sample at 3.0 feet.
B-32	5.0 to 10.0	Sandy Silt	Saprolite	S-63	0.2	Sample at 9.0 feet.
B-33	0.0 to 5.0	Silty Sand	Alluvium	S-66	3.3	Sample at 2.5 feet.
B-33	5.0 to 10.0	Silty Sand	Alluvium	S-67	149.0	Sample at 8.0 feet.
B-34	0.0 to 5.0	Silty Sand	Alluvium	S-64	832.4	Sample at 3.0 feet.
B-34	5.0 to 10.0	Silty Sand	Alluvium	S-65	864.0	Sample at 9.0 feet.
B-35	0.0 to 5.0	Sandy Silt	Alluvium	S-68	14.0	Sample at 2.5 feet.
B-35	5.0 to 10.0	Sandy Silt	Alluvium	S-69	128.6	Sample at 9.0 feet.
B-36	0.0 to 5.0	Sandy Silt	Alluvium	S-70	5.1	Sample at 2.0 feet.
B-36	5.0 to 10.0	Sandy Silt	Alluvium	S-71	490.1	Sample at 9.0 feet.
B-37	0.0 to 5.0	Sandy Silt with gravel	Fill	S-72	0.0	Sample at 2.0 feet.
B-37	5.0 to 10.0	Sandy Silt	Fill	S-73	16.4	Sample at 8.0 feet.
N/A	0.0 to 0.2	Silty Sand	Fill	S-74	0.0	Sample collected from under oil ASTs. No boring, collected by hand.
B-38	0.0 to 5.0	Sandy Silt	Fill	S-75	27.9	Sample at 2.0 feet.
B-38	5.0 to 10.0	Silty Sand	Alluvium	S-76	121.5	Sample at 8.0 feet.
B-39	0.0 to 5.0	Silty Sand with gravel	Fill	S-77	0.0	Sample at 2.5 feet.
B-39	5.0 to 10.0	Silty Sand	Alluvium	S-78	183.2	Sample at 8.0 feet.
B-40	0.0 to 5.0	Silty Sand	Saprolite	S-79	15.2	Sample at 3.0 feet.
B-40	5.0 to 10.0	Silty Sand	Saprolite	S-80	13.2	Sample at 9.0 feet.
B-41	0.0 to 5.0	Sandy Silt	Fill	S-81	3.6	Sample at 3.0 feet.
B-41	5.0 to 10.0	Sandy Silt	Fill	S-82	0.2	Sample at 8.0 feet.
B-42	0.0 to 5.0	Sandy Silt	Alluvium	S-83	0.1	Sample at 3.0 feet.
B-42	5.0 to 10.0	Sandy Silt	Alluvium	S-84	0.4	Sample at 8.0 feet.
B-43	0.0 to 5.0	Silty Sand with gravel	Fill	S-85	0.0	Sample at 1.5 feet.
B-43	5.0 to 10.0	Sandy Silt	Alluvium	S-86	0.2	Sample at 9.0 feet.
B-44	0.0 to 5.0	Silty Sand	Fill	S-87	0.0	Sample at 2.0 feet.
B-44	5.0 to 10.0	Sandy Silt	Alluvium	S-88	0.0	Sample at 7.0 feet.
B-45	0.0 to 5.0	Silty Sand	Fill	S-89	0.0	Sample at 3.0 feet.
B-45	5.0 to 10.0	Sandy Silt	Alluvium	S-90	0.3	Sample at 8.0 feet.
B-46	0.0 to 5.0	Sandy Silt	Fill	S-91	0.2	Sample at 2.0 feet.
B-46	5.0 to 10.0	Silty Sand	Alluvium	S-92	0.0	Sample at 9.0 feet.
B-47	0.0 to 5.0	Sandy Silt	Fill	S-93	0.0	Sample at 2.0 feet.
B-47	5.0 to 10.0	Silty Sand	Alluvium	S-94	0.0	Sample at 9.0 feet.
B-48	0.0 to 5.0	Silty Sand	Fill	S-95	0.3	Sample at 2.0 feet.
B-48	5.0 to 10.0	Sandy Silt with gravel	Fill	S-96	0.0	Sample at 9.0 feet.
B-49	0.0 to 5.0	Silty Sand	Fill	S-97	0.0	Sample at 2.5 feet.
B-49	5.0 to 10.0	Sandy Silt with gravel	Fill	S-98	0.1	Sample at 9.0 feet.
B-50	0.0 to 5.0	Silty Sand with gravel	Fill	S-99	0.0	Sample at 3.0 feet.
B-50	5.0 to 10.0	Silty Sand with gravel	Fill	S-100	0.0	Sample at 9.0 feet.
B-51	0.0 to 5.0	Silty Sand	Fill	S-101	0.0	Sample at 2.5 feet.
B-51	5.0 to 10.0	Silty Sand with gravel	Fill	S-102	0.0	Sample at 9.0 feet.
B-52	0.0 to 5.0	Silty Sand	Alluvium	S-103	0.0	Sample at 3.0 feet.
B-52	5.0 to 10.0	Sandy Silt	Alluvium	S-104	0.2	Sample at 8.5 feet.
B-53	0.0 to 5.0	Sandy Silt	Fill	S-105	0.0	Sample at 2.0 feet.
B-53	5.0 to 10.0	Sandy Silt	Fill	S-106	0.0	Sample at 9.0 feet.
B-54	0.0 to 5.0	Sandy Silt	Fill	S-107	0.4	Sample at 2.0 feet.
B-54	5.0 to 10.0	Silty Sand	Alluvium	S-108	0.0	Sample at 9.0 feet.
B-55	0.0 to 5.0	Silty Sand	Fill	S-109	0.1	Sample at 3.0 feet.
B-55	5.0 to 10.0	Sandy Silt	Alluvium	S-110	0.2	Sample at 7.0 feet.
B-56	0.0 to 5.0	Silty Sand	Fill	S-111	0.1	Sample at 1.5 feet.
B-56	5.0 to 10.0	Silty Sand	Fill	S-112	0.2	Sample at 8.0 feet.
B-57	0.0 to 5.0	Sandy Silt	Fill	S-113	0.0	Sample at 2.5 feet.
B-57	5.0 to 10.0	Silty Sand	Saprolite	S-114	0.2	Sample at 9.0 feet.

**Table B-3: Summary of Soil Sampling Results**

Revision Date: 10/26/18

Incident Number and Name: 41466, Clifford Gould LLC Property

Parcel ID#: 008

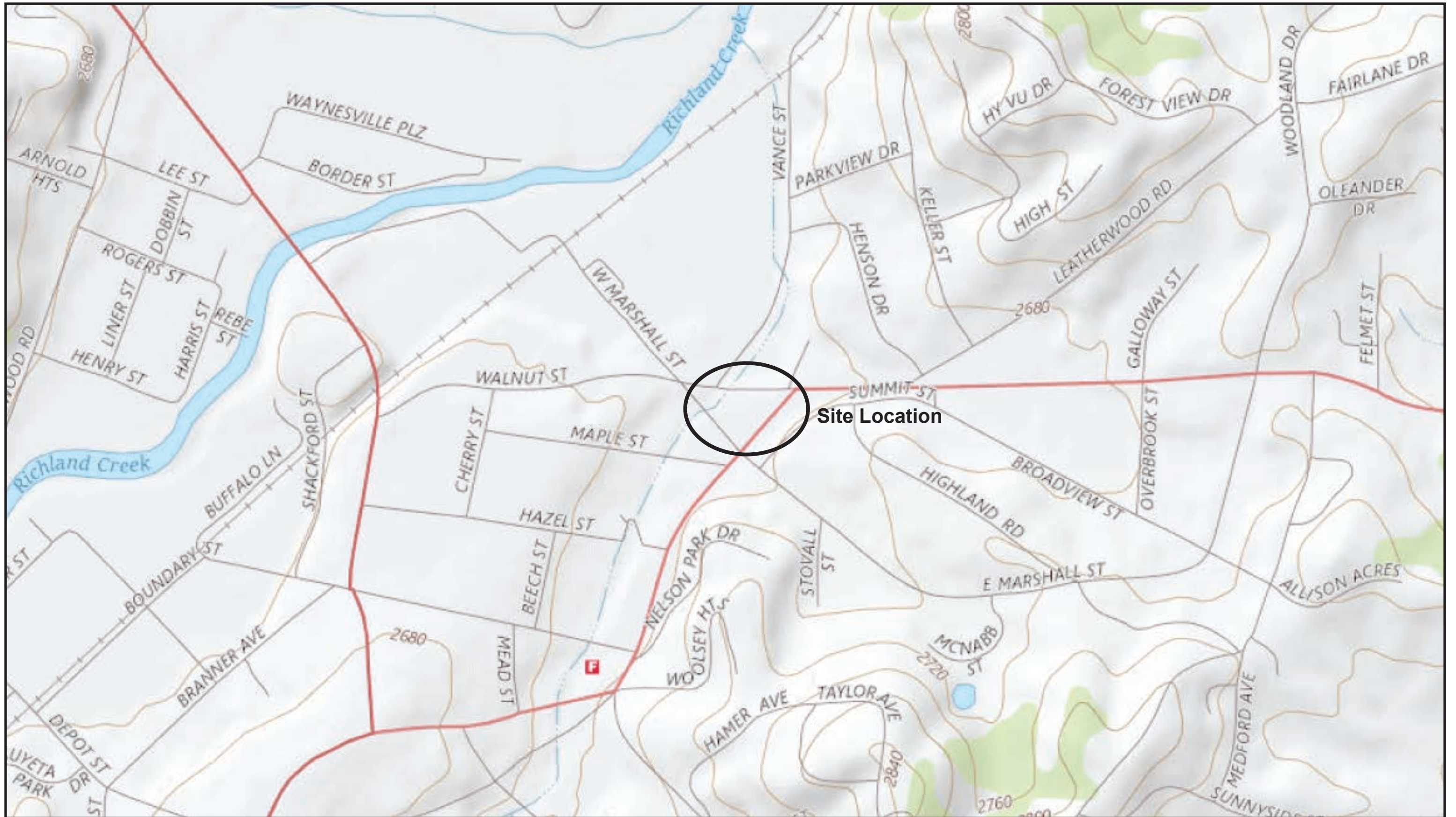
Analytical Method (e.g., VOC by EPA 8260) →					UVF	UVF
Contaminant of Concern →					TPH GRO (mg/kg)	TPH DRO (mg/kg)
Sample ID	Date Collected (mm/dd/yy)	Source Area	Sample Depth (ft. BGS)	Incident Phase		
S-60	10/24/18	B-31	3.0	PSA	<0.65	<0.26
S-61	10/24/18	B-31	9.5	PSA	<b>714.2</b>	<b>1,215</b>
S-62	10/24/18	B-32	3.0	PSA	<0.60	0.69
S-63	10/24/18	B-32	9.0	PSA	<0.57	2.7
S-64	10/24/18	B-34	3.0	PSA	<b>582.1</b>	<b>490.2</b>
S-65	10/24/18	B-34	9.0	PSA	<b>500</b>	<b>1,095</b>
S-66	10/24/18	B-33	2.5	PSA	<0.56	0.7
S-67	10/24/18	B-33	8.0	PSA	42.0	<b>174.1</b>
S-68	10/24/18	B-35	2.5	PSA	<0.64	6.5
S-69	10/24/18	B-35	9.0	PSA	<b>77.9</b>	<b>248.6</b>
S-70	10/24/18	B-36	2.0	PSA	<0.54	11.9
S-71	10/24/18	B-36	9.0	PSA	<b>290.5</b>	<b>893.3</b>
S-72	10/24/18	B-37	2.0	PSA	<0.58	11.1
S-73	10/24/18	B-37	8.0	PSA	<0.51	21.8
S-74	10/24/18	Oil ASTs	0.0 – 0.2	PSA	<87.6	<b>258.8</b>
S-75	10/24/18	B-38	2.0	PSA	<0.55	11.3
S-76	10/24/18	B-38	8.0	PSA	<0.55	23.9
S-77	10/24/18	B-39	2.5	PSA	<0.57	<0.23
S-78	10/24/18	B-39	8.0	PSA	<b>492.3</b>	<b>9,181</b>
S-79	10/24/18	B-40	3.0	PSA	<0.58	0.97
S-80	10/24/18	B-40	9.0	PSA	<0.53	<0.21
S-81	10/24/18	B-41	3.0	PSA	<0.56	4.7
S-82	10/24/18	B-41	8.0	PSA	<0.56	18.1
S-83	10/24/18	B-42	3.0	PSA	<0.52	1.3
S-84	10/24/18	B-42	8.0	PSA	<0.47	0.97
S-85	10/24/18	B-43	1.5	PSA	<0.60	17.0
S-86	10/24/18	B-43	9.0	PSA	<0.57	1.5
S-87	10/24/18	B-44	2.0	PSA	<0.59	33.6
S-88	10/24/18	B-44	7.0	PSA	<0.56	39.3
S-89	10/24/18	B-45	3.0	PSA	<0.55	<0.22
S-90	10/24/18	B-45	8.0	PSA	<0.58	3.1
S-91	10/24/18	B-46	2.0	PSA	<0.66	24.5
S-92	10/24/18	B-46	9.0	PSA	<0.21	<0.08
S-93	10/24/18	B-47	2.0	PSA	<1.8	92.0
S-94	10/24/18	B-47	9.0	PSA	<0.63	2.3
S-95	10/24/18	B-48	2.0	PSA	<0.56	2.9
S-96	10/24/18	B-48	9.0	PSA	<0.60	1.5
S-97	10/24/18	B-49	2.5	PSA	<0.77	1.1
S-98	10/24/18	B-49	9.0	PSA	<0.58	1.7
S-99	10/24/18	B-50	3.0	PSA	<0.69	0.33
S-100	10/24/18	B-50	9.0	PSA	<0.60	18.6
<b>NC DEQ Action Level (mg/kg)</b>					50	100


ft. BGS = feet below ground surface  
mg/kg =milligrams per kilogram

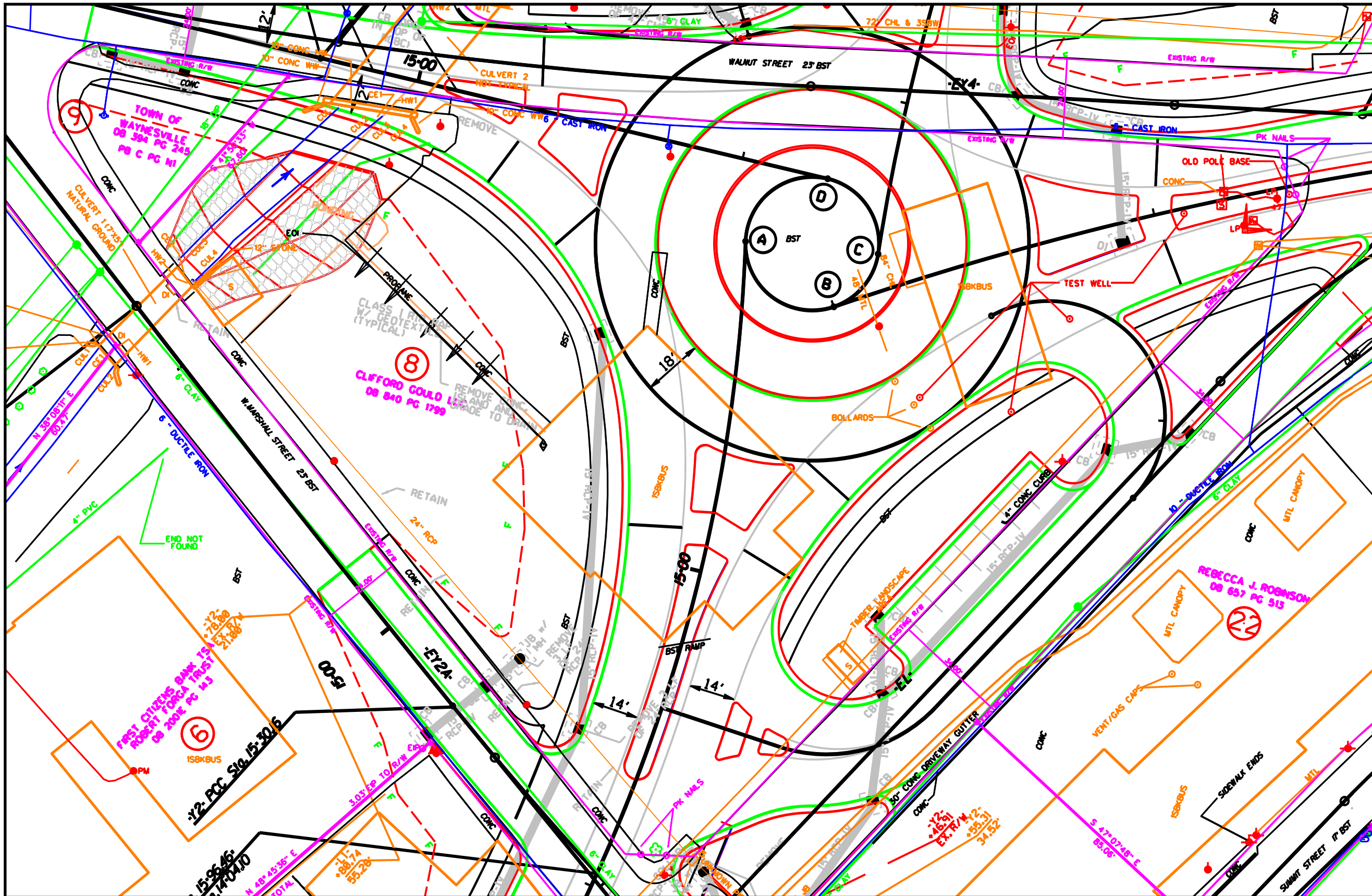


Analytical Method (e.g., VOC by EPA 8260) →					UVF	UVF
Contaminant of Concern →					TPH GRO (mg/kg)	TPH DRO (mg/kg)
Sample ID	Date Collected (mm/dd/yy)	Source Area	Sample Depth (ft. BGS)	Incident Phase		
S-101	10/24/18	B-51	2.5	PSA	<0.56	21.8
S-102	10/24/18	B-51	9.0	PSA	<0.55	8.9
S-103	10/24/18	B-52	3.0	PSA	<0.66	<0.26
S-104	10/24/18	B-52	8.5	PSA	<0.61	3.5
S-105	10/24/18	B-53	2.0	PSA	<0.58	19.1
S-106	10/24/18	B-53	9.0	PSA	<61.8	<b>10,102</b>
S-107	10/24/18	B-54	2.0	PSA	<0.92	58.4
S-108	10/24/18	B-54	9.0	PSA	<0.54	1.2
S-109	10/24/18	B-55	3.0	PSA	<0.58	8.5
S-110	10/24/18	B-55	7.0	PSA	<0.58	2.6
S-111	10/24/18	B-56	1.5	PSA	<0.58	3.2
S-112	10/24/18	B-56	8.0	PSA	<0.62	7.7
S-113	10/24/18	B-57	2.5	PSA	<0.67	2.8
S-114	10/24/18	B-57	9.0	PSA	<0.59	4.5
<b>NC DEQ Action Level (mg/kg)</b>					50	100

ft. BGS = feet below ground surface  
mg/kg = milligrams per kilogram



<p><b>Figure 1</b> Site Location Map Source: U.S.G.S. The National Map</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Clifford Gould LLC Property 783 N Main Street Waynesville, NC</p>	<p>Parcel #008 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>	<p>0 300 600 Feet</p> 
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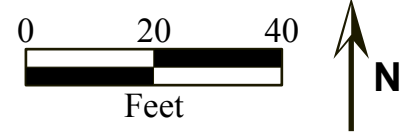
**Figure 2**  
Site Plan

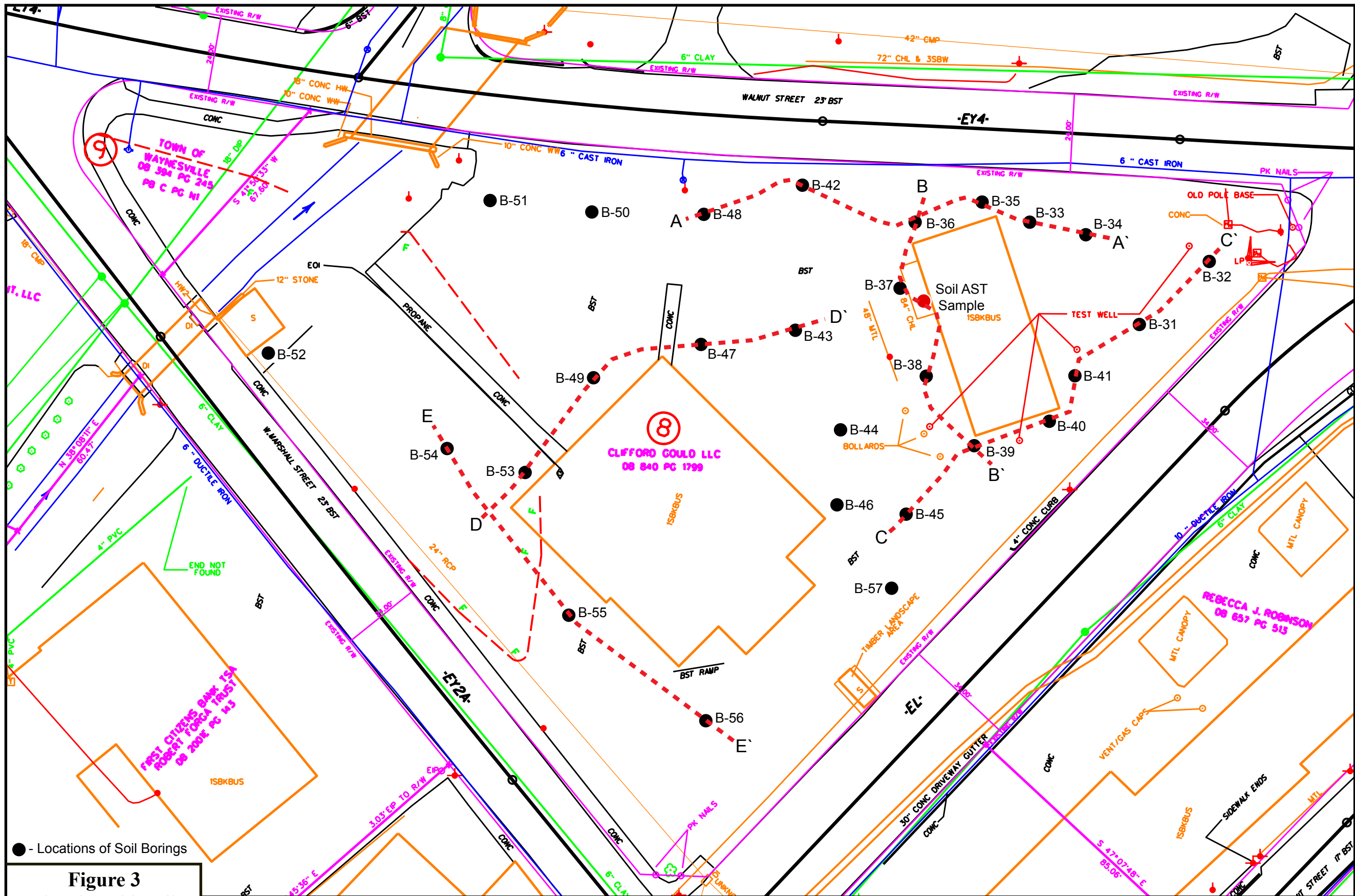
State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC





● - Locations of Soil Borings

**Figure 3**

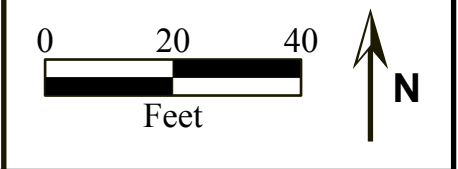
Site Plan with Soil Boring Locations and Approximate Cross-Section Locations

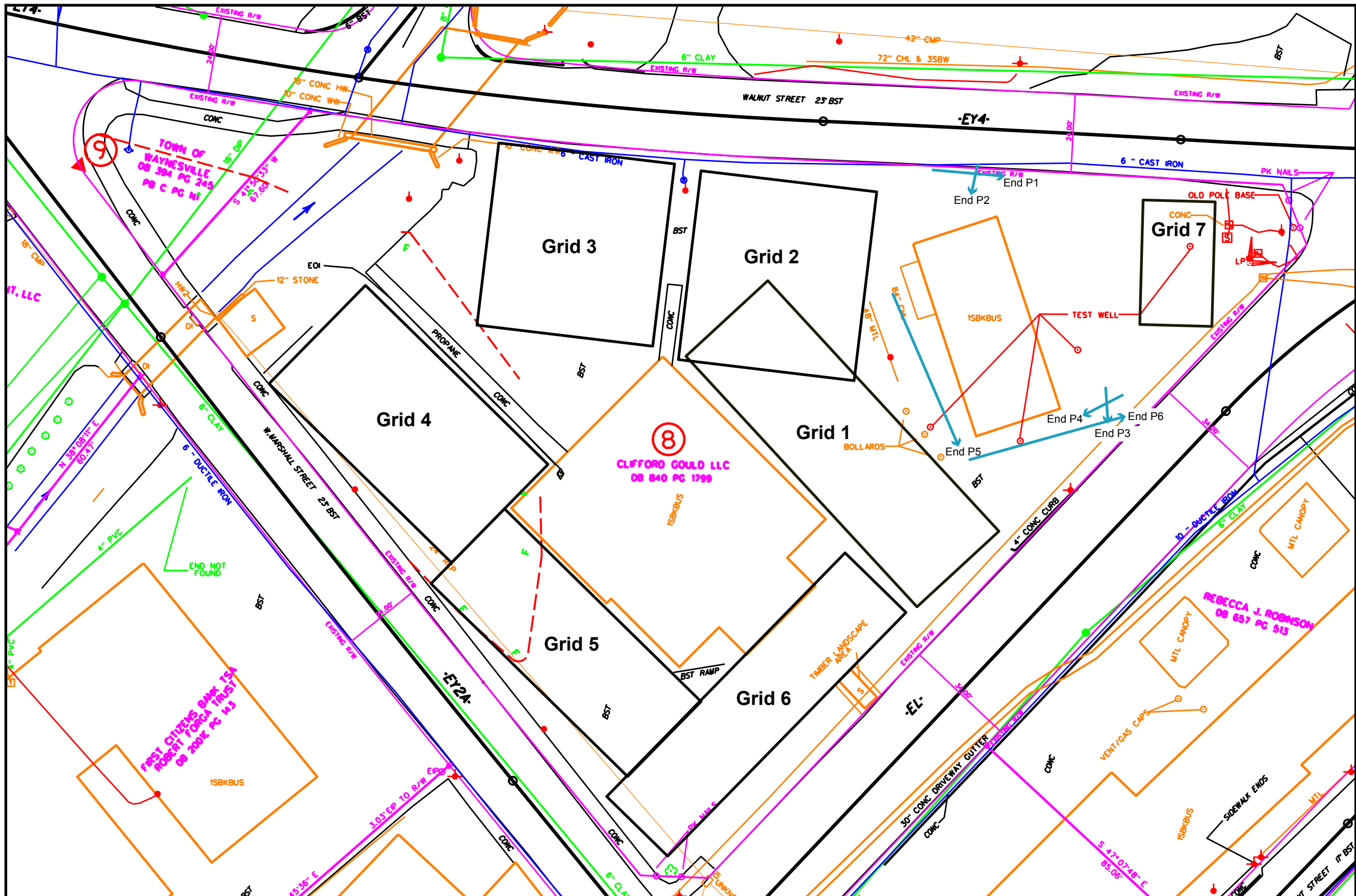
State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC





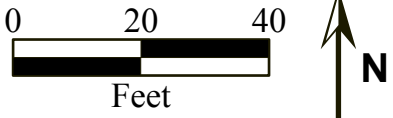
**Figure 4**  
 Site Plan with  
 Grid and GPR  
 Profile Locations

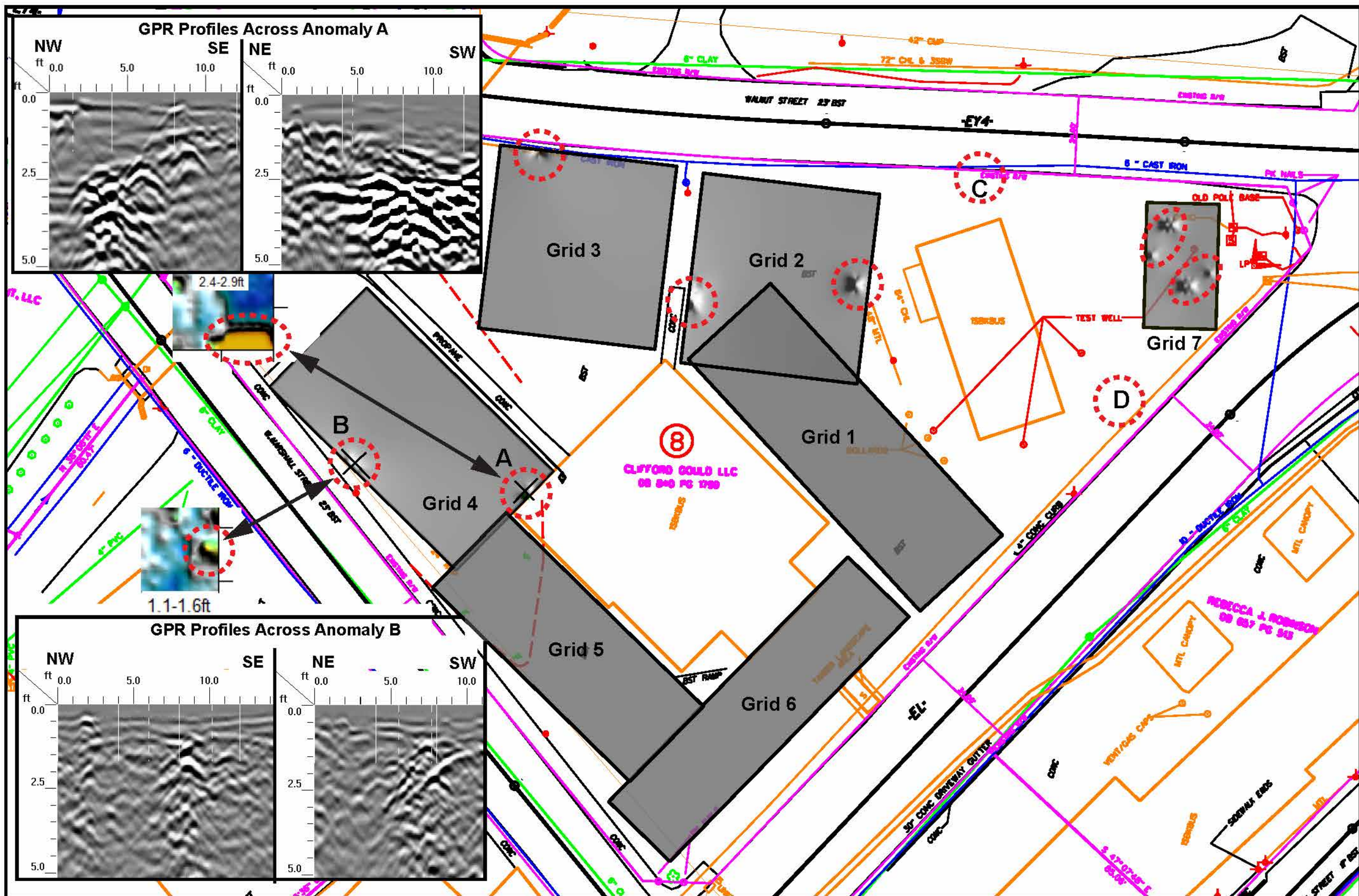
State Project: U-5888  
 Haywood County, NC

Clifford Gould LLC Property  
 783 N Main Street  
 Waynesville, NC

Parcel #008  
 Facility I.D.: N/A

Seramur & Associates, PC  
 Boone, NC





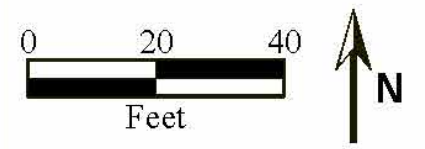
**Figure 5**  
Magnetometer  
Survey Results

State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC





**Figure 6**

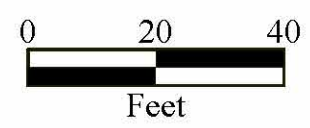
Shallow GPR  
Depth Slices  
(0.3 - 0.8 ft.)

State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC





**Figure 7**

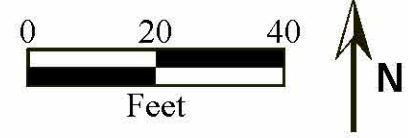
Intermediate GPR  
Depth Slices  
(1.3 - 1.9 ft.)

State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC







**Figure 8**

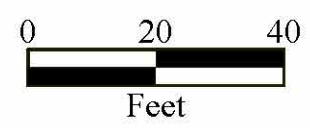
Deep GPR  
Depth Slices  
(3.2 - 3.7 ft.)

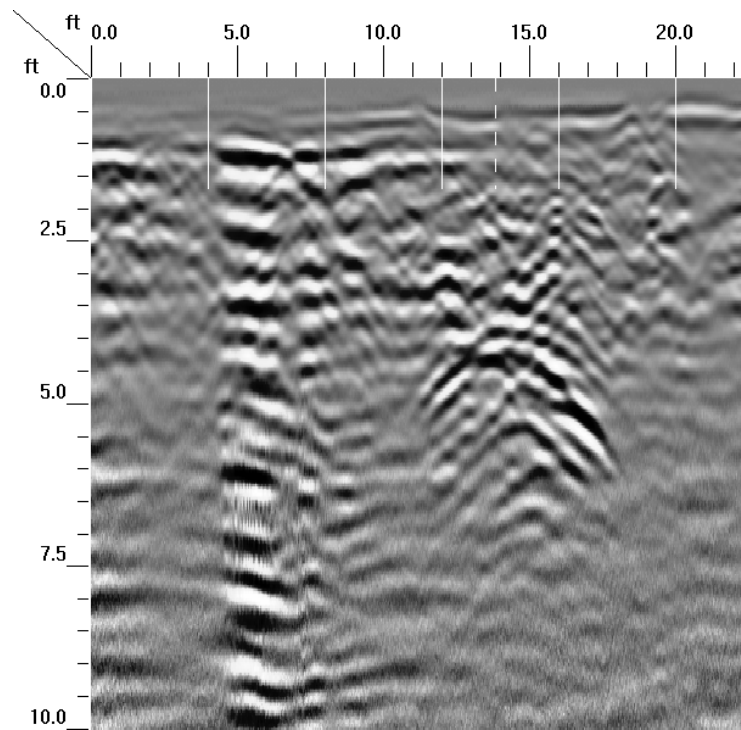
State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

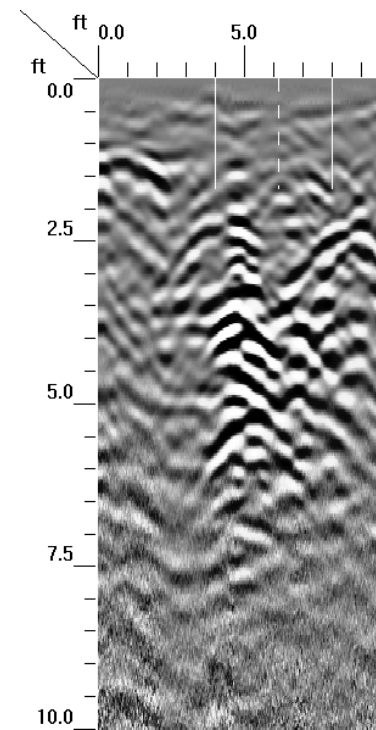
Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC

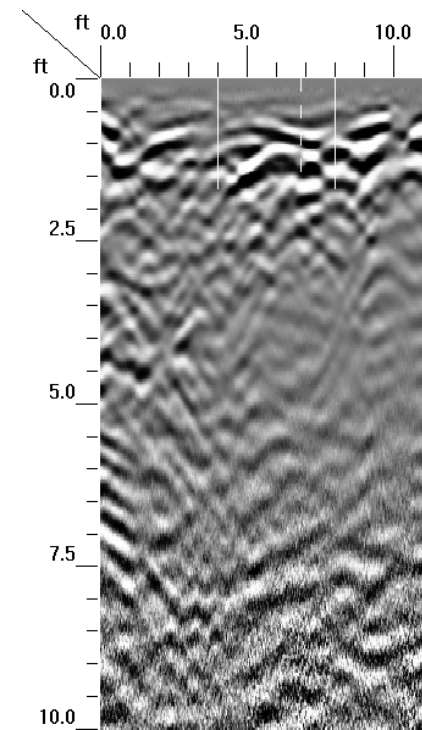




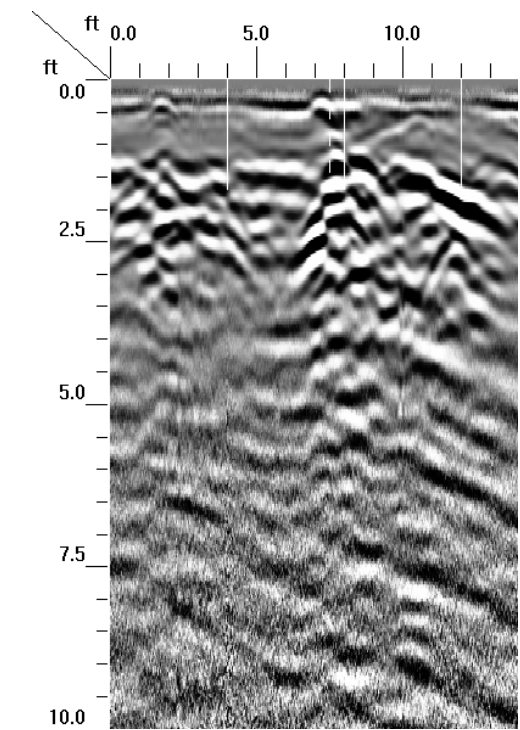
Profile 1



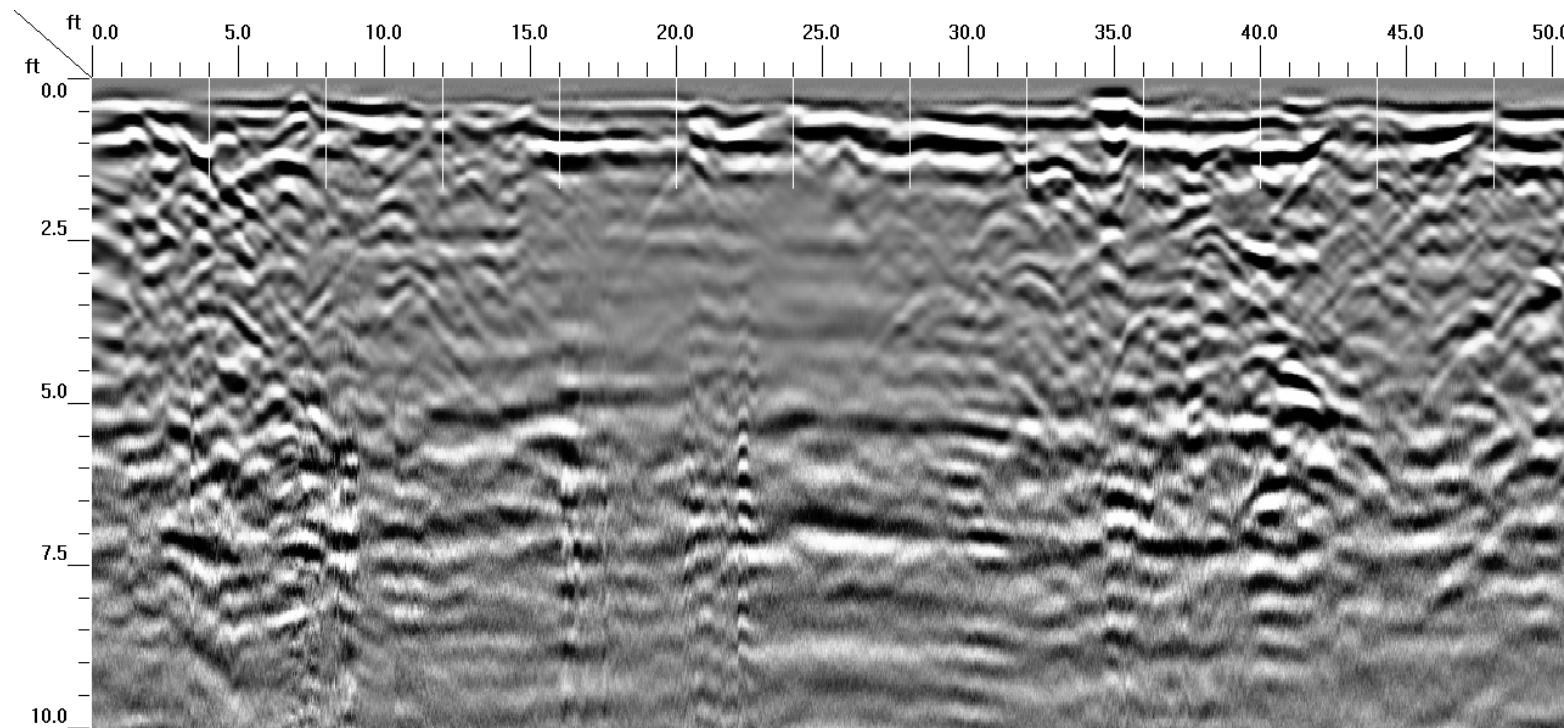
Profile 2



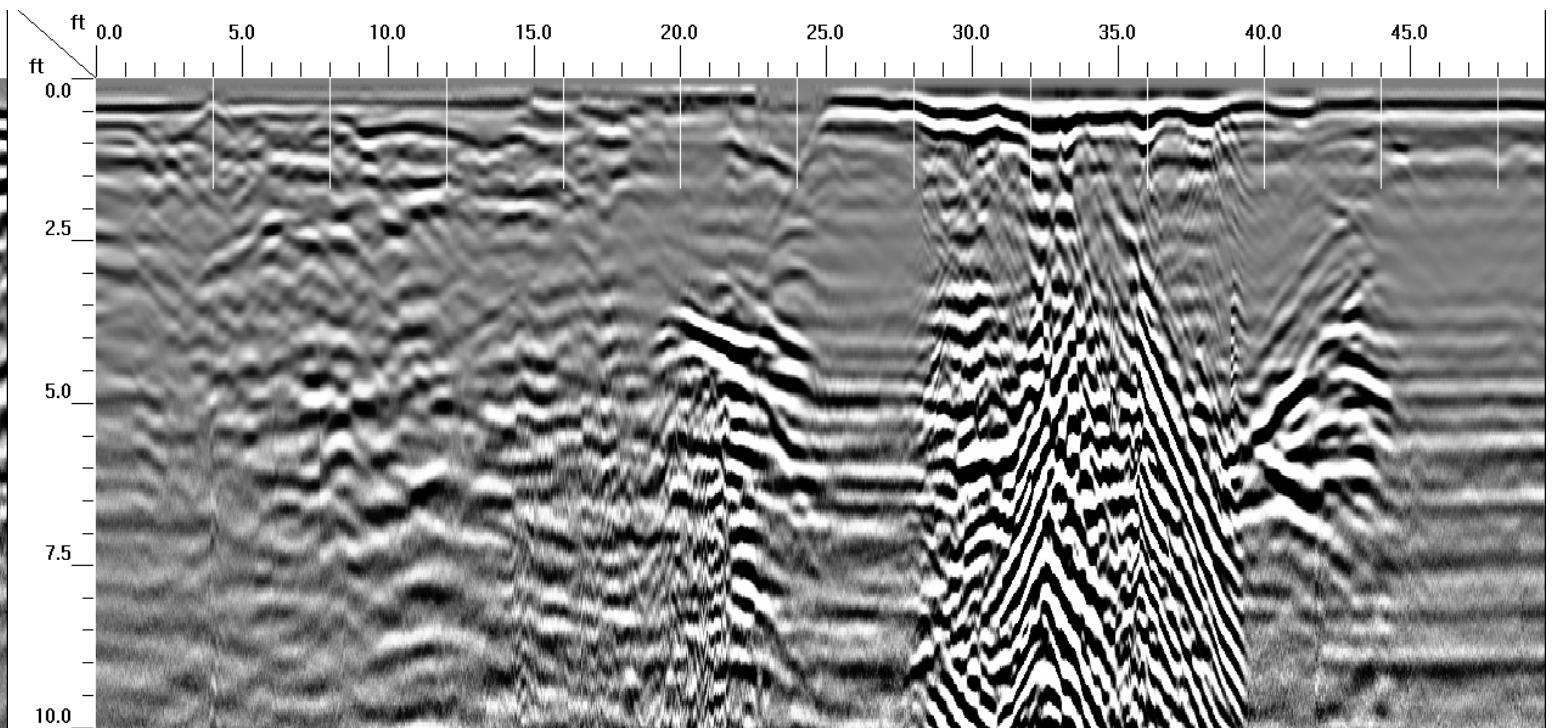
Profile 3



Profile 4



Profile 5



Profile 6

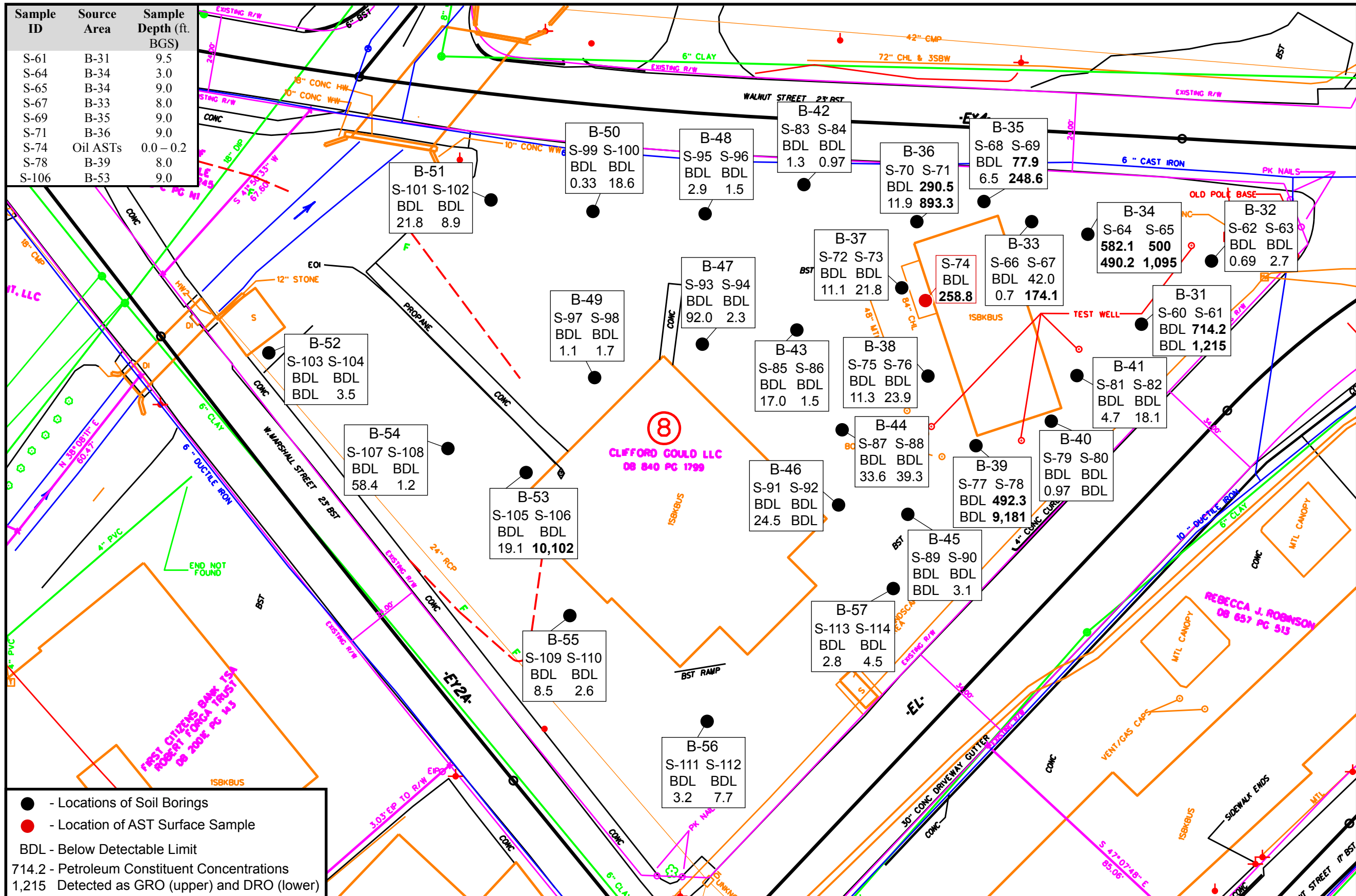
**Figure 9**  
GPR Profiles 1-6

State Project: U-5888  
Haywood County, NC

Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC



**Figure 10**  
Soil Analytical Results

State Project: U-5888  
Haywood County, NC

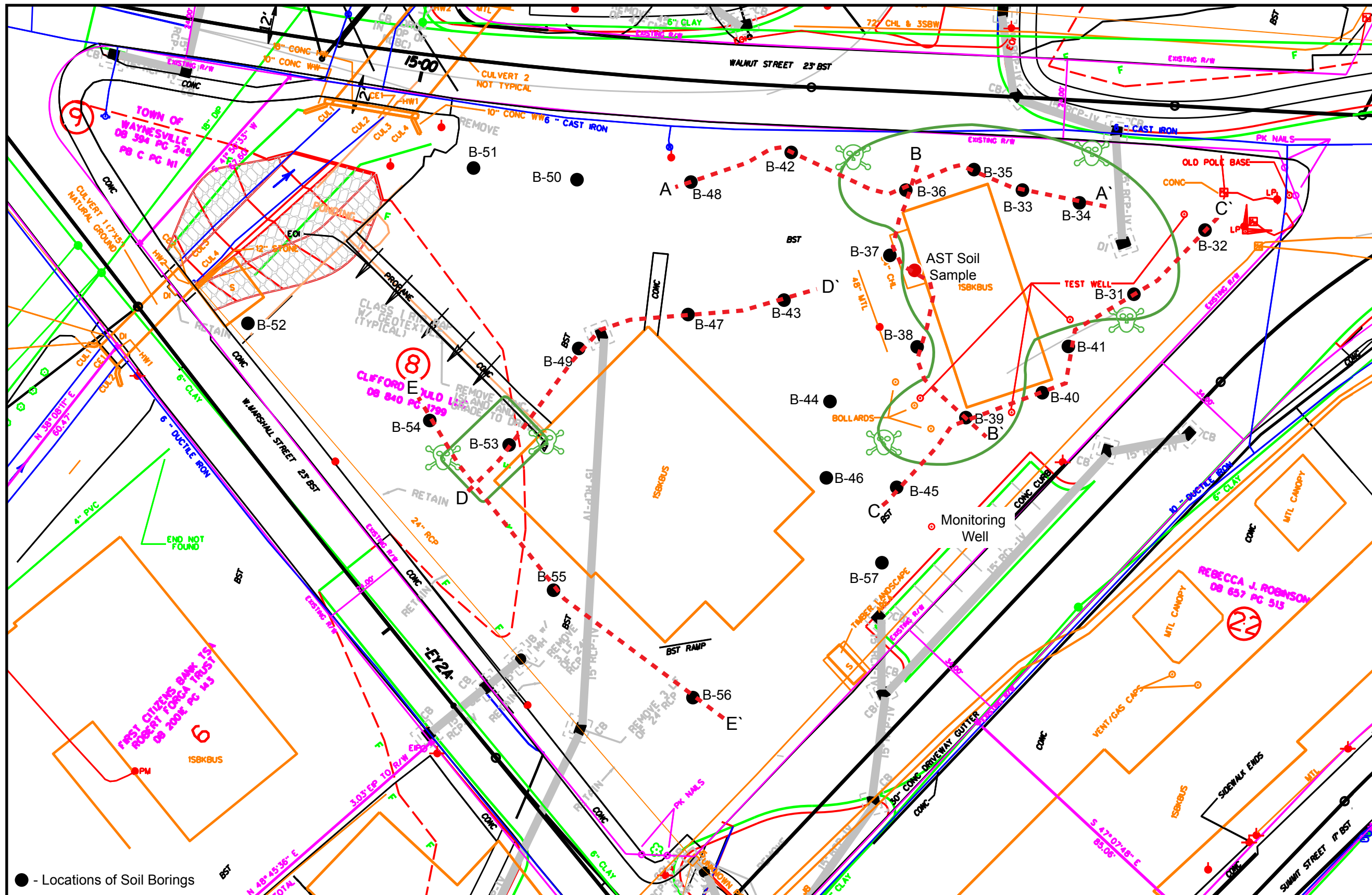
Clifford Gould LLC Property  
783 N Main Street  
Waynesville, NC

Parcel #008  
Facility I.D.: N/A

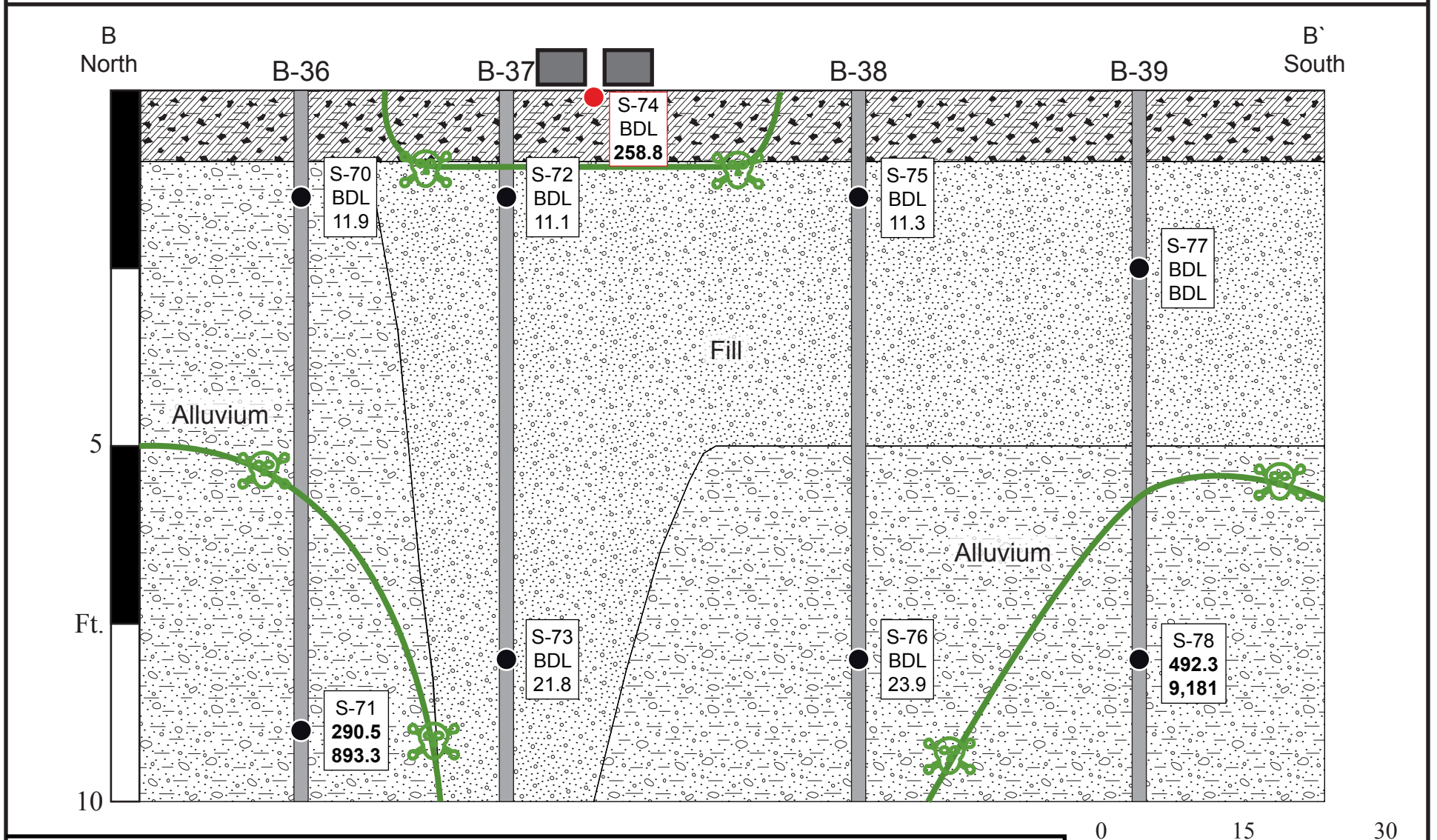
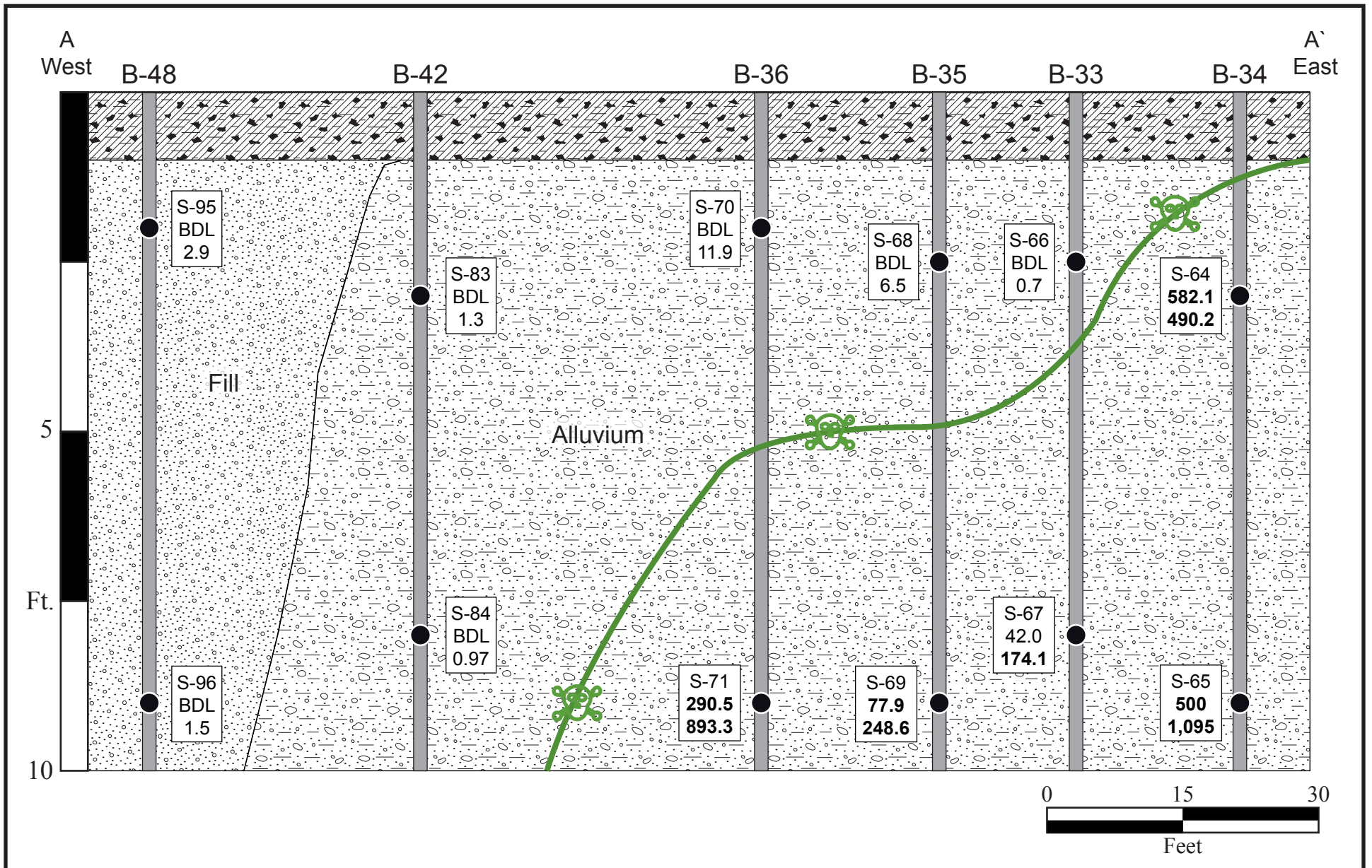
Seramur & Associates, PC  
Boone, NC

0 20 40  
Feet

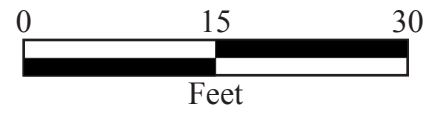
N



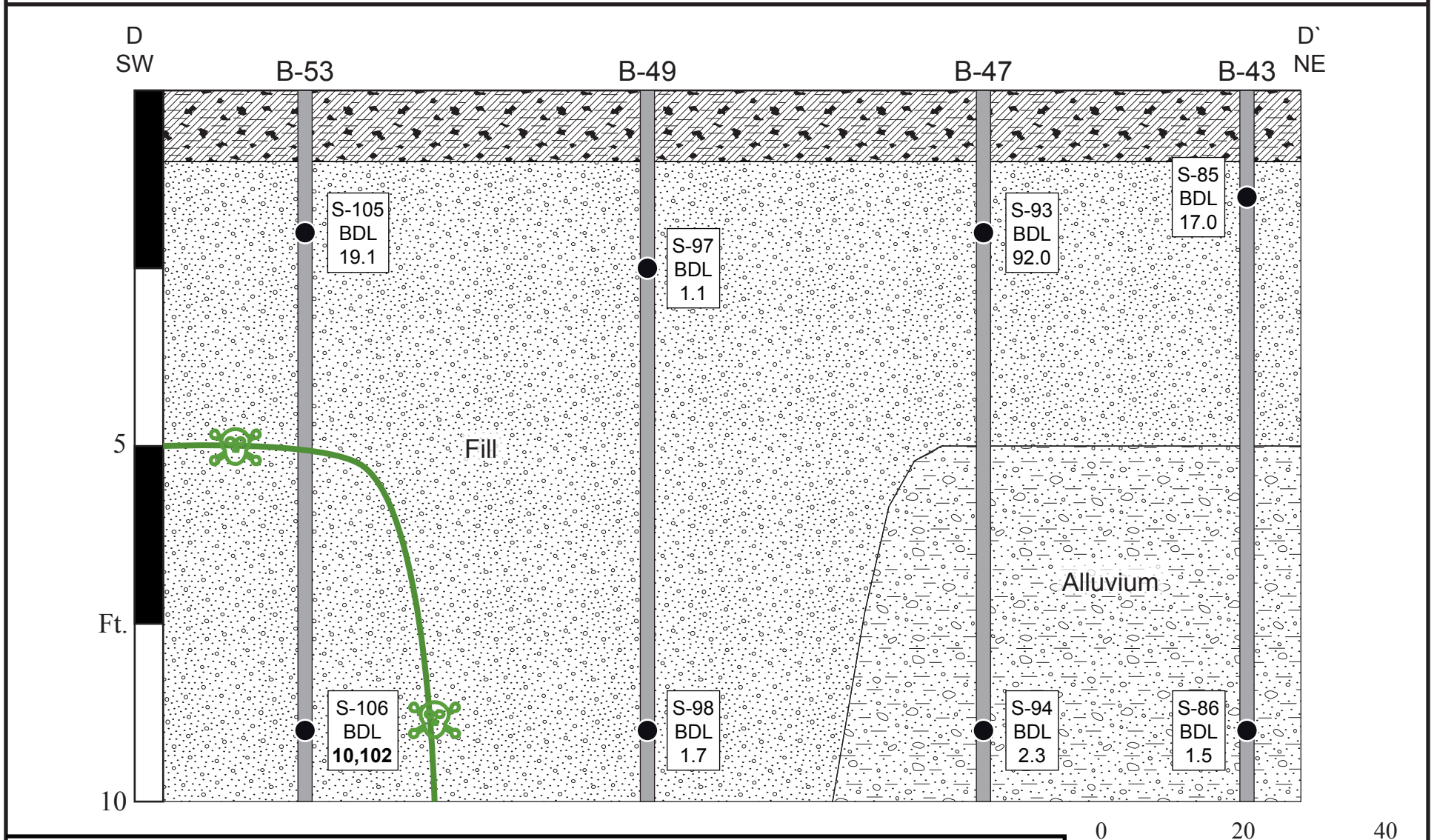
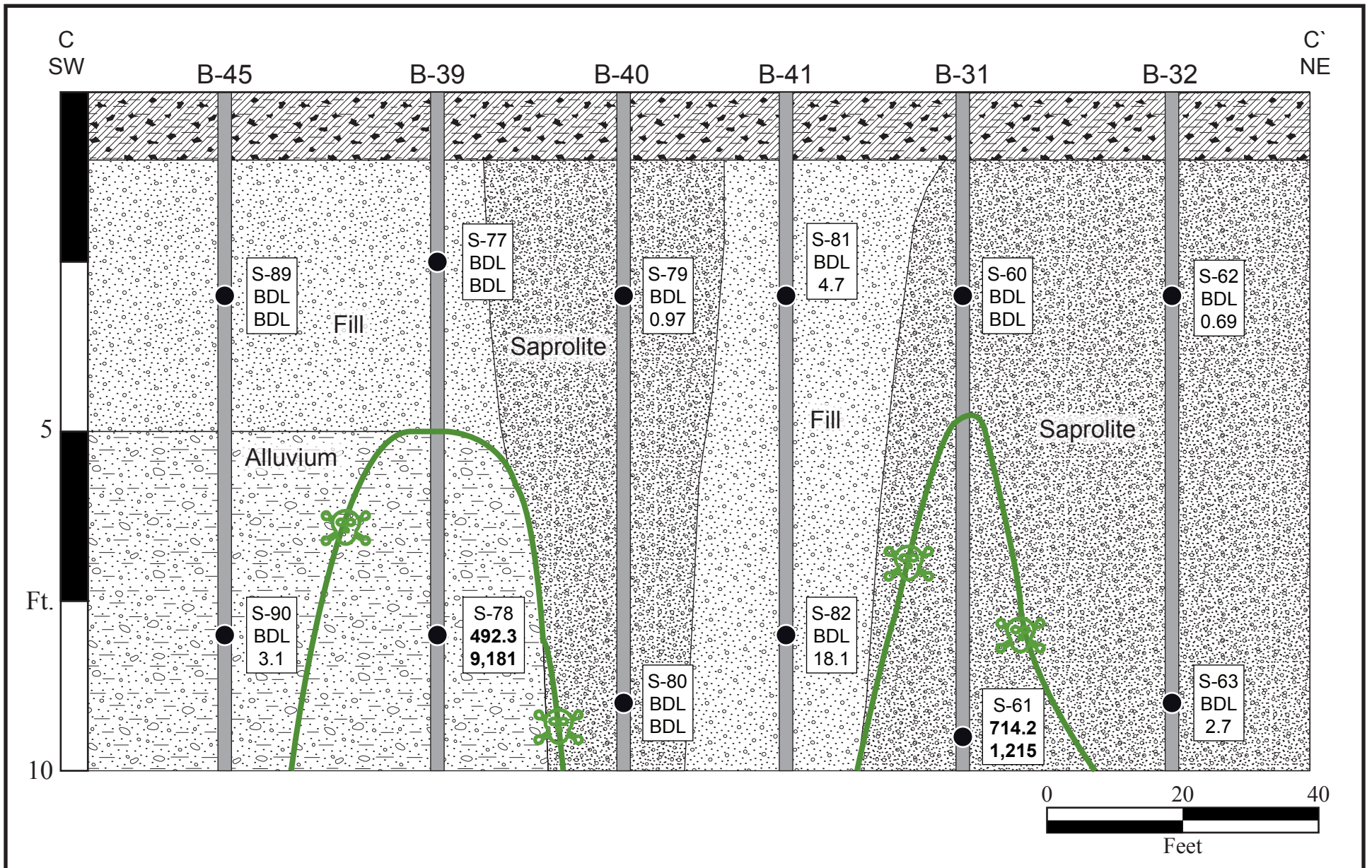
<p><b>Figure 11</b> Site Plan with Approx. Extent of Soil Contamination</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Clifford Gould LLC Property 783 N Main Street Waynesville, NC</p>	<p>Parcel #008 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>	<p>0 20 40 Feet</p> <p>N</p>
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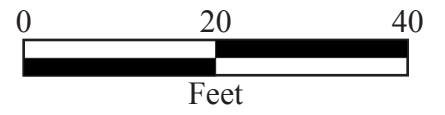
● - Locations of Soil Samples    BDL - Below Detectable Limit    42.0 - Petroleum Constituent Concentrations  
 174.1 Detected as GRO (upper) and DRO (lower)



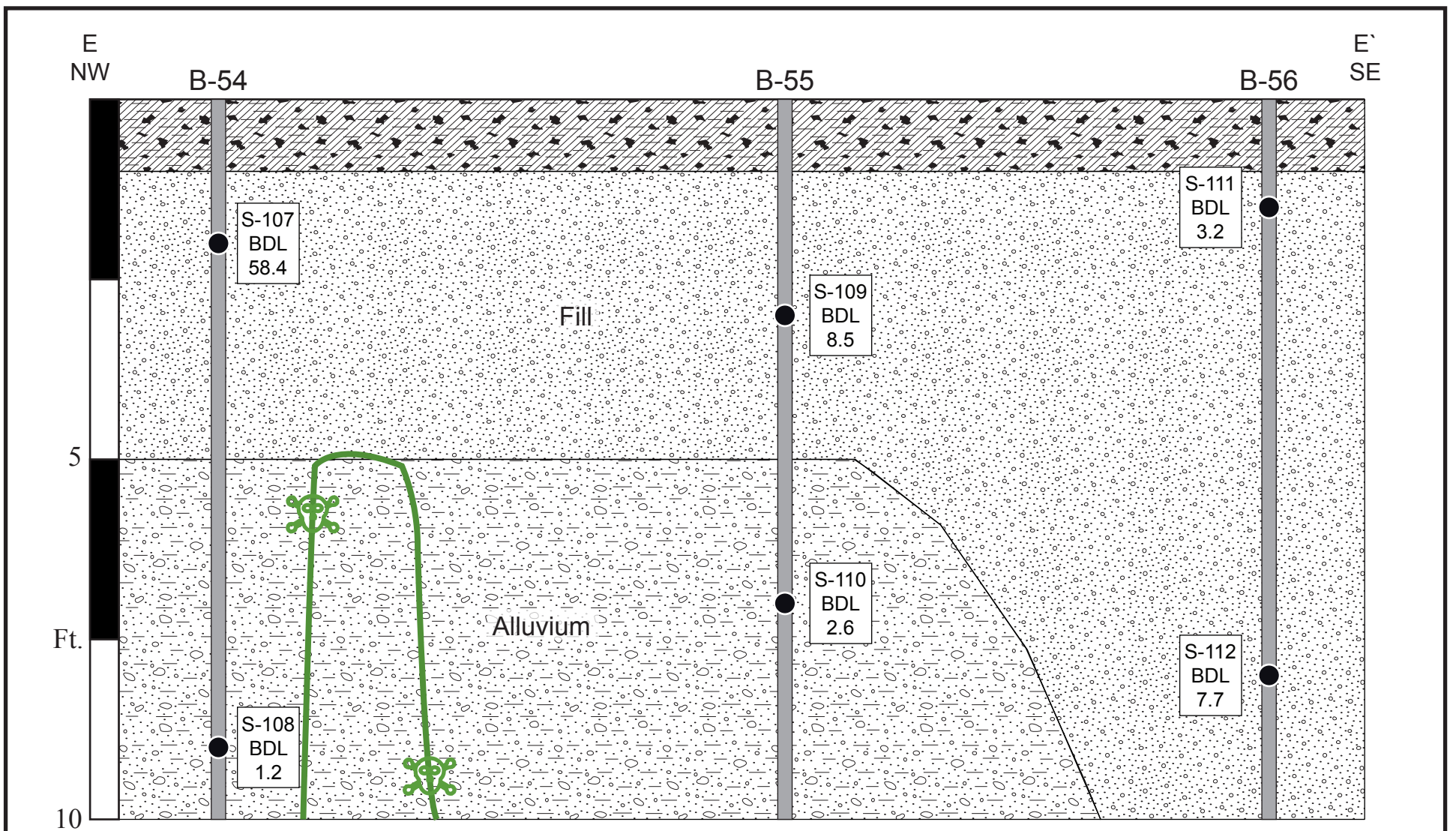
<p><b>Figure 12</b> Cross-Sections A-A' and B-B'</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Clifford Gould LLC Property 783 N Main Street Waynesville, NC</p>	<p>Parcel #008 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>
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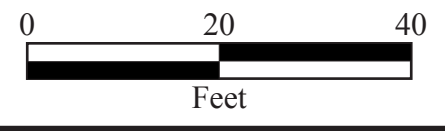
● - Locations of Soil Samples    BDL - Below Detectable Limit    492.3 - Petroleum Constituent Concentrations  
 9,181 Detected as GRO (upper) and DRO (lower)



<b>Figure 13</b> Cross-Sections C-C' and D-D'	State Project: U-5888 Haywood County, NC	Clifford Gould LLC Property 783 N Main Street Waynesville, NC	Parcel #008 Facility I.D.: N/A	Seramur & Associates, PC Boone, NC
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● - Locations of Soil Samples    BDL - Below Detectable Limit    BDL - Petroleum Constituent Concentrations  
 8.5 Detected as GRO (upper) and DRO (lower)



<b>Figure 14</b> Cross-Section E-E'	State Project: U-5888 Haywood County, NC	Clifford Gould LLC Property 783 N Main Street Waynesville, NC	Parcel #008 Facility I.D.: N/A	Seramur & Associates, PC Boone, NC
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## **Appendix B**

### **Laboratory Reports and Chain of Custody Records**





### Hydrocarbon Analysis Results

**Client:** SERAMUR & ASSOCIATES  
**Address:** 165 KNOLL DRIVE  
 BOONE, NC 28607

**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

**Contact:** KEITH SERAMUR  
 JOEY ANDERSON  
**Project:** NCDOT U-5888 P008

**Operator** MAX MOYER

											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	
Soil	S-60	26.0	<0.65	<0.65	<0.26	<0.65	<0.01	<0.01	<0.008	0	0	0	PHC ND,(FCM)
Soil	S-61	307.0	<7.7	714.2	1215	1929	105	4.1	<0.092	89.1	10.9	0	No Match found
Soil	S-62	24.1	<0.6	<0.6	0.69	0.69	0.3	0.02	<0.007	0	85.3	14.7	V.Deg.PHC 75.7%,(FCM)
Soil	S-63	22.6	<0.57	<0.57	2.7	2.7	1.4	0.06	<0.007	0	93.1	6.9	Deg.Fuel 75.2%,(FCM)
Soil	S-64	144.0	215.9	582.1	490.2	1072.3	47.1	1.8	<0.043	93.7	6.2	0	Deg.Gas 67.1%,(FCM)
Soil	S-65	149.0	<3.7	500	1095	1595	94.8	3.6	<0.045	86.4	13.6	0	Deg.Kerosene 81.3%,(FCM)
Soil	S-66	22.4	<0.56	<0.56	0.7	0.7	0.56	0.02	<0.007	0	94.5	5.5	Deg.Fuel 73.9%,(FCM)
Soil	S-67	21.8	<0.55	42	174.1	216.1	17.4	0.65	<0.007	74.4	25.5	0.1	Deg.Kerosene 73%,(FCM)
Soil	S-68	25.7	<0.64	<0.64	6.5	6.5	2.6	0.14	0.002	0	92.5	7.5	Deg.Fuel 77.2%,(FCM)
Soil	S-69	20.8	<0.52	77.9	248.6	326.5	20.2	0.77	<0.006	82.3	17.6	0.1	Deg.Kerosene 75.8%,(FCM)
Initial Calibrator QC check			OK			Final FCM QC Check			OK			99.6%	

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:** SERAMUR & ASSOCIATES  
**Address:** 165 KNOLL DRIVE  
 BOONE, NC 28607

**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

**Contact:** KEITH SERAMUR  
 JOEY ANDERSON  
**Project:** NCDOT U-5888 P008

**Operator** MAX MOYER

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	
Soil	S-70	21.7	<0.54	<0.54	11.9	11.9	4.5	0.22	0.002	0	92.7	7.3	Deg Fuel 88.9%,(FCM)
Soil	S-71	61.2	<1.5	290.5	893.3	1183.8	72.3	2.8	<0.018	82.9	17.1	0	Deg.Kerosene 74.4%,(FCM)
Soil	S-72	23.0	<0.58	<0.58	11.1	11.1	4.9	0.15	0.001	0	91.7	8.3	Bit.Road Tar 94.5%,(FCM)
Soil	S-73	20.5	<0.51	<0.51	21.8	21.8	12.1	0.58	0.013	0	89.5	10.5	V.Deg.PHC 71.5%,(FCM)
Soil	S-74	3502.0	<87.6	<87.6	258.8	258.8	93.4	5.2	0.19	0	75.7	24.3	V.Deg.PHC 76.3%,(FCM)
Soil	S-75	21.8	<0.55	<0.55	11.3	11.3	6	0.29	0.008	0	88.6	11.4	V.Deg.PHC 70%,(FCM)
Soil	S-76	21.8	<0.55	<0.55	23.9	23.9	16.7	0.5	0.002	0	98.2	1.8	Deg.Fuel 78.9%,(FCM)
Soil	S-77	22.6	<0.57	<0.57	<0.23	0.04	0.04	0.004	<0.007	0	100	0	Residual HC
Soil	S-78	839.0	<42	492.3	9181	9673	780.2	29.8	<0.25	43.2	56.6	0.2	Deg.Kerosene 68.9%,(FCM)
Soil	S-79	23.2	<0.58	<0.58	0.97	0.97	0.46	0.02	<0.007	0	86.4	13.6	V.Deg.PHC 75.4%,(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

**101.3%**

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:** SERAMUR & ASSOCIATES  
**Address:** 165 KNOLL DRIVE  
 BOONE, NC 28607

**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

**Contact:** KEITH SERAMUR  
 JOEY ANDERSON  
**Project:** NCDOT U-5888 P008

**Operator** MAX MOYER

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	
Soil	S-80	21.1	<0.53	<0.53	<0.21	<0.53	<0.01	<0.01	<0.006	0	0	0	PHC ND,(FCM)
Soil	S-81	22.2	<0.56	<0.56	4.7	4.7	2.5	0.13	0.001	0	88.6	11.4	V.Deg.PHC 76.3%,(FCM)
Soil	S-82	22.2	<0.56	<0.56	18.1	18.1	8.5	0.41	0.004	0	93	7	Deg Fuel 75.7%,(FCM)
Soil	S-83	21.0	<0.52	<0.52	1.3	1.3	0.6	0.03	<0.006	0	92.5	7.5	Deg Fuel 70.3%,(FCM)
Soil	S-84	19.0	<0.47	<0.47	0.97	0.97	0.52	0.03	<0.006	0	94.1	5.9	Deg Fuel 71.1%,(FCM)
Soil	S-85	23.9	<0.6	<0.6	17	17	9	0.44	0.005	0	96	4	Deg Fuel 78.1%,(FCM)
Soil	S-86	22.6	<0.57	<0.57	1.5	1.5	0.79	0.04	<0.007	0	84.6	15.4	V.Deg.PHC 30.4%,(FCM)
Soil	S-87	23.6	<0.59	<0.59	33.6	33.6	20.2	0.93	0.007	0	95.8	4.2	Deg Fuel 90.9%,(FCM)
Soil	S-88	22.4	<0.56	<0.56	39.3	39.3	22.9	1.1	0.009	0	94.8	5.2	Deg Fuel 75.9%,(FCM)
Soil	S-89	22.0	<0.55	<0.55	<0.22	<0.55	<0.01	<0.01	<0.007	0	0	0	PHC ND,(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

**98.7%**

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:** SERAMUR & ASSOCIATES  
**Address:** 165 KNOLL DRIVE  
 BOONE, NC 28607

**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

**Contact:** KEITH SERAMUR  
 JOEY ANDERSON  
**Project:** NCDOT U-5888 P008

**Operator** MAX MOYER

											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			
Soil	S-90	23.0	<0.58	<0.58	3.1	3.1	1.4	0.07	0.001	0	85	15	V.Deg.PHC 71.7%,(FCM)		
Soil	S-91	26.5	<0.66	<0.66	24.5	24.5	11.7	0.58	0.007	0	93.7	6.3	Deg Fuel 93.2%,(FCM)		
Soil	S-92	8.4	<0.21	<0.21	<0.08	<0.21	<0.004	<0.004	<0.003	0	0	0	PHC ND,(FCM)		
Soil	S-93	71.9	<1.8	<1.8	92	92	44.4	1.4	0.007	0	92.3	7.7	Bit.Road Tar 96.1%,(FCM)		
Soil	S-94	25.0	<0.63	<0.63	2.3	2.3	1.2	0.05	0.001	0	92.5	7.5	Deg Fuel 87.2%,(FCM)		
Soil	S-95	22.4	<0.56	<0.56	2.9	2.9	1.1	0.06	0.001	0	89.3	10.7	Deg Fuel 76.3%,(FCM)		
Soil	S-96	23.9	<0.6	<0.6	1.5	1.5	0.49	0.03	<0.007	0	83.4	16.6	Deg Fuel 63.1%,(FCM)		
Soil	S-97	31.0	<0.77	<0.77	1.1	1.1	0.32	0.02	<0.009	0	75.5	24.5	Deg Fuel 69%,(FCM)		
Soil	S-98	23.2	<0.58	<0.58	1.7	1.7	0.78	0.04	0.001	0	82.1	17.9	V.Deg.PHC 71.9%,(FCM)		
Soil	S-99	27.7	<0.69	<0.69	0.33	0.33	0.29	0.03	<0.008	0	88.2	11.8	Residual HC		
Initial Calibrator QC check										OK			Final FCM QC Check	OK	101.3%

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:** SERAMUR & ASSOCIATES, PC  
**Address:** 165 KNOLL DRIVE  
 BOONE NC 28607

**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

**Contact:** KEITH SERAMUR  
 COLLECTED BY KS AND JA  
**Project:** NCDOT U-5888 P008

**Operator** NICK HENDRIX

**U04049**

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 - C10	C10 - C18	C18	
Soil	S-100	24.1	<0.6	<0.6	18.6	18.6	10.8	0.25	0.001	0	93.9	6.1	Bit.Road Tar 97%,(FCM)
Soil	S-101	22.2	<0.56	<0.56	21.8	21.8	9.7	0.5	0.019	0	84.5	15.5	V.Deg.PHC 94.6%,(FCM)
Soil	S-102	22.0	<0.55	<0.55	8.9	8.9	5.7	0.27	0.003	0	92.7	7.3	V.Deg.PHC 30.9%,(FCM)
Soil	S-103	26.3	<0.66	<0.66	<0.26	<0.66	<0.01	<0.01	<0.008	0	0	0	PHC ND,(FCM)
Soil	S-104	24.5	<0.61	<0.61	3.5	3.5	1.9	0.1	0.001	0	92.8	7.2	V.Deg.PHC 41.9%,(FCM)
Soil	S-105	23.0	<0.58	<0.58	19.1	19.1	9.2	0.47	0.013	0	81.8	18.2	V.Deg.PHC 93.5%,(FCM)
Soil	S-106	2472.0	<61.8	<61.8	10102	10102	3924	136.8	0.071	0	99.3	0.7	Deg.Diesel 85.1%,(FCM)
Soil	S-107	36.8	<0.92	<0.92	58.4	58.4	32.5	1.7	0.042	0	93.6	6.4	Deg Fuel 91.1%,(FCM)
Soil	S-108	21.7	<0.54	<0.54	1.2	1.2	0.49	0.03	<0.007	0	89.4	10.6	Deg Fuel 69.1%,(FCM)
Soil	S-109	23.0	<0.58	<0.58	8.5	8.5	5	0.23	0.006	0	90	10	V.Deg.PHC 68.1%,(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

**100.0%**

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

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

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

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only.

**Data generated by HC-1 Analyser**



### Hydrocarbon Analysis Results

**Client:** SERAMUR & ASSOCIATES  
**Address:** 165 KNOLL DRIVE  
 BOONE, NC 28607

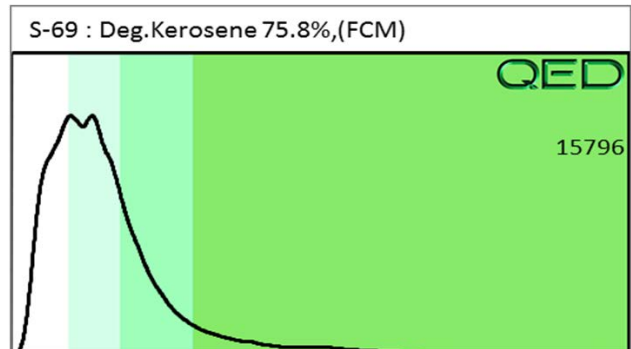
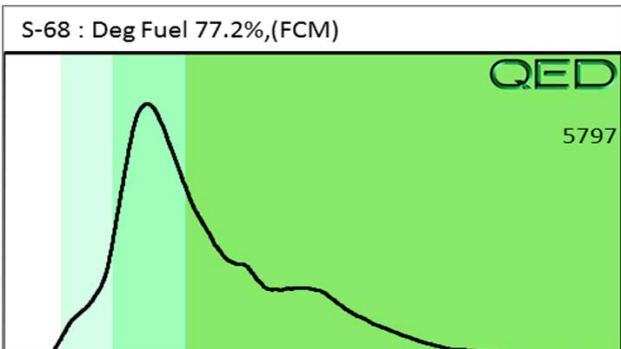
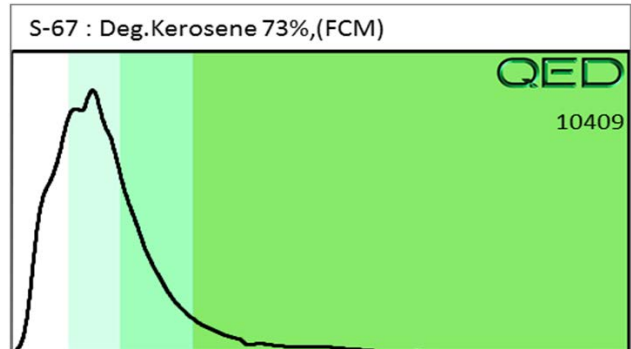
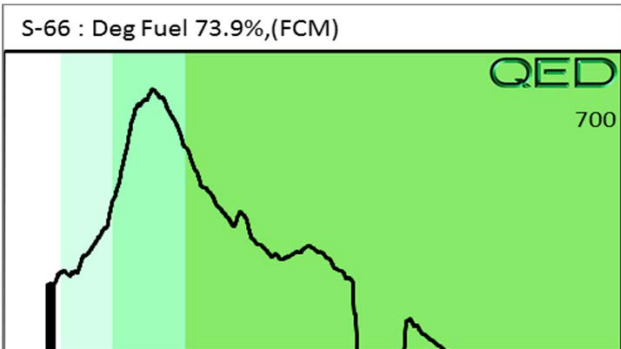
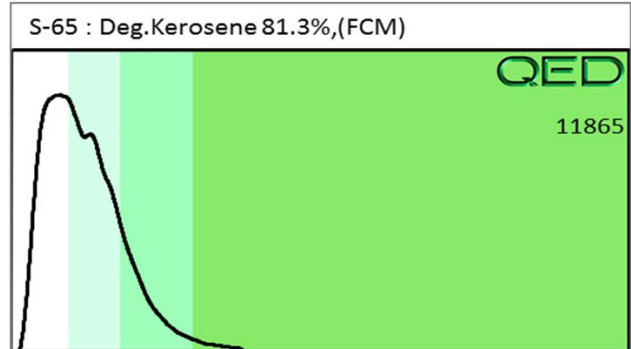
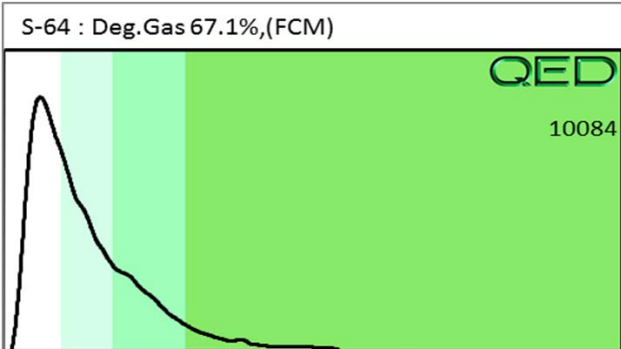
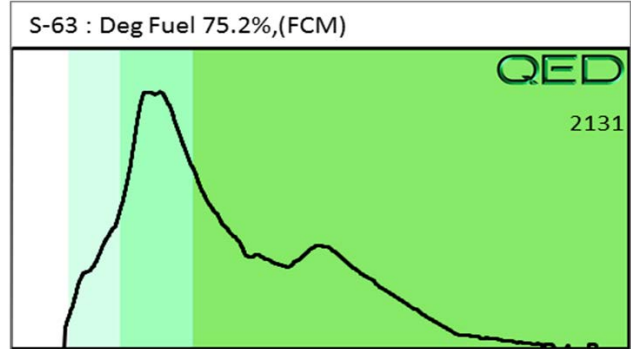
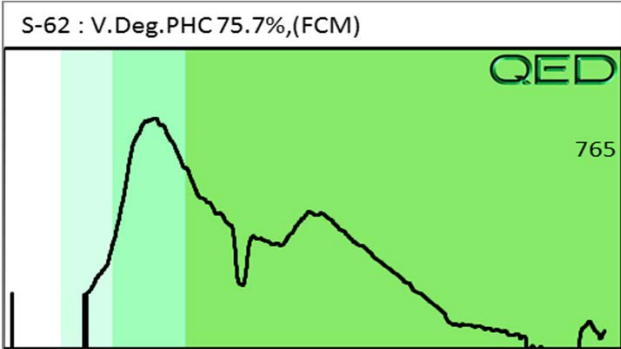
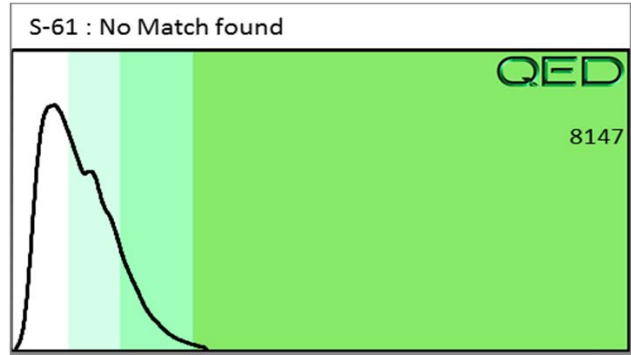
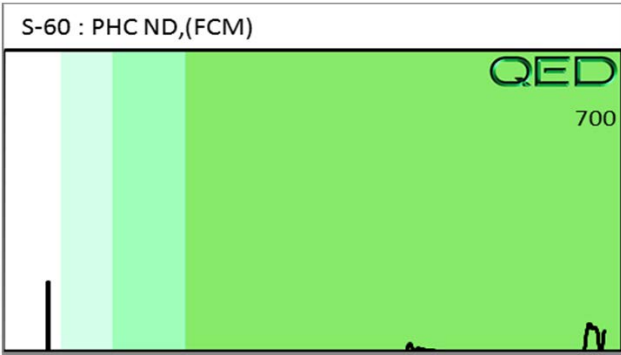
**Samples taken** Wednesday, October 24, 2018  
**Samples extracted** Wednesday, October 24, 2018  
**Samples analysed** Friday, October 26, 2018

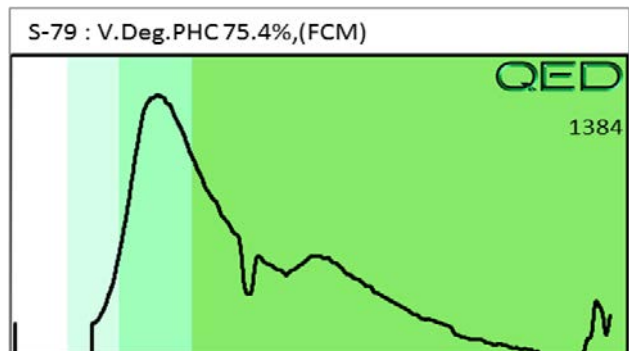
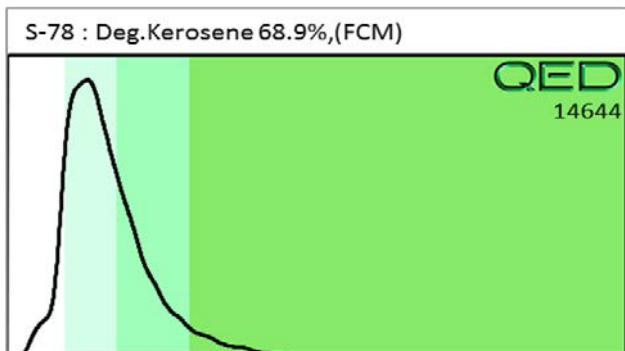
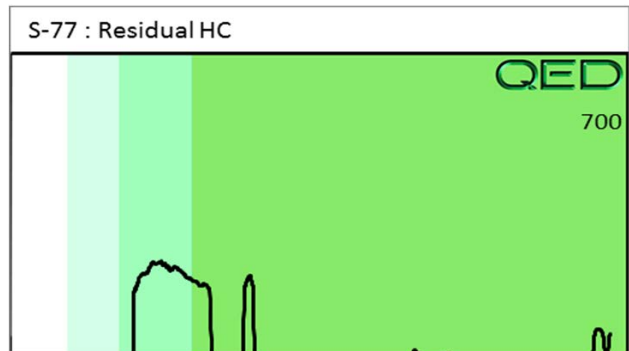
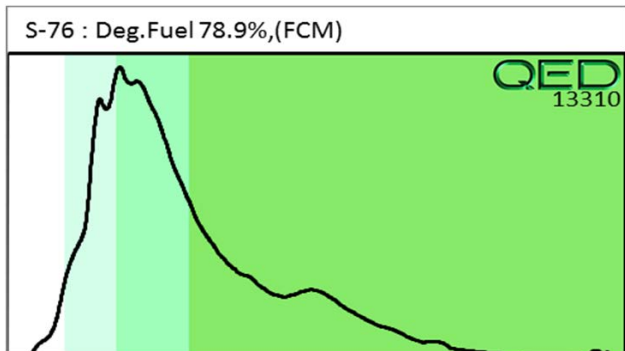
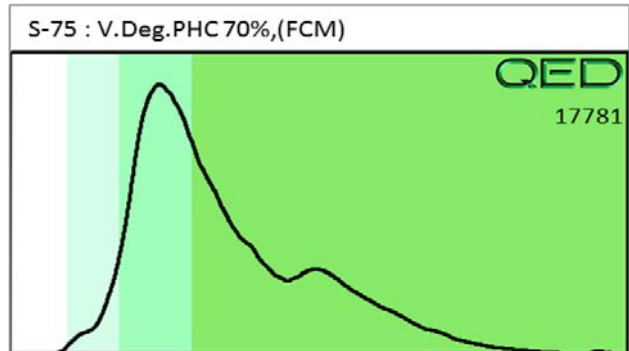
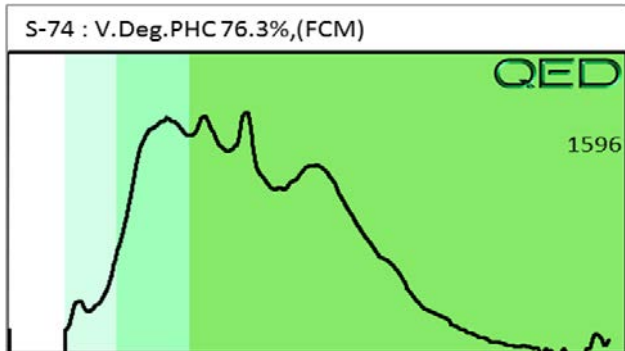
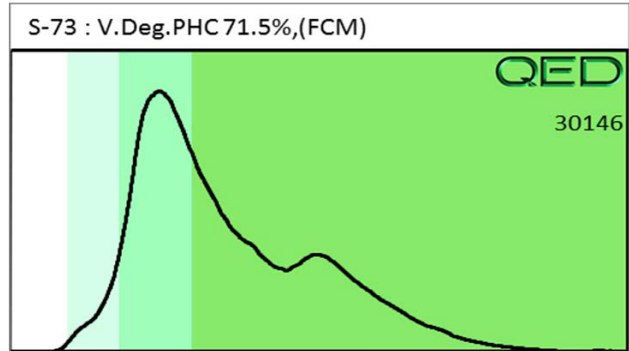
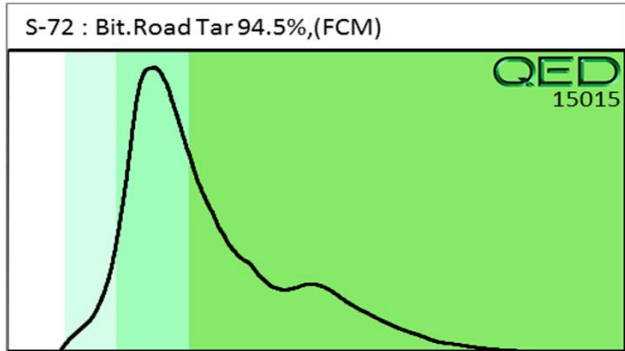
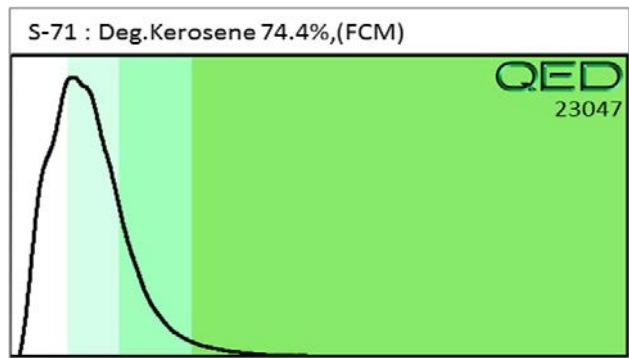
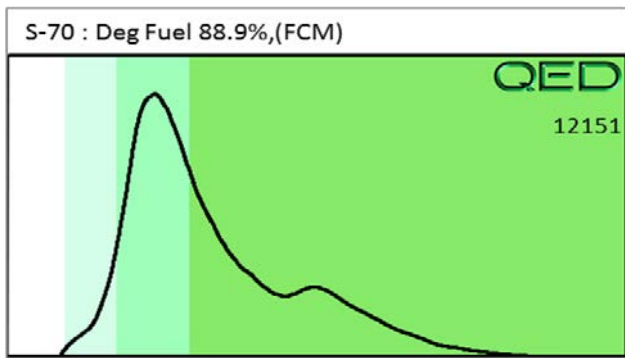
**Contact:** KEITH SERAMUR  
 JOEY ANDERSON  
**Project:** NCDOT U-5888 P008

**Operator** MAX MOYER

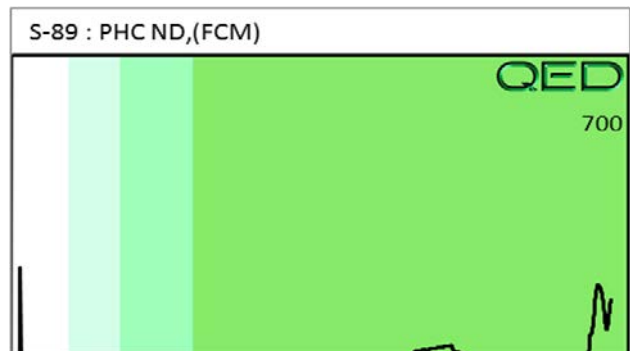
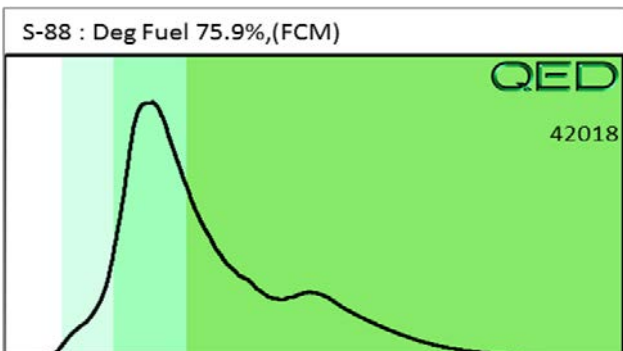
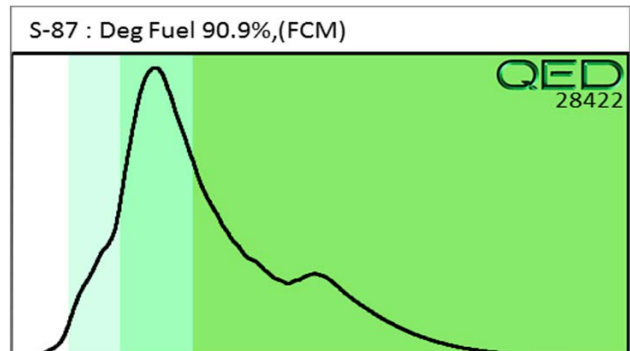
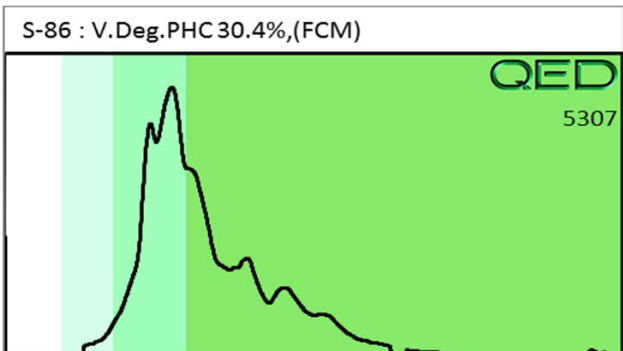
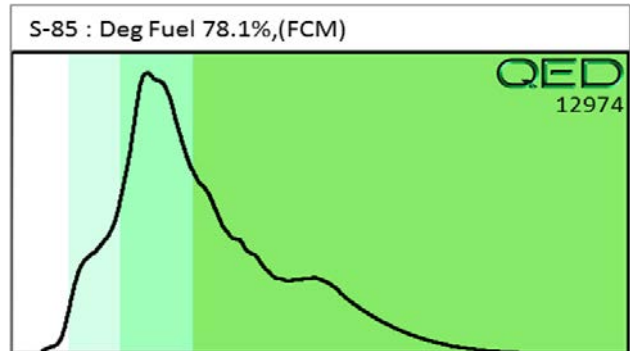
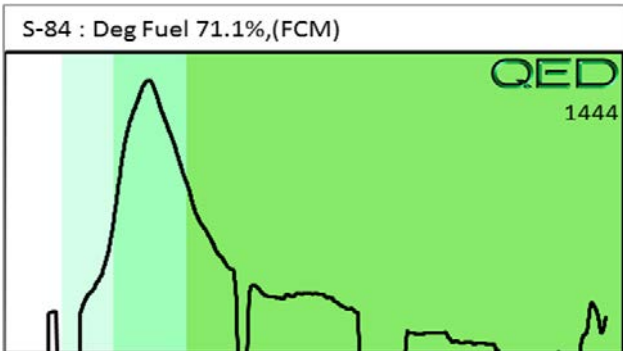
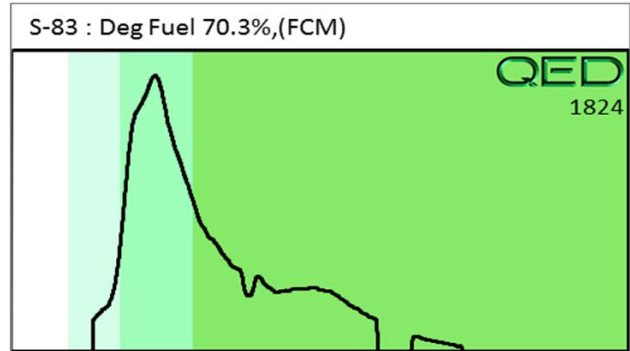
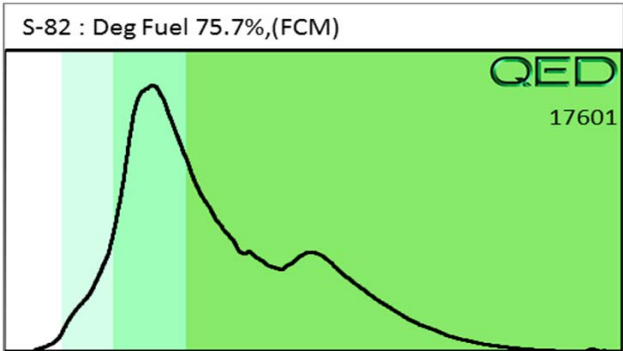
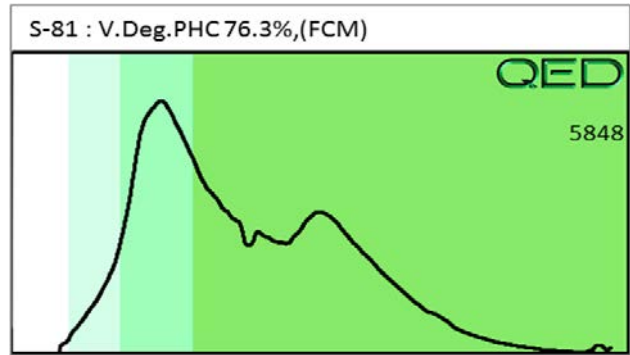
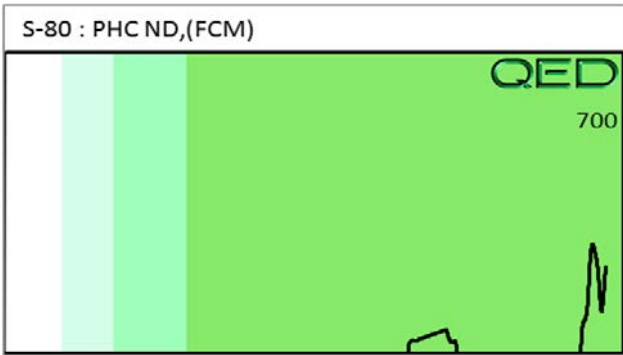
											F03640			
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match	
										% light	% mid	% heavy		
Soil	S-110	23.2	<0.58	<0.58	2.6	2.6	1	0.06	<0.007	0	85.5	14.5	Deg Fuel 39.2%,(FCM)	
Soil	S-111	23.2	<0.58	<0.58	3.2	3.2	1.2	0.06	0.001	0	89.7	10.3	Deg Fuel 74.3%,(FCM)	
Soil	S-112	24.8	<0.62	<0.62	7.7	7.7	3.5	0.17	0.003	0	83.8	16.2	V.Deg.PHC 94.1%,(FCM)	
Soil	S-113	26.8	<0.67	<0.67	2.8	2.8	1.5	0.06	0.001	0	86.6	13.4	V.Deg.PHC 91%,(FCM)	
Soil	S-114	23.6	<0.59	<0.59	4.5	4.5	2.1	0.12	0.007	0	73.2	26.8	V.Deg.PHC 71.6%,(FCM)	
Initial Calibrator QC check									OK	Final FCM QC Check			OK	109.2%

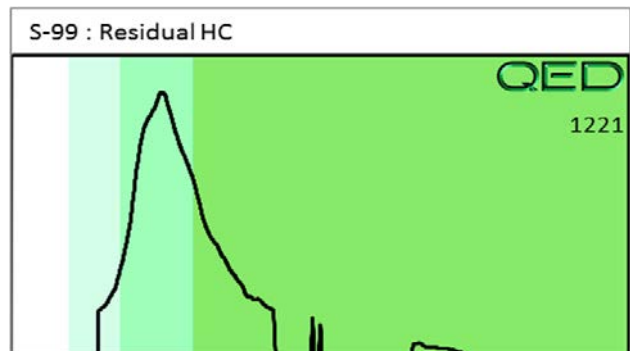
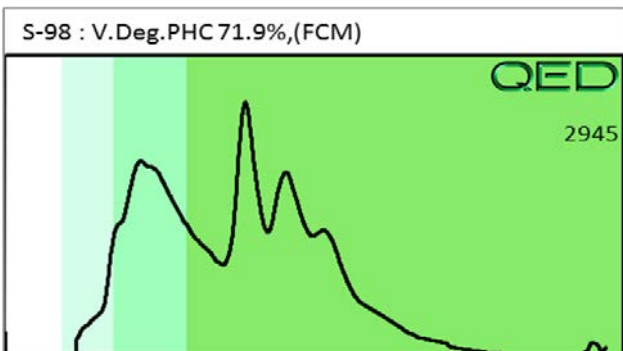
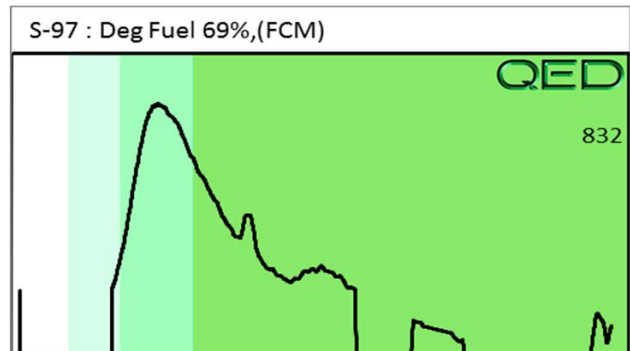
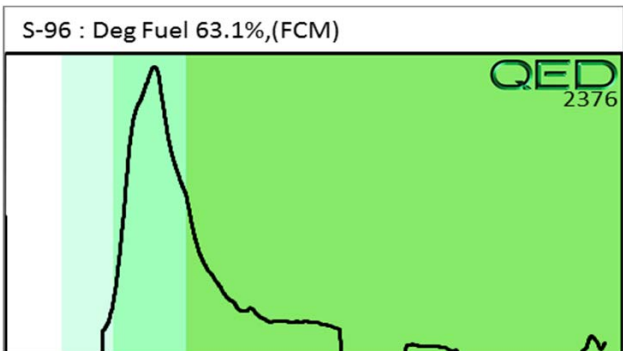
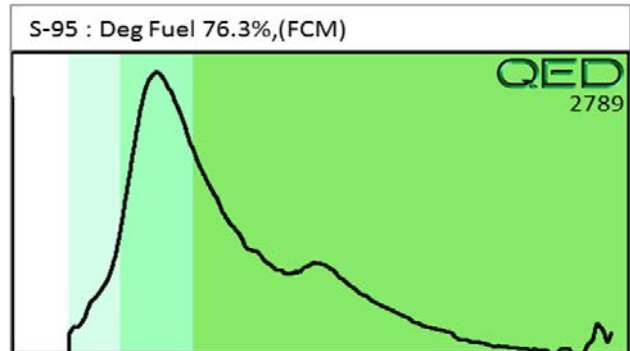
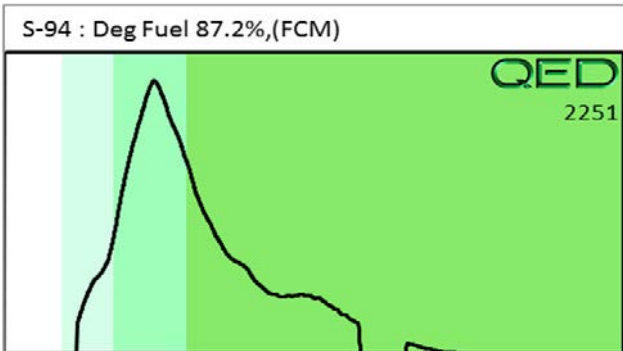
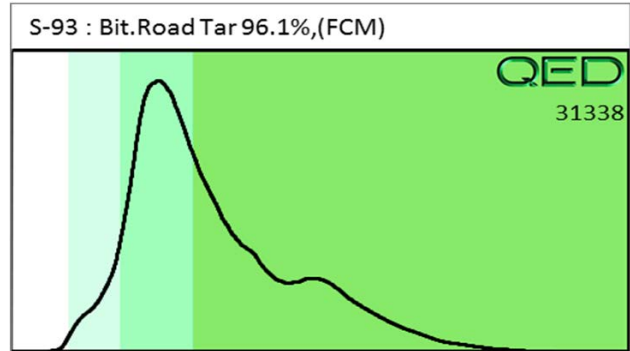
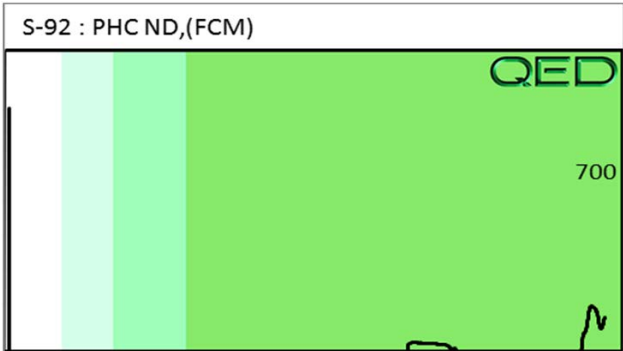
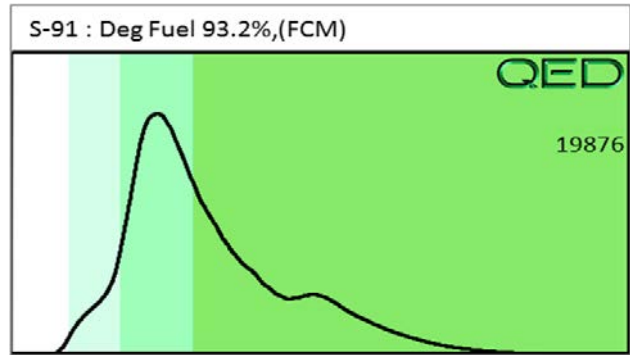
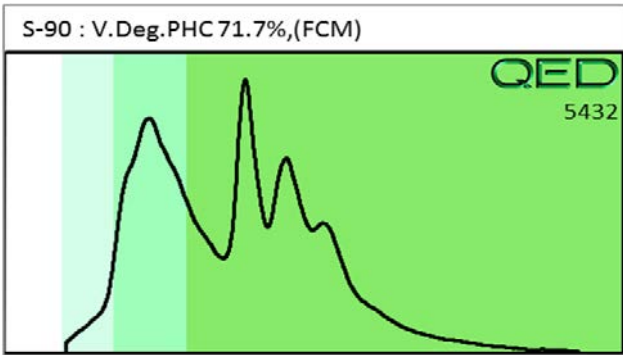
Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content  
 Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental 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

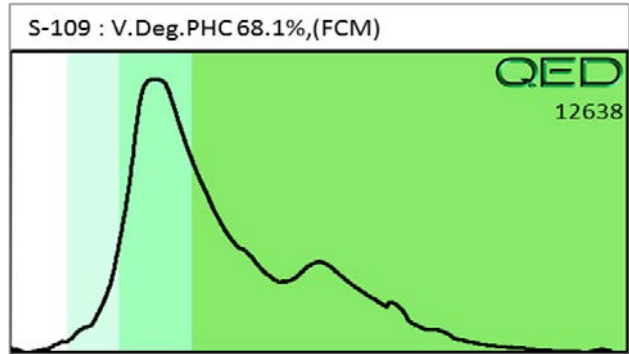
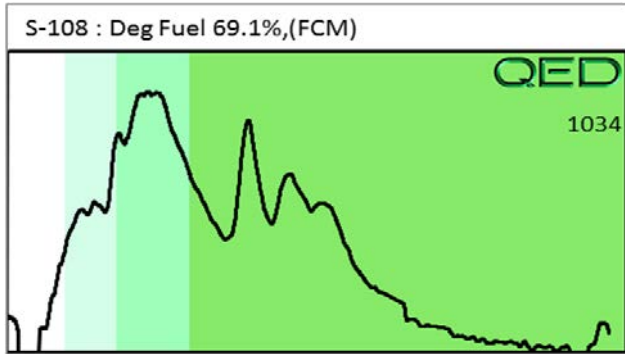
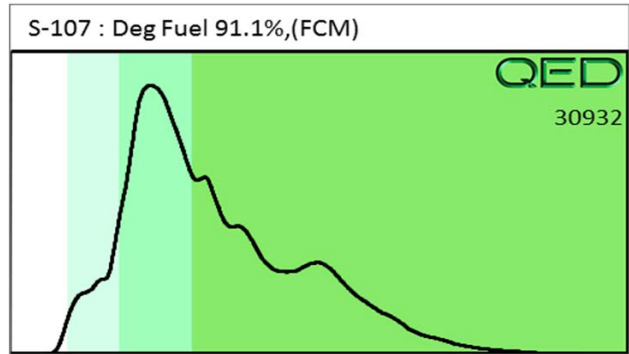
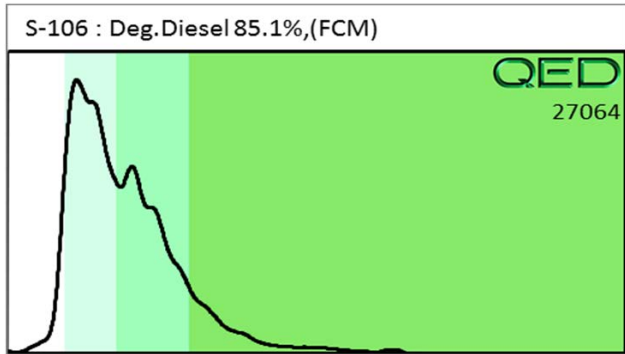
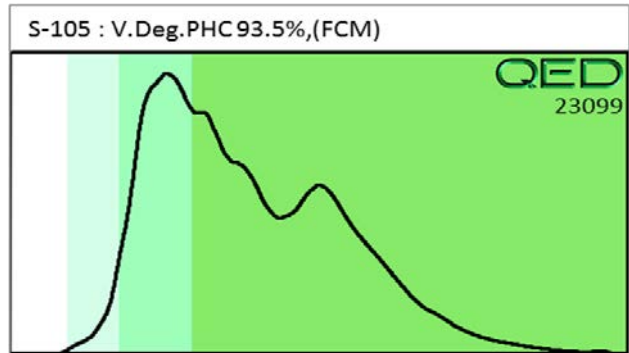
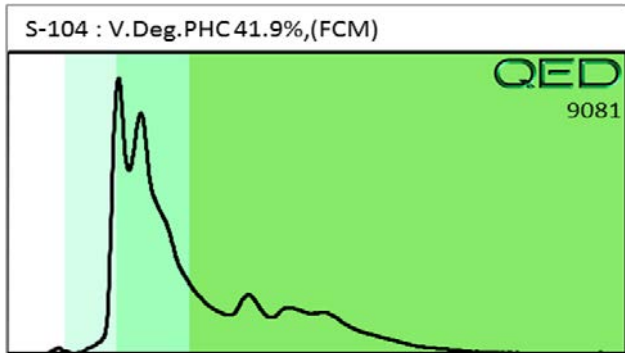
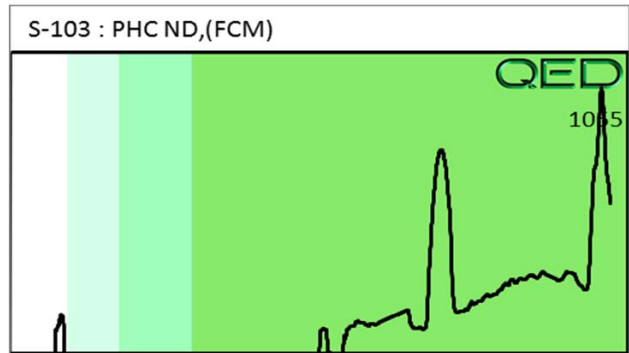
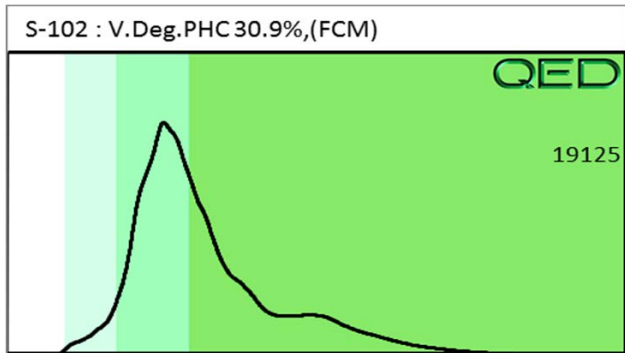
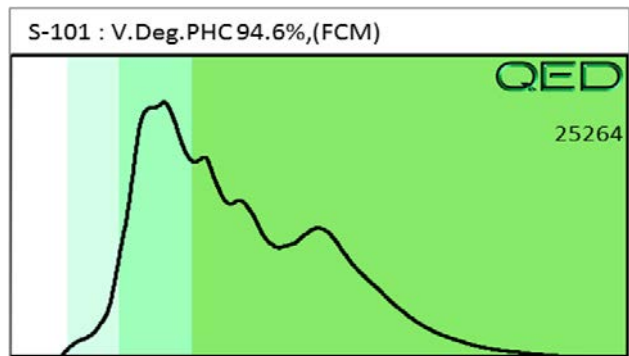
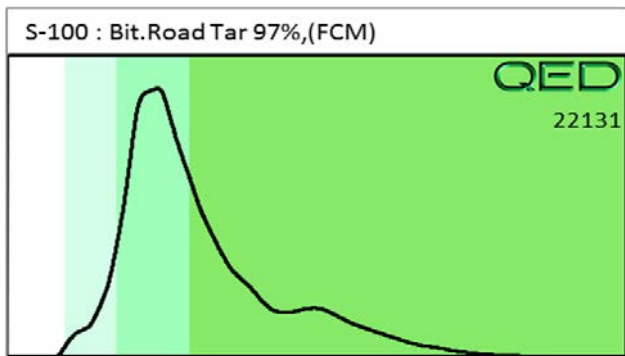


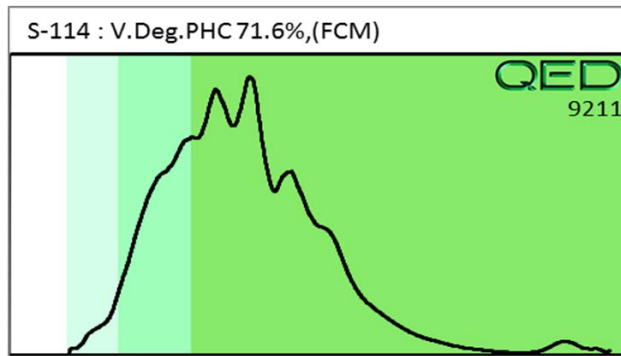
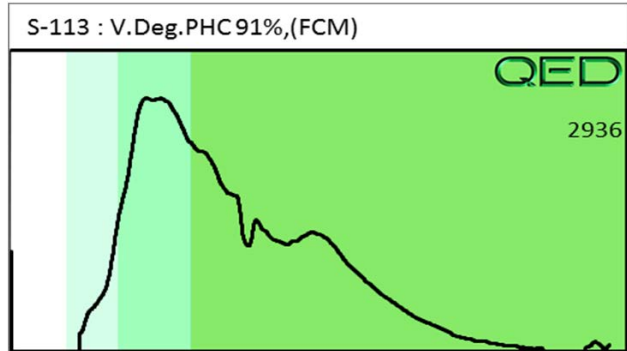
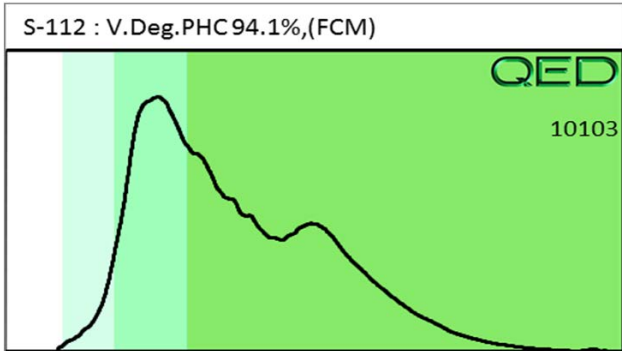
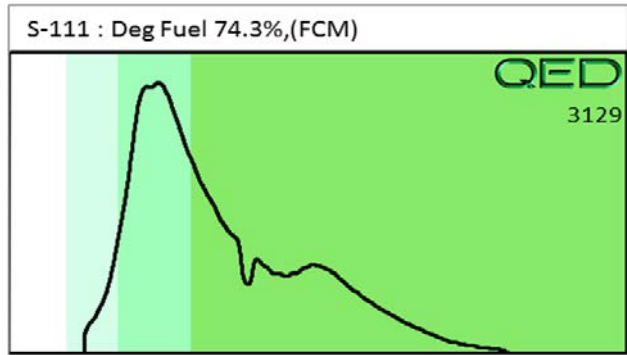
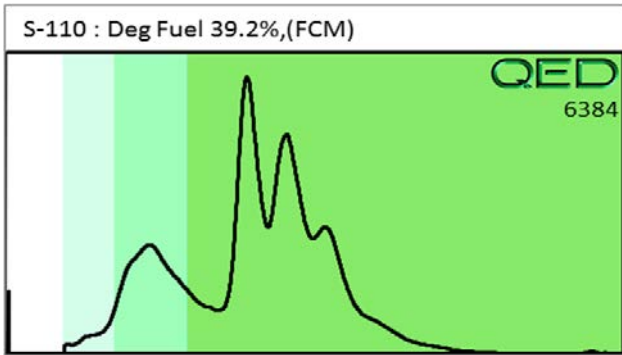












B96

Client Name: Seramur & Associates, PC  
 Address: 165 Knoll Drive  
Boone, NC 28607  
 Contact: Keith Seramur  
 Project Ref.: UCDOT 11-5888 P008  
 Email: seramur@icbind.com  
 Phone #: (828) 264-0289  
 Collected by: Joey Anderson & Keith Seramur



**RAPID ENVIRONMENTAL DIAGNOSTICS**  
**CHAIN OF CUSTODY AND ANALYTICAL**  
**REQUEST FORM**

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409

Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and BaP

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
10/24/18 11:16		X	JBA	S-60	53.7	43.7	10.0
10/24/18 11:54		X	JBA	S-61	54.7	43.7	11.0
10/24/18 12:09		X	JBA	S-62	54.4	43.6	10.8
10/24/18 12:14		X	JBA	S-63	55.2	43.7	11.5
10/24/18 12:24		X	JBA	S-64	56.7	44.1	12.6
10/24/18 12:26		X	JBA	S-65	56.2	44.0	12.2
10/24/18 13:24		X	JBA	S-66	55.7	44.1	11.6
10/24/18 13:27		X	JBA	S-67	55.7	43.8	11.9
10/24/18 13:33		X	JBA	S-68	54.0	43.9	10.1
10/24/18 13:36		X	JBA	S-69	56.5	44.0	12.5
10/24/18 13:42		X	JBA	S-70	55.9	43.9	12.0
10/24/18 13:45		X	JBA	S-71	57.5	44.1	13.4
10/24/18 13:53		X	JBA	S-72	54.7	43.4	11.3
10/24/18 13:55		X	JBA	S-73	56.9	44.2	12.7
10/24/18 14:00		X	JBA	S-74	53.4	43.8	9.6
10/24/18 14:03		X	JBA	S-75	55.4	43.5	11.9
10/24/18 14:05		X	JBA	S-76	55.9	44.0	11.9
10/24/18 14:10		X	JBA	S-77	54.9	43.4	11.5
10/24/18 14:12		X	JBA	S-78	56.3	43.6	12.7
10/24/18 14:17		X	JBA	S-79	55.1	43.9	11.2

Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
	10/25/18 10:00	Fed Ex	
Relinquished by	Date/Time	Accepted by	Date/Time
		MM	10/26/18 1205

**RED Lab USE ONLY**

B96

Client Name: Seramur + Associates, PC  
 Address: 165 Kroll Drive  
 Boone, NC 28607  
 Contact: Keith Seramur  
 Project Ref.: NCDOT 4-5888 P008  
 Email: seramur@icland.com  
 Phone #: (828) 264-0289  
 Collected by: Joey Andersen + Keith Seramur



**RAPID ENVIRONMENTAL DIAGNOSTICS**  
**CHAIN OF CUSTODY AND ANALYTICAL**  
**REQUEST FORM**

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409  
 Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and BaP

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
10/24/18 14:14		X	JBA	S-80	55.9	43.6	12.3
10/24/18 14:40		X	JBA	S-81	55.2	43.5	11.7
10/24/18 14:42		X	JBA	S-82	54.9	43.2	11.7
10/24/18 14:48		X	JBA	S-83	56.4	44.0	12.4
10/24/18 14:57		X	JBA	S-84	57.8	44.1	13.7
10/24/18 14:58		X	JBA	S-85	54.7	43.8	10.9
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10/24/18 15:03		X	JBA	S-87	54.7	43.7	11.0
10/24/18 15:06		X	JBA	S-88	55.5	43.9	11.6
10/24/18 15:56		X	JBA	S-89	55.4	43.6	11.8
10/24/18 15:58		X	JBA	S-90	55.0	43.7	11.3
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10/24/18 16:12		X	JBA	S-92	55.6	43.7	11.9
10/24/18 16:16		X	JBA	S-93	54.8	43.4	11.4
10/24/18 16:18		X	JBA	S-94	54.1	43.7	10.4
10/24/18 16:32		X	JBA	S-95	55.0	43.4	11.6
10/24/18 16:34		X	JBA	S-96	54.6	43.7	10.9
10/24/18 16:39		X	JBA	S-97	52.4	44.0	8.4
10/24/18 16:40		X	JBA	S-98	54.9	43.7	11.2
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Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
	10/25/18 10:00	FedEx	
Relinquished by	Date/Time	Accepted by	Date/Time
		MW	10/26/18 12:05

**RED Lab USE ONLY**

20



## **Appendix C**

### **Documents From NCDEQ Incident Files**





Waste Management  
ENVIRONMENTAL QUALITY

PAT MCCRORY  
*Governor*

DONALD R. VAN DER VAART  
*Secretary*

MICHAEL SCOTT  
*Director*

October 18, 2016

Mr. Art Neergaard  
393 Oregon Street  
Cincinnati, OH 45202

Re: Notice of No Further Action  
15A NCAC 2L .0407(d)  
Risk-based Assessment and Corrective Action for  
Petroleum Underground Storage Tanks

Main Street Automotive  
817 N. Main Street, Waynesville  
Haywood County  
Incident Number: 41466  
Risk Classification: Low/Industrial Commercial

Dear Mr. Neergaard,

On October 17, 2016, the Underground Storage Tank (UST) Section received proof that public notice requirements have been met. **As all required actions have been completed, the UST Section determines that no further action is warranted for this incident.**

This determination shall apply unless the UST Section later finds that the discharge or release poses an unacceptable risk or a potentially unacceptable risk to human health or the environment. Pursuant to Title 15A NCAC 2L .0407(a), the responsible party has a continuing obligation to notify the Department of any changes that might affect the risk or land use classifications that have been assigned.

Be advised that as groundwater contamination exceeds the groundwater quality standards established in Title 15A NCAC 2L .0202, groundwater within the area of contamination or within the area where groundwater contamination is expected to migrate is not suitable for use as a water supply.

If you have any questions regarding this notice, please contact me at the address or telephone number listed below.

Sincerely,

Michael Streeter, L.G.  
Hydrogeologist  
Asheville Regional Office  
UST Section, Division of Waste Management, NCDEQ

cc: Michael McKenna, Partner Engineering North Carolina, PLLC



**2016008154**

HAYWOOD CO, NC FEE \$26.00

PRESENTED & RECORDED:

09-27-2016 01:40:38 PM

SHERRI C. ROGERS

REGISTER OF DEEDS

BY: TARA E. REINHOLD

DEPUTY

**BK: RB 914**

**PG: 632-635**

## NOTICE OF RESIDUAL PETROLEUM

Main Street Automotive, 817 North Main Street, Waynesville, Haywood County, North Carolina

The property that is the subject of this Notice (hereinafter referred to as the "Site") contains residual petroleum and is an Underground Storage Tank (UST) incident under North Carolina's Statutes and Regulations, which consist of N.C.G.S. 143-215.94 and regulations adopted thereunder. This Notice is part of a remedial action for the Site that has been approved by the Secretary (or his/her delegate) of the North Carolina Department of Environment and Natural Resources (or its successor in function), as authorized by N.C.G.S. Section 143B-279.9 and 143B-279.11. The North Carolina Department of Environment and Natural Resources shall hereinafter be referred to as "DENR".

### NOTICE

Petroleum product was released and/or discharged at the Site. Petroleum constituents remain on the site, but are not a danger to public health and the environment, provided that the restrictions described herein, and any other measures required by DENR pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11, are strictly complied with. This "Notice of Residual Petroleum" is composed of a description of the property, the location of the residual petroleum and the land use restrictions on the Site. The Notice has been approved and notarized by DENR pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11 and has/shall be recorded at the Haywood County Register of Deeds' office

Book \_\_\_\_, Page \_\_\_\_.

### Source Property

Clifford Gould, LLC of Cincinnati, Ohio is the owner in fee simple of all or a portion of the Site, which is located in the County of Haywood, State of North Carolina, and is known and legally described as:

All that parcel of land lying in Waynesville Township, Haywood County, North Carolina, containing 0.910 Acres and being a portion of Deed Book 840, Page 1799 and having the following metes and bounds:

*BEGINNING at a PK Nail set at the intersection of North Main Street and Marshall Road and being located North 53 degrees 33 minutes 03 seconds East 2574.37 feet from N.C.G.S. Monument "COURT HOUSE" having a North Coordinate of 657,973.33 and an East Coordinate of 813,596.46 based on NAD 83 (2001) datum and runs thence with the north margin of Marshall Road two (2) calls as follows: North 38 degrees 09 minutes 49 seconds West 169.29 feet to a PK Nail set; thence North 39 degrees 03 minutes 07 seconds West 51.38 feet to a 5/8" rebar set; thence North 47 degrees 03 minutes 53 seconds East 75.67 feet to a 5/8" rebar set at the south margin of Walnut Street; thence with the south margin of Walnut Street four (4) calls as follows: South 81 degrees 08 minutes 04 seconds East 8.20 feet to a point; with a curve to the left having a radius of 900.00 feet, an arc length of 99.49 feet and along a chord of South 84 degrees 18 minutes 06 seconds East 99.44 feet to a point; South 87 degrees 28 minutes 07 seconds East 167.71 feet to a PK Nail set; along a curve to the right having a radius of 5.00 feet, an arc length of 11.44 feet and along a chord of South 21 degrees 54 minutes 14 seconds East 9.10 feet to a PK Nail set at the west margin of North Main Street, thence with the west margin of North Main Street two (2) calls as follows: South 43 degrees 39 minutes 38 seconds West 273.57 feet to a PK Nail set; with a curve to the right having a radius of 5.00 feet, an arc length of 8.57 feet and along a chord of North 87 degrees 15 minutes 06 seconds West 7.56 feet to the POINT OF BEGINNING, containing 0.910 Acres and shown as per survey and plat prepared by Herron Associates P.A., dated September 24, 2015 and certified by J. Randy Herron, P.L.S.*

For protection of public health and the environment, the following land use restrictions required by N.C.G.S. Section 143B-279.9(b) shall apply to all of the above-described real property. These restrictions shall continue in effect as long as residual petroleum remains on the site in excess of unrestricted use standards and cannot be amended or cancelled unless and until the Haywood County Register of Deed receives and records the written concurrence of the Secretary (or his/her delegate) of DENR (or its successor in function).

#### **PERPETUAL LAND USE RESTRICTIONS**

*Soil: The Site shall be used for industrial/commercial use only. Industrial/commercial use means a use where exposure to soil contamination is limited in time and does not involve exposure to children or other sensitive populations such as the elderly or sick. The real property shall not be developed or utilized for residential purposes including but not limited to: primary or secondary residences (permanent or temporary), schools, daycare centers, nursing homes, playgrounds, parks, recreation areas and/or picnic areas.*

*Groundwater: Groundwater from the site is prohibited from use as a water supply. Water supply wells of any kind shall not be installed or operated on the site.*

#### **ENFORCEMENT**

The above land use restriction(s) shall be enforced by any owner, operator, or other party responsible for the Site. The above land use restriction(s) may also be enforced by DENR through any of the remedies provided by law or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Notice without the approval of DENR (or its successor in function) shall be subject to enforcement by DENR to the full extent of the law. Failure by any party required or authorized to enforce any of the above restriction(s) shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

IN WITNESS WHEREOF, Arthur Neergaard caused this Notice to be executed pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11, this 19 day of AUGUST, 2006 2016

Arthur Neergaard  
(name of responsible party if agent is signing)  
By: [Signature]  
(signature of responsible party, attorney or other agent if there is one)  
MEMBER, CLIFFORD GOULD LLC  
(Title of agent for responsible party if there is one)

Signatory's name typed or printed: ARTHUR NEERGAARD

OHIO HAMILTON COUNTY  
(Name of county in which acknowledgment was taken)

I certify that the following person personally appeared before me this day, acknowledging to me that he or she signed the foregoing document: Drivers License R228813

Date: 08/19/16



KEVIN LUBWAMA  
Notary Public, State of Ohio  
My Comm. Expires 06/16/2020

[Signature]  
(signature of Notary Public)  
KEVIN LUBWAMA  
(printed or typed name of Notary Public)

Notary Public

My commission expires: 06-16-20

Approved for the purposes of N.C.G.S. 143B-279.11

*Jan Andersen*  
(signature of Regional Supervisor)  
Jan Andersen  
(printed name of Regional Supervisor)

, Regional Supervisor

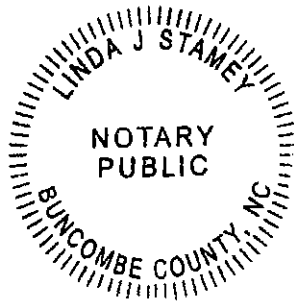
Asheville Regional Office  
UST Section  
Division of Waste Management  
Department of Environment and Natural Resources

NORTH CAROLINA  
Buncombe COUNTY  
(Name of county in which acknowledgment was taken)

I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: Jan Andersen (full printed name of Regional Supervisor)

Date: August 29, 2016

(Official Seal)



*Linda J. Stamey*  
(signature of Notary Public)  
Linda J. Stamey  
(printed or typed name of Notary Public)

Notary Public

My commission expires: January 8, 2020

## Preliminary Site Assessment Report

November 16, 2018  
WBS Element: 44625.1.1  
State Project: U-5888  
Haywood County

at

**Derek Scott Oates and Jennifer Fish Oates Property**

**Parcel #011**

**847 N Main Street, Waynesville, NC 28786**

**PIN #: 8615-69-0841**

**Facility ID No.: N/A**

**Groundwater Incident No.: 41031**

Prepared For:

**Mr. Dennis G. Li, Ph.D**

**NCDOT, Geotechnical Engineering Unit**

**GeoEnvironmental Section**

**1589 Mail Service Center**

**Raleigh, NC 27699-1589**

Prepared By:

**Seramur & Associates, PC**

**165 Knoll Drive**

**Boone, NC 28607**



---

Keith C. Seramur, P.G.

**TABLE OF CONTENTS**

**SECTION** **PAGE**

---

**1.0 INTRODUCTION..... 3**

    1.1 General Site Background Information..... 3

**2.0 SCOPE OF WORK..... 3**

    2.1 Background Research..... 3

    2.2 Plate 1 – Photos of Parcel #011..... 4

    2.3 Geophysical Surveys..... 5

    2.4 Soil Sampling and Analyses ..... 5

**3.0 RESULTS OF INVESTIGATION ..... 6**

    3.1 Geophysical Surveys..... 6

    3.2 Soil Borings, Sampling and Laboratory Results..... 7

    3.3 Volume and Extent of Soil Contamination..... 8

    3.4 Conclusions..... 8

    3.5 Recommendations..... 8

**Appendix A – Tables and Figures**

- Table 1 – Soil Boring Data
- Table B-3 – Summary of Soil Sampling Results
- Figure 1 – Site Location Map
- Figure 2 – Site Plan
- Figure 3 – Site Plan with Soil Boring Locations and Approx. Cross-Section Locations
- Figure 4 – Magnetometer Survey Results
- Figure 5 – Shallow GPR Depth Slices
- Figure 6 – Intermediate GPR Depth Slices
- Figure 7 – Deep GPR Depth Slices
- Figure 8 – Soil Analytical Results
- Figure 9 – Cross-Sections A-A` and B-B`

**Appendix B – Laboratory Reports and Chain of Custody Records**

**Appendix C – Documents From NCDEQ Incident Files**

## **1.0 Introduction**

### **1.1 General Site Background Information**

Seramur & Associates, PC was contracted to complete a Preliminary Site Assessment (PSA) at:

Derek Scott Oates and Jennifer Fish Oates Property  
Parcel #011  
PIN #: 8615-69-0841  
847 N Main Street, Waynesville, NC 28786  
Facility ID No.: N/A  
Groundwater Incident No.: 41031

This property is located at the intersection of North Main Street, Walnut Street and Bridge Street in Downtown Waynesville (Figure 1). The property is currently developed with a consignment store. The proposed Right-of-Way (R/W) and a permanent utility easement (PUE) cover the south side of the property along N Main Street. A temporary construction easement (TCE) is on the west side of the building along Bridge Street (Figure 2). It is our understanding that the R/W and easements are being investigated as part of a traffic circle being built to replace the current intersection.

## **2.0 Scope of Work**

The PSA scope of work included completing a geophysical survey at the property to investigate the potential for underground storage tanks within the easements and proposed R/W. Following the geophysical survey, soil sampling and analyses were performed to assess soil quality and estimate the volume of potentially contaminated soil at the site (Figure 3).

### **2.1 Background Research**

According to Haywood County Tax Administration records, the property is currently owned by Derek Scott Oates and Jennifer Fish Oates. A review of historic aerial photographs showed that the property was developed in the 1950's. Haywood County Tax Administration records indicate that the building was constructed in 1950. There is no Facility I.D. Number associated with this property. There is an Incident Number (41031) associated with this property.

Seramur and Associates personnel obtained electronic incident files from NCDEQ for our background research. NCDEQ reports indicate that the property once operated as a cabinet shop and any prior use of the property is not known.

NCDEQ reports provided included an Initial Abatement Action Report documenting closure of a 550 gallon heating oil UST in 2006. Soil samples were not collected at the time of closure, but were collected at a later time in October, 2011. Contaminated soil was removed from the property in February, 2012, totaling 42.16 tons. Contaminated soil was removed to a depth of 13 feet BGS. A Notice of No Further Action was issued on February 23, 2012.



Seramur and Associates personnel made a pedestrian reconnaissance of the property during the initial site visit on September 25, 2018. At that time, the proposed work area was marked with white paint for utility locating purposes. A utility locate request was initiated with the North Carolina 811 system on October 14, 2018, approximately one week before commencing with drilling.

## 2.2 Plate 1 – Photos of Parcel #011



## **2.3 Geophysical Surveys**

Seramur & Associates set up three grids for a geophysical survey at Parcel #011 (Figures 4 through 7). Grid 1 extended from the west side of the R/W and PUE towards the eastern side of the property. Grid 2 extended from the eastern end of Grid 1 toward the eastern property boundary. Grid 3 extended along the west side of the building covering about half of the TCE. This grid was in the location of the former heating oil UST. The GPR and magnetometer were used to survey areas outside of the three grids that were within the proposed R/W and easements. Geophysical data were collected along transects at a 2-foot spacing.

The Magnetometer survey was completed with a MF-1 Fluxgate magnetometer. The MF-1 Fluxgate magnetometer is designed to measure changes in the Earth's magnetic field associated with larger ferrous objects. It does not respond to smaller objects such as nails or wire, but responds well to variations in the Earth's magnetic field produced by manholes, steel pipe, buried drums and tanks. The sensitivity level is well suited for detecting buried USTs at commercial and industrial facilities. Magnetometer data was compiled in an Excel spreadsheet and a contour map with hill shade was drafted using Golden Software's Surfer® modeling program (Figure 4).

A Ground Penetrating Radar (GPR) survey was completed across the grids using Geophysical Survey Systems, Inc. 400 MHz antenna and a SIR-3000 Single Channel Data Acquisition System with a calibrated survey wheel. The GPR data was downloaded and saved onto a computer. The GPR grid data has been processed and modeled using GPR Slice® software. The GPR data processing included adjusting time zero, completing a background removal and adjusting the time variable gain to enhance deep reflections. GPR transect data collected across the probable USTs were processed using Radan® software.

Three-dimensional models of the GPR grid data were produced with the GPR Slice® software. Three time slices (or depth slices) were imaged in each of the two grids at depths of 0.3 to 0.8 feet, 1.6 to 2.1 feet and 3.2 to 3.7 feet (Figures 5 through 7). Each depth slice is a horizontal slice or plan view of reflections across an approximate 0.5-foot thickness of the subsurface. For example, the shallow GPR depth slices show reflections in the radar data between depths of 0.3 and 0.8 feet.

## **2.4 Soil Sampling and Analyses**

Carolina Soil Investigations, LLC mobilized to the site on October 23<sup>rd</sup>, 2018 to drill Geoprobe borings and collect soil samples. Our project design called for collecting a shallow and deep soil sample from each boring (Figure 3). The purpose of collecting samples at a depth of ~3.0 feet is to test for petroleum releases related to surface spills and releases from product lines. The purpose of collecting samples at a depth of ~9.0 feet is to test for petroleum releases related to underground storage tanks. Soil samples were collected at other depths within the Geoprobe cores if soil staining or petroleum vapors were observed or if limited core recovery occurred. Soil borings were drilled in the proposed R/W along North Main Street on the south side of the property and in the easements along the western side of the property (Figure 3).

A track-mounted Geoprobe rig was used to drill a total of seven soil borings. A new pair of Nitrile gloves was worn while collecting each soil sample. A representative portion of each soil sample was placed in a zip lock bag and allowed to rest for a period of time to allow volatile vapors to accumulate in the headspace of the bag. A calibrated Photoionization detector (PID) was used to screen the headspace in each bag and the concentration of volatile petroleum vapors was measured and recorded (Table 1). The texture and type of soil material in the Geoprobe cores was described and recorded. Table 1 lists the soil boring data including sample number, depth, PID reading, lithology and type of soil material.

Samples were collected and shipped on ice to REDLab, LLC, in Wilmington, NC for laboratory analyses. REDLab analyzed the soil samples for petroleum constituents by Ultra-Violet Fluorescence using a QED HC-1 analyzer. The analytical results are reported as Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) and Total Petroleum as Hydrocarbons (TPH). REDLab provides a hydrocarbon spectrum with each of the sample results. This spectrum is used for a tentative identification of the type of hydrocarbon detected by the analytical method. A hydrocarbon fingerprint is interpreted by REDLab for each sample using a library search of spectra for known hydrocarbon types and concentrations. The laboratory reports and fingerprint spectra are included in Appendix B.

### **3.0 Results of Investigation**

Parcel #011 contains a structure that currently operates as a consignment store. A heating oil UST was removed from the property in 2006 and an NCDEQ Incident was opened for the property in 2011. A Notice of No Further Action was issued after the contaminated soil was removed from the property in 2012.

#### **3.1 Geophysical Surveys**

##### **Magnetometer Survey**

Two magnetic anomalies were detected in Grid 1. One anomaly was a localized reading in the vicinity of a metal light pole. The second was a large anomaly just south of the center of the building. This anomaly is large enough to represent a UST. Magnetic anomalies were not detected in Grids 2 and 3.

##### **Shallow GPR Depth Slice**

The shallow GPR depth slices (0.3-0.8 feet) imaged disorganized areas of high amplitude reflections in a background of medium to low amplitude reflections. There was no evidence of buried infrastructure observed at this depth.

##### **Intermediate GPR Depth Slice**

The intermediate GPR depth slices (1.6-2.1 feet) images several sets of reflections related to site features. Grid one showed a linear high amplitude reflection extending from the road back

toward the building. This is interpreted as a utility line, possibly a sewer line. An oblong, high amplitude reflection was recorded south of the building at the same location as the large magnetic anomaly (Figure 4). Two profiles were collected across the oblong anomaly and show reflection characteristics typical of a UST (Insets A & B on Figure 6). An isosurface image was produced and a horizontal depth slice was overlaid on this image (Inset C on Figure 6). This shows the 3-D relationship between the utility line and the probable UST. This image also shows that the utility line is sloping toward the street as would be expected for a sewer line.

Grid 2 shows a linear high amplitude reflection extending from the road back toward the side of the building. This is interpreted as the water line. The water line is mapped about 3 feet west of this anomaly.

A rectangular area of low amplitude reflections (blue) in Grid 3 shows an outline of the UST excavation for the former heating oil UST.

### **Deep GPR Depth Slice**

The deep GPR depth slices (3.2-3.7 feet) do not show any distinct reflections patterns related to buried infrastructure. There are a few small, high amplitude reflectors observed across the grid but there were no magnetic anomalies recorded at these locations.

The geophysical surveys imaged one probable UST on the south side of the building. They also imaged an outline of the former heating oil UST excavation.

### **3.2 Soil Borings, Sampling and Laboratory Results**

The soil type at Parcel #011 consisted of fill material and saprolite, ranging from silty sand to sandy silt. Alluvium was encountered at depth in one boring (Table 1 and Figure 9). Groundwater was not encountered in any of the soil borings.

Borings B-1 and B-2 were drilled southeast of the building in the Proposed R/W (Figure 3). Borings B-3 and B-4 were drilled on either side of the probable UST south of the building. Borings B-5 and B-6 were drilled along the west side of the building around the former heating oil UST excavation. Boring B-7 was drilled in the PUE off of the southwest corner of the building.

Elevated DRO concentrations (28.4 ppm) were detected in S-1 collected from B-1 on the far east side of the property. Petroleum constituents in this soil maybe related to the releases at Parcel #012 to the east. The USTs on Parcel #012 were formerly located along the western side of that property. Concentrations above 5.3 ppm DRO were not detected in any other soil samples collected from Parcel #011.

### 3.3 Volume and Extent of Soil Contamination

Contaminated soil, defined as GRO concentrations above 50 ppm and DRO concentrations above 100 ppm, was not detected in soil samples collected at Parcel #011.

### 3.4 Conclusions

The large magnetic anomaly detected in Grid 1 is interpreted to be a probable UST. GPR profiles show reflection characteristics consistent with a UST in the center of Grid 1. The GPR depth slices and the 3-D isosurface model clearly shows anomalies of the size and shape of buried a UST.

Laboratory analyses of soil samples collected within the proposed Right-of-Way and easement on Parcel #011 did not detect concentrations of GRO and DRO constituents above their respective action levels.

### 3.5 Recommendations

SAPC recommends that the probable UST be properly closed. A licensed geologist or engineer should supervise the excavation and removal of this UST and completion of the UST Closure Report.

## Appendix A

### Tables and Figures

Table 1. Soil Boring Data - Parcel #011 - Derek S. and Jennifer F. Oates Property						
Boring No.	Depth (ft)	Lithology	Soil type	Soil Sample	PID ppm	Comments
B-1	0.0 to 5.0	Silty Sand	Fill	S-1	0.1	Sample at 3.0 feet.
B-1	5.0 to 10.0	Silty Sand	Fill	S-2	0.3	Sample at 9.5 feet.
B-2	0.0 to 2.0	Silty Sand	Fill	S-3	0.1	Sample at 3.0 feet.
	2.0 to 5.0		Saprolite			
B-2	5.0 to 10.0	Silty Sand	Saprolite	S-4	0.2	Sample at 9.0 feet.
B-3	0.0 to 2.0	Silty Sand	Fill	S-5	0.1	Sample at 3.0 feet.
	2.0 to 5.0		Saprolite			
B-3	5.0 to 7.5	Silty Sand	Saprolite	S-6	0.1	Sample at 9.0 feet.
	7.5 to 10.0	Silty Sand with Gravel	Alluvium			
B-4	0.0 to 2.0	Silty Sand	Fill	S-7	0.1	Sample at 3.0 feet.
	2.0 to 5.0	Sandy Silt	Saprolite			
B-4	5.0 to 10.0	Sandy Silt	Saprolite	S-8	0.1	Sample at 6.0 feet.
				S-9	0.4	Sample at 9.0 feet.
B-5	0.0 to 5.0	Sandy Silt	Fill	S-10	0.1	Sample at 3.0 feet.
B-5	5.0 to 10.0	Sandy Silt	Fill	S-11	0.0	Sample at 9.0 feet.
B-6	0.0 to 5.0	Sandy Silt	Fill	S-12	0.1	Sample at 1.5 feet.
B-6	5.0 to 10.0	Sandy Silt	Fill	S-13	0.4	Sample at 9.5 feet.
B-7	0.0 to 2.0	Silty Sand	Fill	S-14	0.2	Sample at 3.0 feet.
	2.0 to 5.0	Sandy Silt	Saprolite			
B-7	5.0 to 10.0	Sandy Silt	Saprolite	S-15	0.1	Sample at 9.0 feet.

**Table B-3: Summary of Soil Sampling Results**

Revision Date: 10/25/18

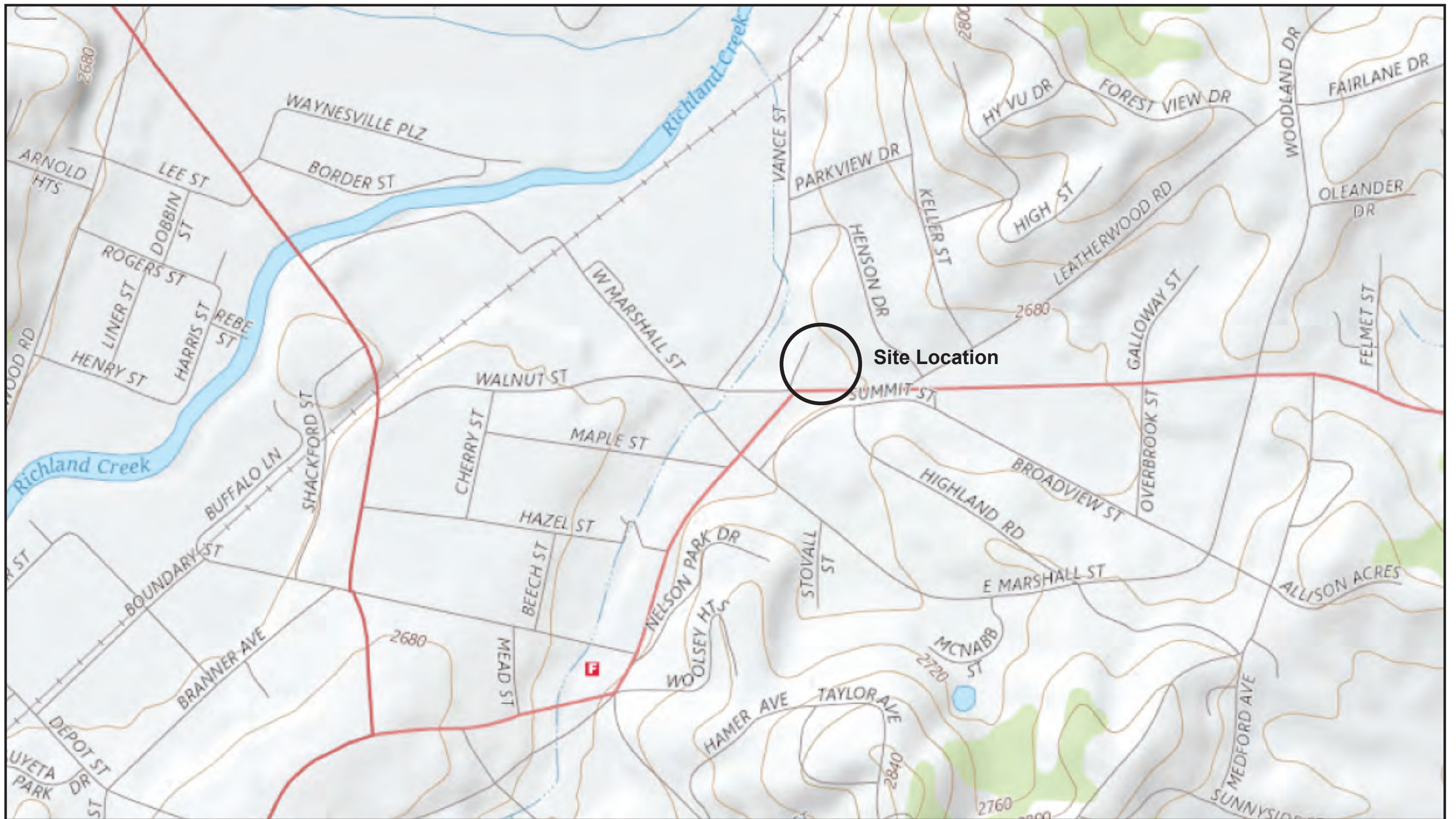
Incident Number and Name: 41031, Derek S. Oates and Jennifer F. Oates Property

Parcel ID#: 011

Analytical Method (e.g., VOC by EPA 8260) →					UVF	UVF
Contaminant of Concern →					TPH GRO (mg/kg)	TPH DRO (mg/kg)
Sample ID	Date Collected (mm/dd/yy)	Source Area	Sample Depth (ft. BGS)	Incident Phase		
S-1	10/23/18	B-1	3.0	PSA	<0.58	28.4
S-2	10/23/18	B-1	9.5	PSA	<0.52	5.2
S-3	10/23/18	B-2	3.0	PSA	<0.52	0.10
S-4	10/23/18	B-2	9.0	PSA	<0.56	0.30
S-5	10/23/18	B-3	3.0	PSA	<0.61	<0.25
S-6	10/23/18	B-3	9.0	PSA	<0.58	<0.23
S-7	10/23/18	B-4	3.0	PSA	<0.53	0.07
S-8	10/23/18	B-4	6.0	PSA	<0.49	3.0
S-9	10/23/18	B-4	9.0	PSA	<0.75	0.14
S-10	10/23/18	B-5	3.0	PSA	<0.30	0.70
S-11	10/23/18	B-5	9.0	PSA	<0.55	<0.22
S-12	10/23/18	B-6	1.5	PSA	<0.56	0.56
S-13	10/23/18	B-6	9.5	PSA	<0.63	5.3
S-14	10/23/18	B-7	3.0	PSA	<1.0	2.4
S-15	10/23/18	B-7	9.0	PSA	<0.76	2.5
<b>NC DEQ Action Level (mg/kg)</b>					50	100

ft. BGS = feet below ground surface

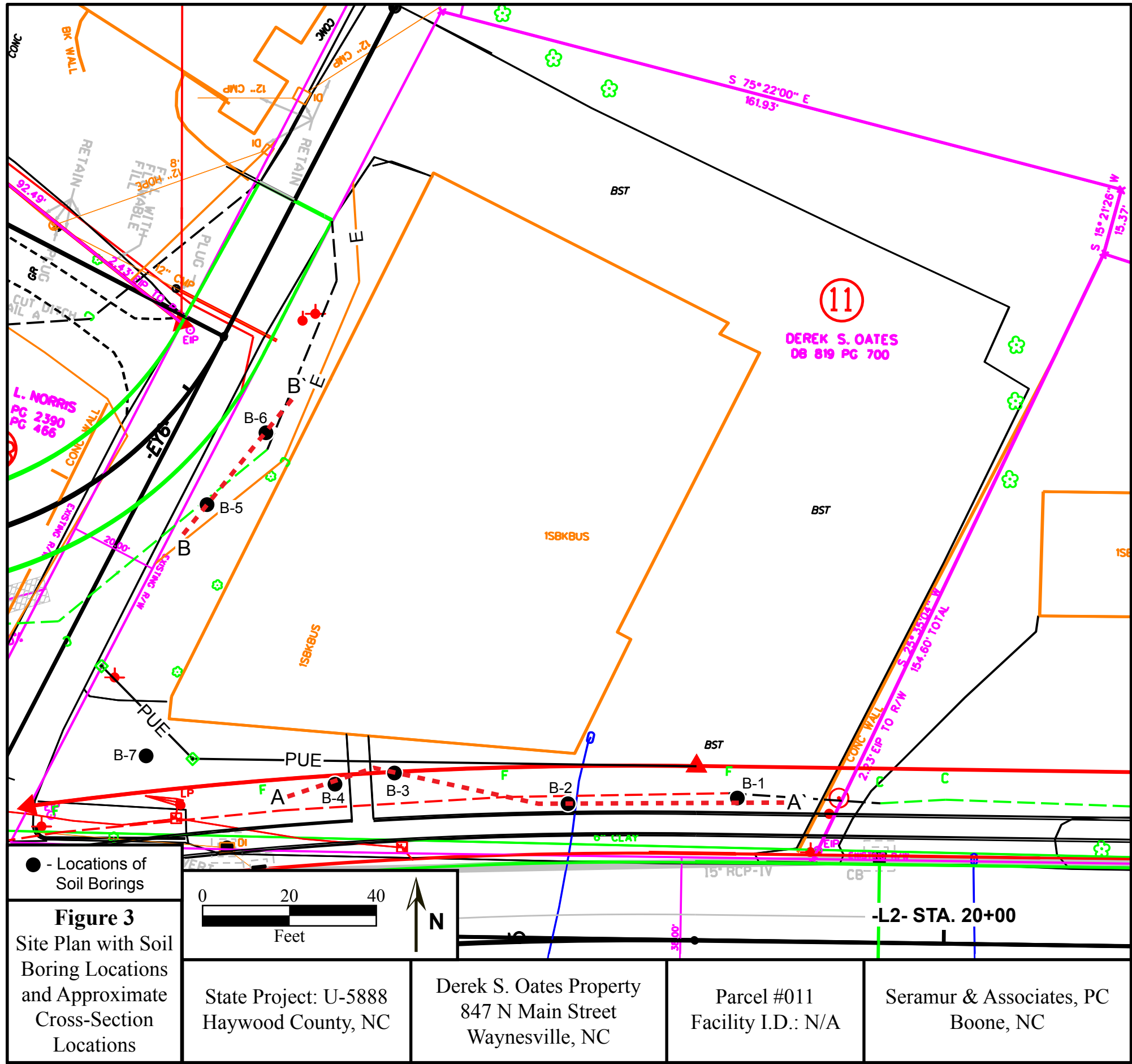
mg/kg = milligrams per kilogram

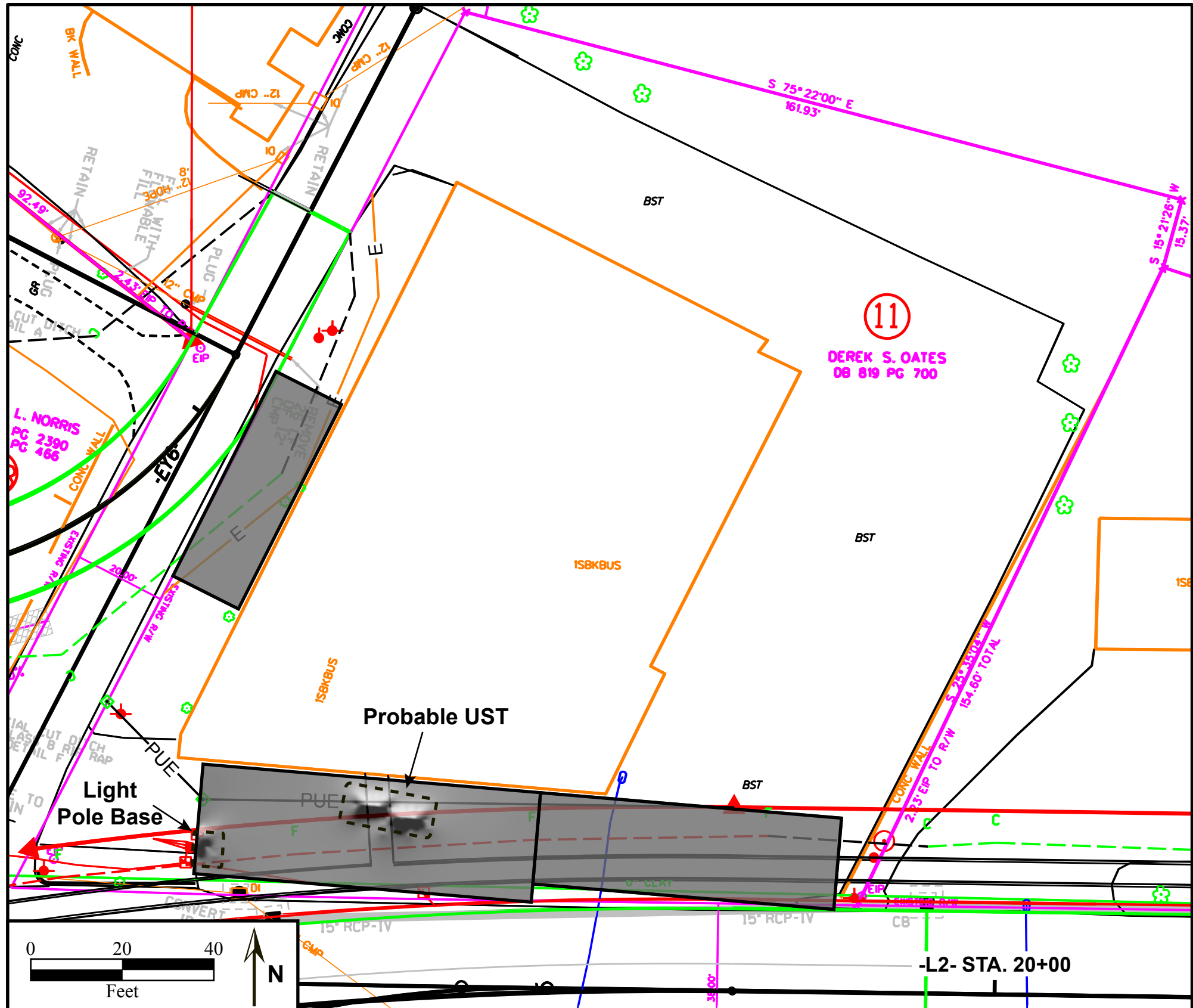


<p><b>Figure 1</b> Site Location Map Source: U.S.G.S. The National Map</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Derek S. Oates Property 847 N Main Street Waynesville, NC</p>	<p>Parcel #011 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>	<p>0 300 600 Feet</p>
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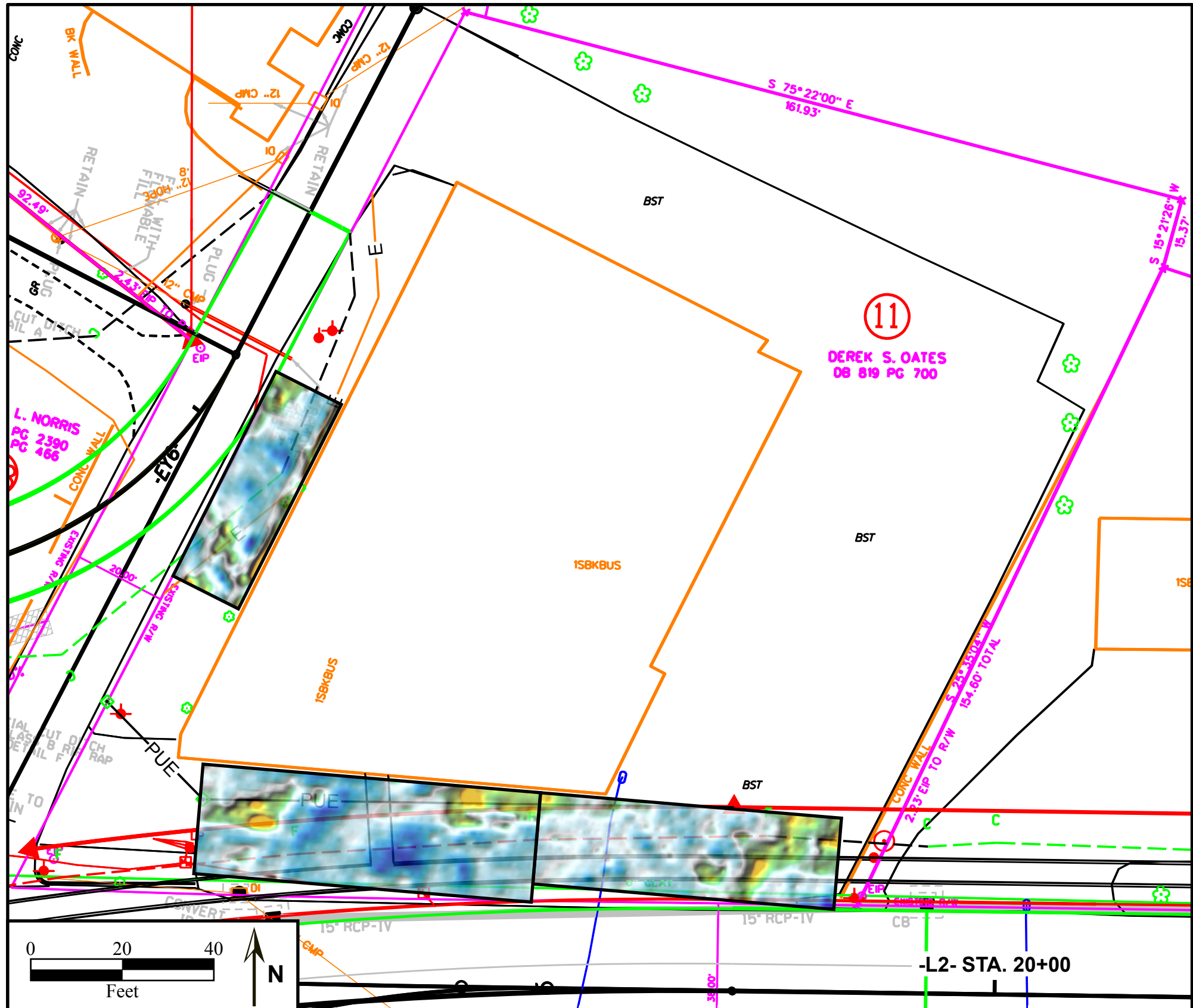






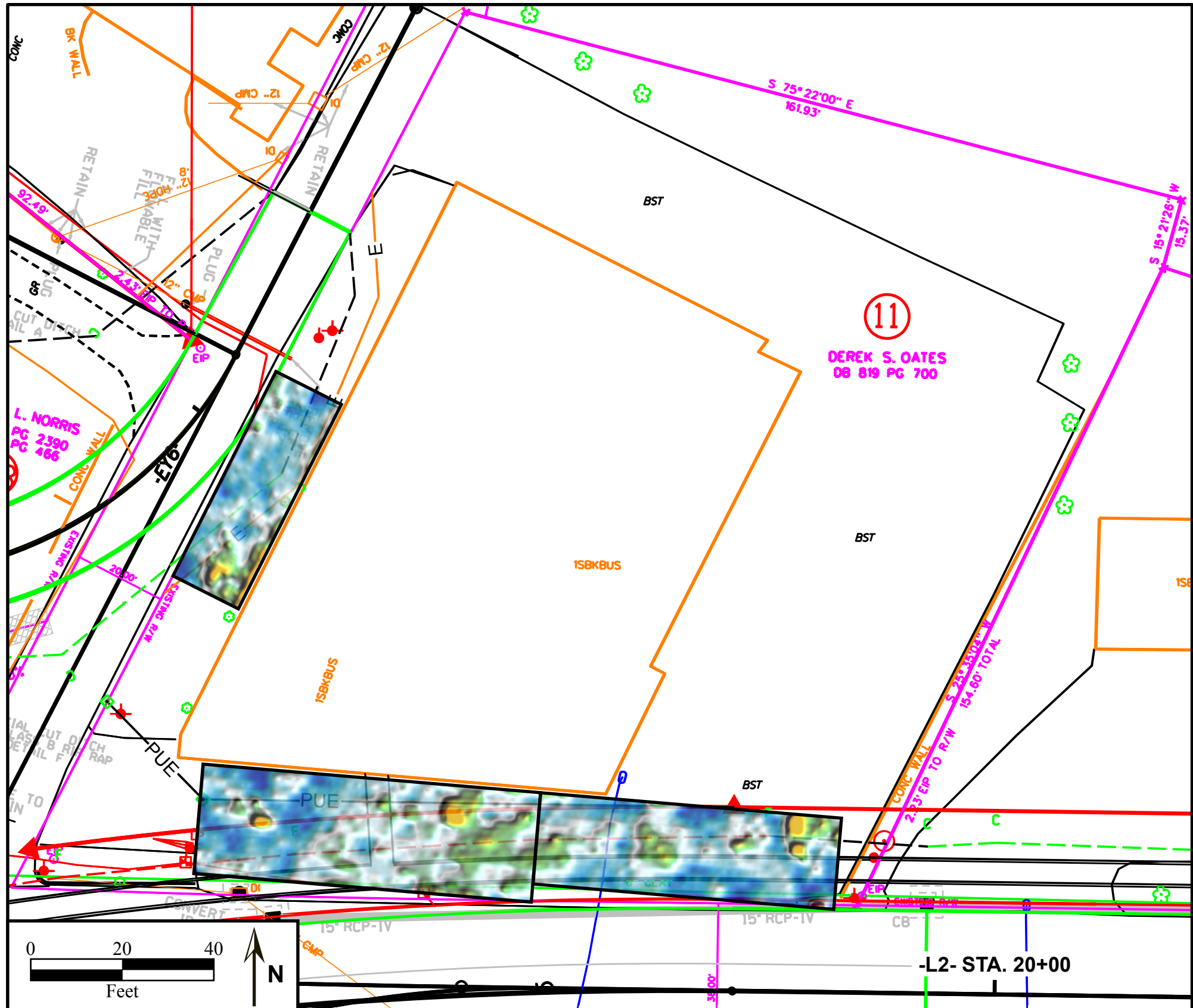


<p><b>Figure 4</b> Magnetometer Survey Results</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Derek S. Oates Property 847 N Main Street Waynesville, NC</p>	<p>Parcel #011 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>
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<p><b>Figure 5</b> Shallow GPR Depth Slices (0.3 - 0.8 ft.)</p>	<p>State Project: U-5888 Haywood County, NC</p>	<p>Derek S. Oates Property 847 N Main Street Waynesville, NC</p>	<p>Parcel #011 Facility I.D.: N/A</p>	<p>Seramur &amp; Associates, PC Boone, NC</p>
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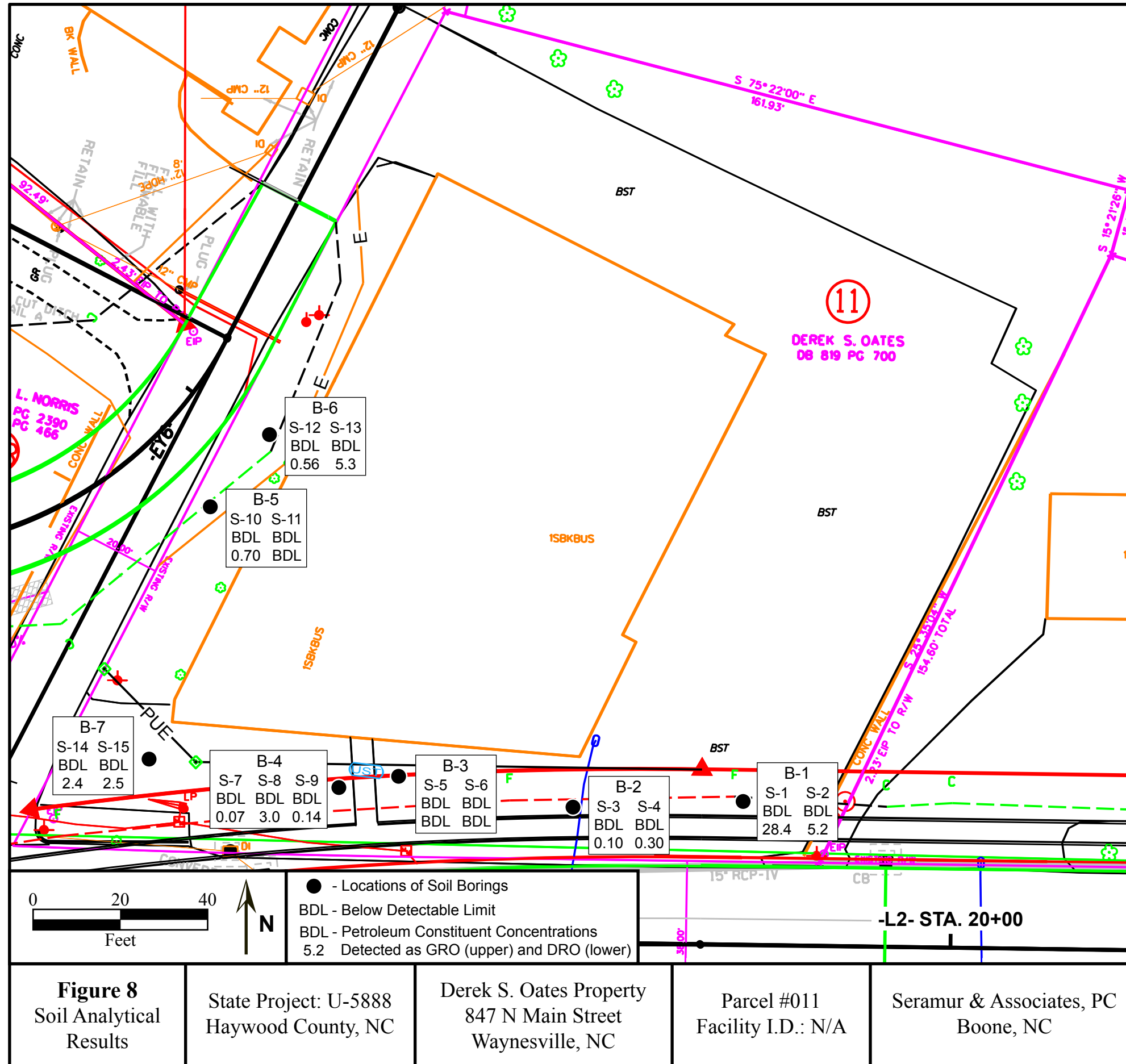
**Figure 7**  
 Deep GPR  
 Depth Slices  
 (3.2 - 3.7 ft.)

State Project: U-5888  
 Haywood County, NC

Derek S. Oates Property  
 847 N Main Street  
 Waynesville, NC

Parcel #011  
 Facility I.D.: N/A

Seramur & Associates, PC  
 Boone, NC



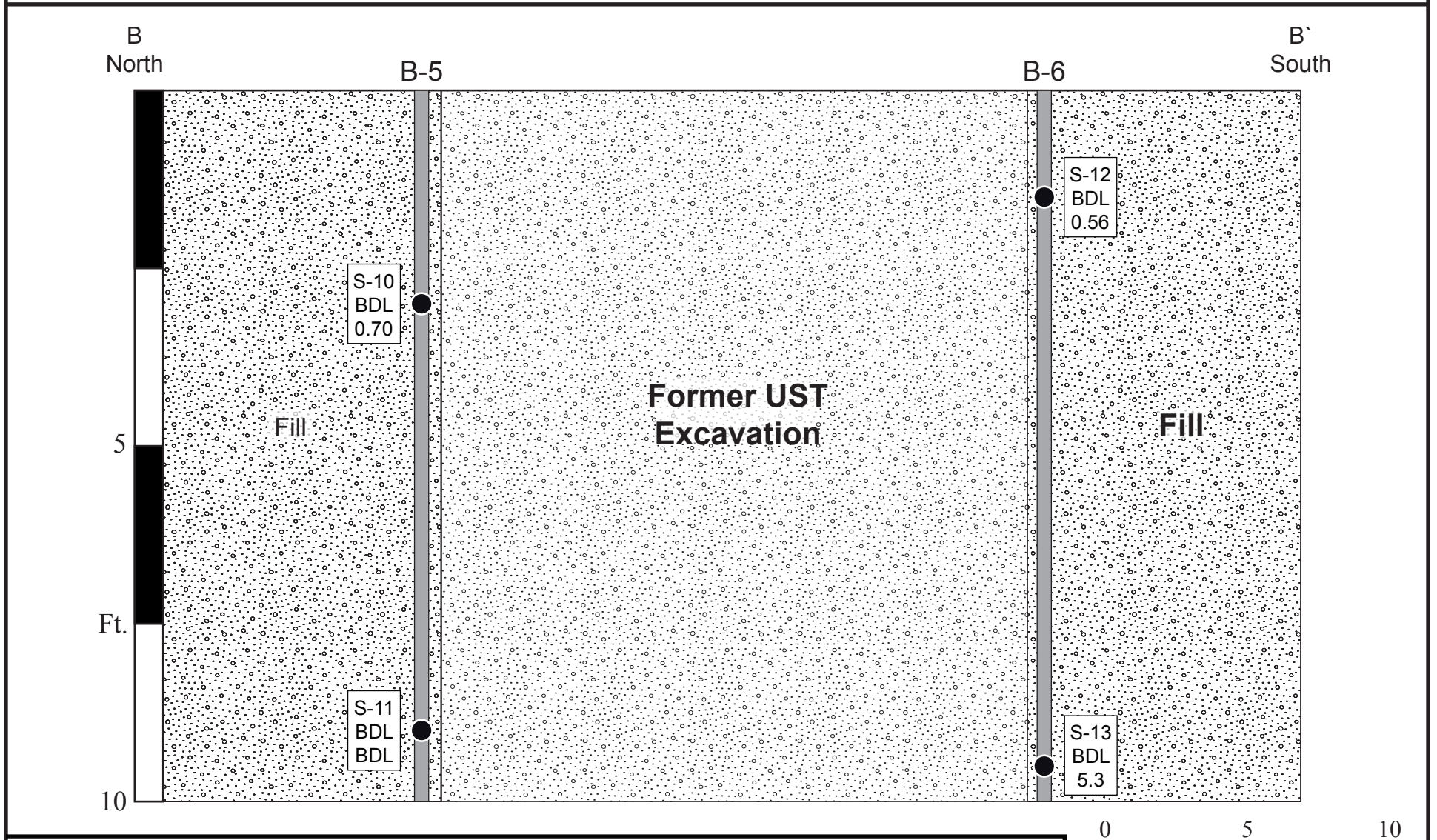
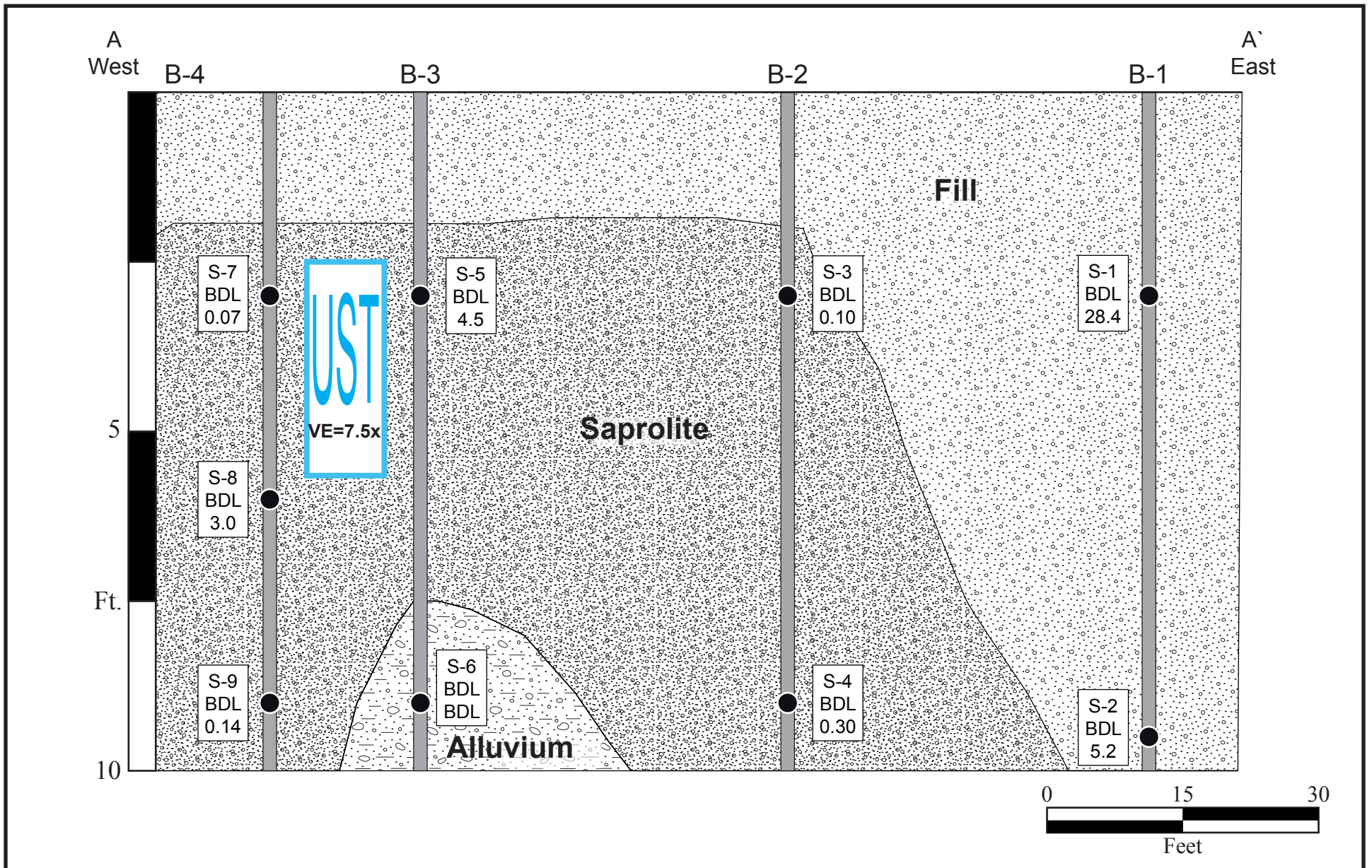
**Figure 8**  
Soil Analytical Results

State Project: U-5888  
Haywood County, NC

Derek S. Oates Property  
847 N Main Street  
Waynesville, NC

Parcel #011  
Facility I.D.: N/A

Seramur & Associates, PC  
Boone, NC



● - Locations of Soil Samples    BDL - Below Detectable Limit    BDL - Petroleum Constituent Concentrations  
 5.2 Detected as GRO (upper) and DRO (lower)

<b>Figure 9</b> Cross-Sections A-A' and B-B'	State Project: U-5888 Haywood County, NC	Derek S. Oates Property 847 N Main Street Waynesville, NC	Parcel #011 Facility I.D.: N/A	Seramur & Associates, PC Boone, NC
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## **Appendix B**

### **Laboratory Reports and Chain of Custody Records**





### Hydrocarbon Analysis Results

**Client:** SERAMUR & ASSOCIATES PC  
**Address:** 165 KNOLL DRIVE  
 BOONE NC 28607

**Samples taken** Tuesday, October 23, 2018  
**Samples extracted** Tuesday, October 23, 2018  
**Samples analysed** Thursday, October 25, 2018

**Contact:** KEITH SERAMUR  
 COLLECTED BY JA  
**Project:** NCDOT U-5888 P011

**Operator** NICK HENDRIX

U04049

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 - C10	C10 - C18	C18	
Soil	S-1	23.2	<0.58	<0.58	28.4	28.4	15.4	0.73	0.021	0	88.2	11.8	V.Deg.PHC 75.9%,(FCM)
Soil	S-2	20.8	<0.52	<0.52	5.2	5.2	2	0.11	0.001	0	91.7	8.3	Deg Fuel 75.4%,(FCM)
Soil	S-3	20.8	<0.52	<0.52	0.1	0.1	0.09	0.008	<0.006	0	53.3	46.7	Residual HC
Soil	S-4	22.4	<0.56	<0.56	0.3	0.3	0.36	0.007	<0.00	0	80.5	19.5	V.Deg.PHC 90.1%,(FCM)
Soil	S-5	24.5	<0.61	<0.61	<0.25	0.05	0.05	0.004	<0.007	0	34	66	Residual HC
Soil	S-6	23.2	<0.58	<0.58	<0.23	0.04	0.04	0.003	<0.007	0	34	66	Residual HC,(P)
Soil	S-7	21.3	<0.53	<0.53	0.07	0.07	0.07	0.006	<0.006	0	29	71	Residual HC
Soil	S-8	19.7	<0.49	<0.49	3	3	1.1	0.06	0.001	0	88.7	11.3	Deg Fuel 74%,(FCM)
Soil	S-9	29.9	<0.75	<0.75	0.14	0.14	0.13	0.005	<0.009	0	34	66	Residual HC
Soil	S-10	12.0	<0.3	<0.3	0.7	0.7	0.31	0.02	0.001	0	78.2	21.8	V.Deg.PHC 77.3%,(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

106.6%

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

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

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

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only.

**Data generated by HC-1 Analyser**



### Hydrocarbon Analysis Results

**Client:** SERAMUR & ASSOCIATES PC  
**Address:** 165 KNOLL DRIVE  
 BOONE NC 28607

**Samples taken** Tuesday, October 23, 2018  
**Samples extracted** Tuesday, October 23, 2018  
**Samples analysed** Thursday, October 25, 2018

**Contact:** KEITH SERAMUR  
 COLLECTED BY JA  
**Project:** NCDOT U-5888 P011

**Operator** NICK HENDRIX

U04049

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 - C10	C10 - C18	C18	
Soil	S-11	22.0	<0.55	<0.55	<0.22	0.04	0.04	0.003	<0.007	0	34	66	Residual HC
Soil	S-12	22.2	<0.56	<0.56	0.56	0.56	0.55	0.01	<0.007	0	82.5	17.5	V.Deg.PHC 94.2%,(FCM)
Soil	S-13	25.0	<0.63	<0.63	5.3	5.3	1.5	0.08	0.001	0	83.7	16.3	Deg.PHC 70.8%,(FCM)
Soil	S-14	41.3	<1	<1	2.4	2.4	0.96	0.05	<0.012	0	89.2	10.8	Deg Fuel 75.7%,(FCM)
Soil	S-15	30.2	<0.76	<0.76	2.5	2.5	0.95	0.05	<0.009	0	86.4	13.6	Deg Fuel 71%,(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

**97.2%**

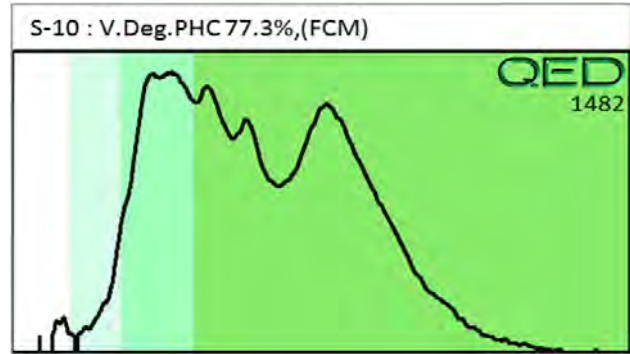
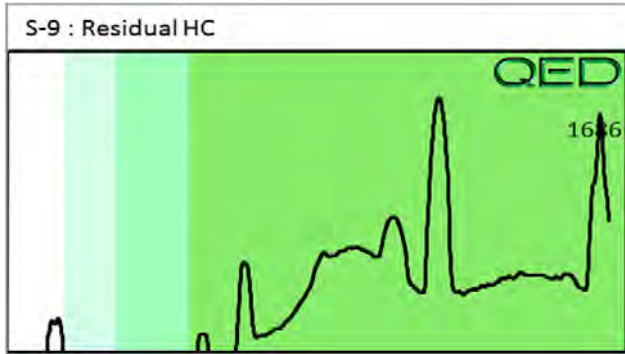
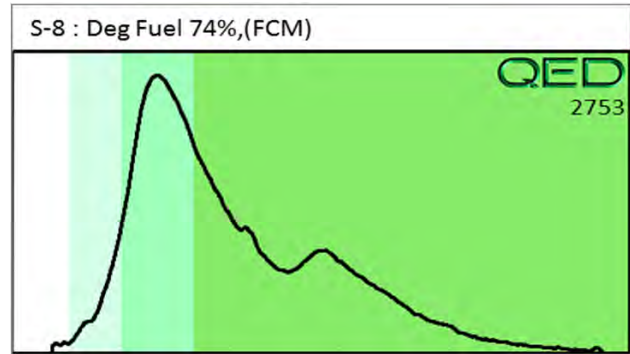
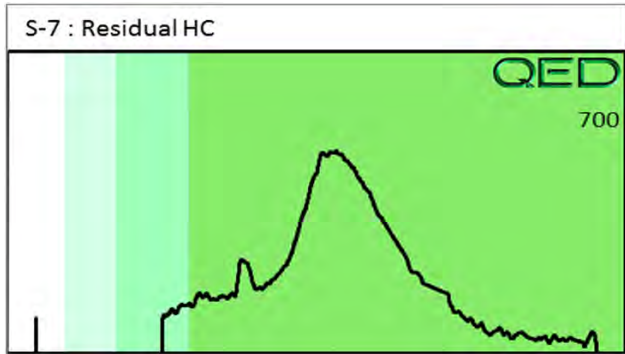
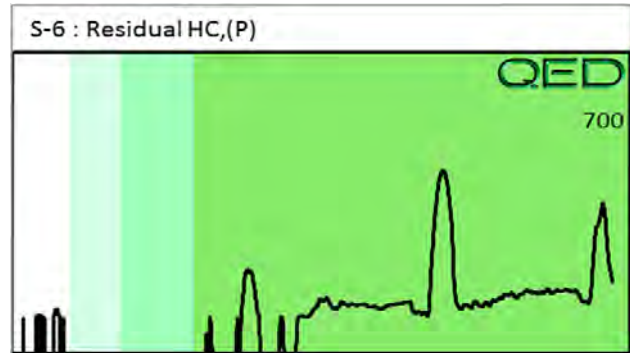
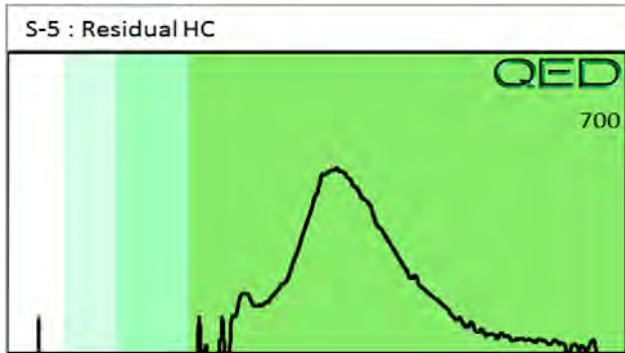
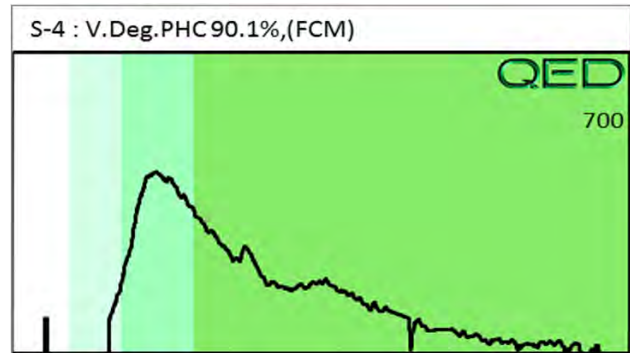
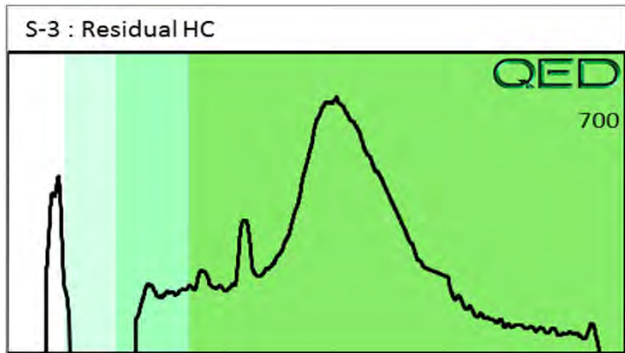
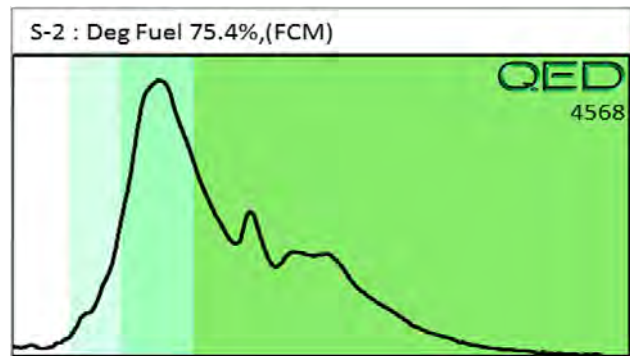
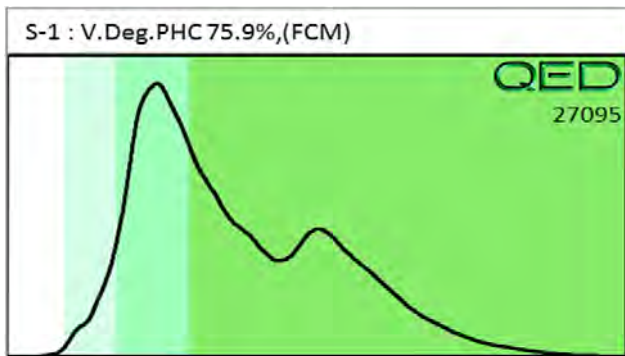
Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

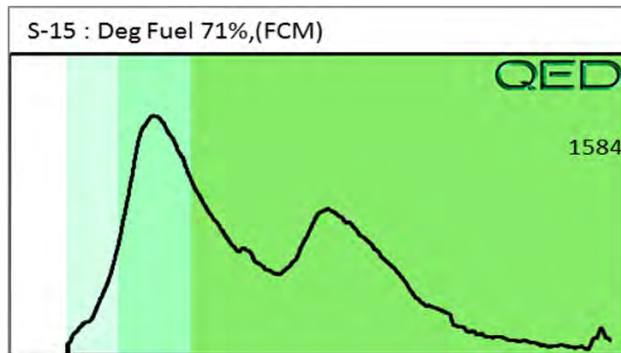
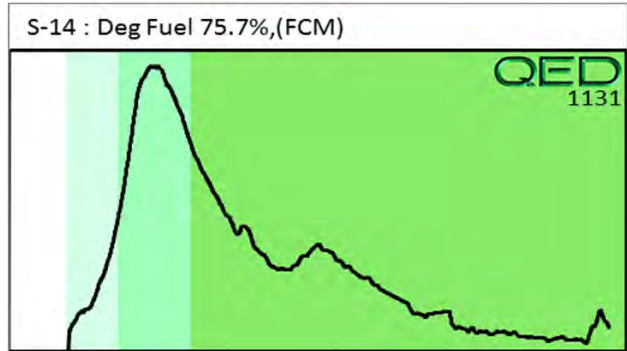
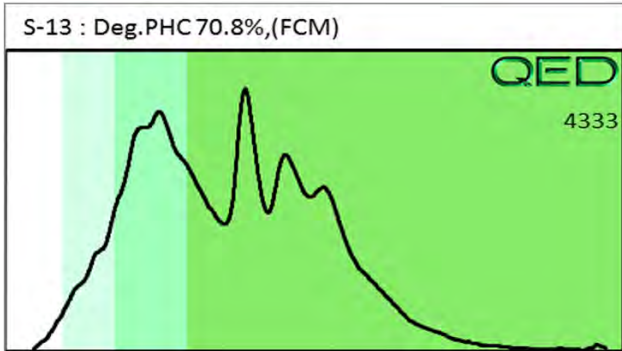
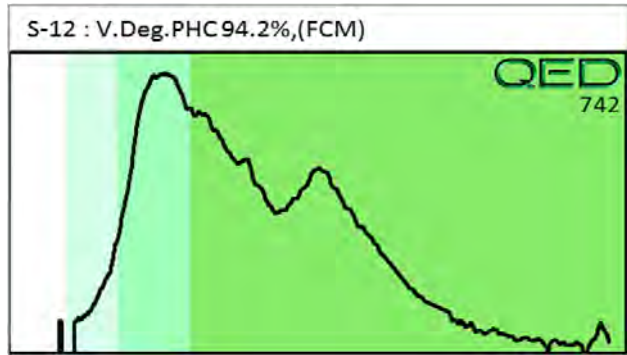
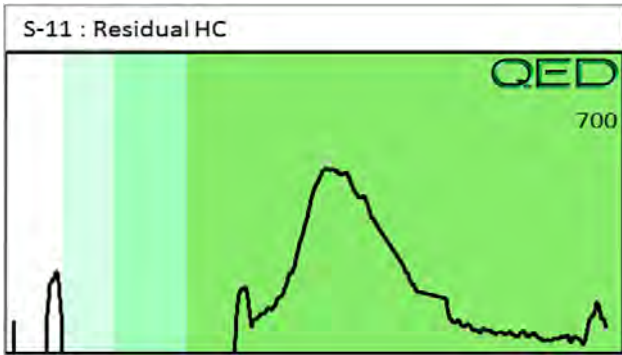
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

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

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only.

**Data generated by HC-1 Analyser**





Client Name: Seramur & Associates PC  
 Address: 165 Knoll Drive  
 Boone, NC 28607  
 Contact: Keith Seramur  
 Project Ref.: NCDOT U-5888 Fall  
 Email: seramur@icland.com  
 Phone #: (828) 264-0289  
 Collected by: Joey Anderson



**RAPID ENVIRONMENTAL DIAGNOSTICS**  
**CHAIN OF CUSTODY AND ANALYTICAL**  
**REQUEST FORM**

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409

Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and BaP

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
10/23/18 9:13		X	JBA	S-1	54.8	43.6	11.2
10/23/18 9:18		X	JBA	S-2	56.3	43.8	12.5
10/23/18 9:24		X	JBA	S-3	55.9	43.4	12.5
10/23/18 9:25		X	JBA	S-4	55.1	43.5	11.6
10/23/18 9:28		X	JBA	S-5	54.6	44.0	10.6
10/23/18 9:36		X	JBA	S-6	55.4	44.2	11.2
10/23/18 9:39		X	JBA	S-7	56.1	44.0	12.2
10/23/18 9:45		X	JBA	S-8	56.7	43.5	13.2
10/23/18 9:47		X	JBA	S-9	52.7	44.0	8.7
10/23/18 9:51		X	JBA	S-10	55.8	44.1	11.7
10/23/18 9:56		X	JBA	S-11	55.2	43.4	11.8
10/23/18 10:00		X	JBA	S-12	55.7	44.0	11.7
10/23/18 10:06		X	JBA	S-13	54.4	44.0	10.4
10/23/18 10:31		X	JBA	S-14	50.2	43.9	6.3
10/23/18 10:34		X	JBA	S-15	52.4	43.8	8.6

Comments:

**RED Lab USE ONLY**

15

Relinquished by	Date/Time	Accepted by	Date/Time
	10/24/18 12:30	Fed Ex	12:30
Relinquished by	Date/Time	Accepted by	Date/Time
		JH	10/25 12:00

## **Appendix C**

### **Documents From NCDEQ Incident Files**



North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue, Governor  
Dee Freeman, Secretary

Division of Waste Management  
Underground Storage Tank Section

Dexter R. Matthews, Director

February 23, 2012

United Community Bank  
Attn: Mike McKinney  
165 North Main Street  
Waynesville, North Carolina 28786

Re: Notice of No Further Action  
15A NCAC 2L .0407(d)  
Risk-based Assessment and Corrective Action  
for Petroleum Underground Storage Tanks

Cabin Company  
847 North Main Street, Waynesville  
Haywood County  
Incident Number: ~~2107~~ 41031 ces  
Risk Classification: Low

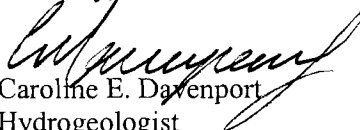
Dear Mr. McKinney:

The 20-Day Report and Initial Abatement Action Report received by the UST Section, Asheville Regional Office on February 21, 2012 have been reviewed. The review indicates that the site is classified as low risk and that after soil excavation soil contamination does not exceed Soil-to-Groundwater Maximum Soil Contaminant Concentrations (MSCCs), established in Title 15A NCAC 2L .0411.

The UST Section determines that no further action is warranted for this incident. This determination shall apply unless the UST Section later finds that the discharge or release poses an unacceptable risk or a potentially unacceptable risk to human health or the environment. Pursuant to Title 15A NCAC 2L .0407(a) you have a continuing obligation to notify the Department of any changes that might affect the risk or land use classifications that have been assigned.

This No Further Action determination applies only to the subject incident; for any other incidents at the subject site, the responsible party must continue to address contamination as required. If you have any questions regarding this notice, please contact Caroline Davenport at (828) 296-4500.

Sincerely,

  
Caroline E. Davenport  
Hydrogeologist  
Asheville Regional Office

cc: Haywood County Health Department  
Singleton Environmental: [Singletonenv@bellsouth.net](mailto:Singletonenv@bellsouth.net)



ENVIRONMENTAL, INC.

February 17, 2012

Ms. Caroline Davenport  
NCDENR-UST Division  
2090 US Hwy 70  
Swannanoa, NC 28778

**RECEIVED**  
FEB 21 2012  
UST SECTION  
Asheville Regional Office

RE: Cabin Company – Incident # ~~29007~~ 41031 *ceb*

Ms. Davenport:

The bank foreclosing on the property is: United Community Bank, 165 North Main Street, Waynesville, NC 28786. The contact is Mike McKinney. Please send the NFA letter to the bank. I do not have the current address for the Stricklands. You can reach me at (828) 667-5001 if you have any questions.

Sincerely,

Chris Singleton, P.G.  
Singleton Environmental, Inc.



# INITIAL ACTIONS & ABATEMENT REPORT

February 17, 2012

**Site Name:** Cabin Company  
847 North Main Street  
Waynesville, NC 28782

**Incident Number:** ~~20007~~ 41031 *oes*

**UST Owner / Operator:** Mike & Jeanne Strickland  
Cabin Company  
847 North Main Street  
Waynesville, NC 28786

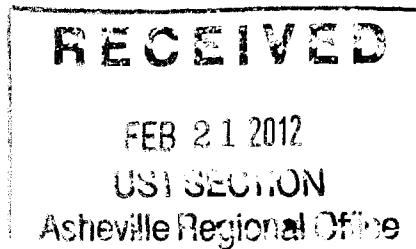
**Consultant / Contractor:** Singleton Environmental, Inc.  
PO Box 2012  
Enka, NC 28728  
Telephone: (828) 667-5001

**Date Release Discovered:** October 24, 2011

**Estimated Quantity of Release:** Unknown/unquantified


**Cause/Source of Release:** One 550-gallon heating oil UST

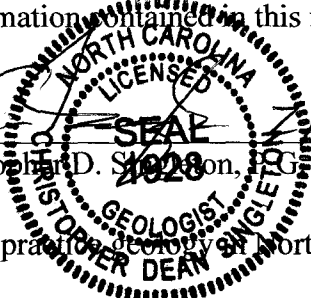
**Latitude:** (35° 29' 51.72" North)  
**Longitude:** (82° 58' 45.11" West)



## Signature and Seal of Certifying Professional Geologist:

I, Christopher D. Singleton, a North Carolina Professional Geologist for Singleton Environmental, Inc. do certify that the information contained in this report is correct and accurate to the best of my knowledge.

  
Christopher D. Singleton, P.G. #1928  
2/17/12

A circular professional seal for Christopher D. Singleton, a Professional Geologist in North Carolina. The seal contains the text "NORTH CAROLINA LICENSED PROFESSIONAL GEOLOGIST" around the perimeter and "CHRISTOPHER DEAN SINGLETON" in the center. The license number "1928" is also visible. The seal is stamped over the signature and name.

Singleton Environmental, Inc. is licensed to practice geology in North Carolina.

## Introduction

This report summarizes tank closure and initial site assessment activities for a 550-gallon heating oil underground storage tank (UST) at the property owned by the Cabin Company located at 847 North Main Street in Waynesville, North Carolina. Figure 1 shows the site location, and Figure 2 presents a site map showing the location of the former UST.

## Site History

The following table summarizes information about the UST at the site:

Tank No.	Volume (gallons)	Contents (i.e., gasoline, diesel, kerosene, heating oil, waste oil, etc.)	Use (resale, heating building, distribution, farm or residential, etc.)	Date last used	Indicate whether UST has been removed or closed in place	Date of permanent closure (if applicable)	Was a release detected from this UST system? If yes, give date.
1	550	#2 Heating Oil	Heating Building	2006	Removed	2006	Yes 10/24/11

Ownership of Tank: Mike & Jeanne Strickland  
Cabin Company  
847 North Main Street  
Waynesville, NC 28786

## Initial Abatement Activities

The 550-gallon heating oil UST located at the site was removed in 2006. The UST was located on the western side of the building as shown in Figure 2. On October 24, 2011, Singleton Environmental, Inc. mobilized to the site to collect a confirmation soil sample using a Giddings Drill Rig. Contaminated soils were encountered directly underneath the former UST and on February 6, 2012 soil excavation activities were initiated. The contaminated soils were excavated to a depth of 9 feet below the bottom of the former UST, to a total depth of 13 feet below existing site grade. The final excavation measured 15 feet long by 12 feet wide by 13 feet deep. The completed excavation cavity was backfilled with clean suitable soil and compacted.

Contaminated soils removed from the UST excavation (42.16 tons) were transported to Environmental Soils, Inc. in Lattimore, North Carolina, for disposal.

## Source Investigation

One soil sample (SB-6 in Figure 2) was collected from the UST excavation on October 24, 2011 during the former UST assessment. Soil sample SB-6 was collected from directly beneath the former UST location at a depth of 5 ft-bgs. Sample SB-6 was submitted for laboratory analysis of diesel and gasoline range organics (DRO/GRO) by EPA Method 8015 with 3550 extraction.

Analytical results from SB-6 indicated a DRO concentration of 7,730 mg/kg. Petroleum concentrations detected in SB-6 are representative of soil that was excavated and removed from the site. Soil analytical results are summarized in Table 1.

Five additional soil samples (Soil-A, Soil-B, Soil-C, Soil-D and Soil-E in Figure 2) were collected from the UST excavation on February 7, 2012. Soil-B, Soil-C, Soil-D and Soil-E were collected from the four side walls of the excavation at a depth of approximately 13 feet below existing site grade. Soil-A was collected from the bottom of the excavation at a depth of approximately 13 feet below ground surface. Soil samples Soil-A, Soil-B, Soil-C, Soil-D and Soil-E were submitted for laboratory analysis of volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, volatile petroleum hydrocarbons (VPH) by MADEP methods, and extractable petroleum hydrocarbons (EPH) by MADEP methods.

Analytical results from soil samples Soil-A, Soil-B, Soil-C, Soil-D and Soil-E did not detect any petroleum compounds above the soil-to-groundwater maximum contaminant levels. Refer to Table 1 for a summary of each constituent and the detected contamination level. A copy of the laboratory analytical report is included in Appendix A.

## Conclusions and Recommendations

The results of this investigation indicate that contaminated soil beneath the former 550-gallon heating oil UST located at the Cabin Company property has been removed. Therefore, Singleton Environmental recommends *no further action* at this site.

**TABLE 1**  
**SOIL ANALYTICAL RESULTS**

Cabin Company  
Waynesville, North Carolina

	<b>SB-6</b> 10/24/2011 4 ft-bgs	<b>Soil-A</b> 2/7/2012 13 ft-bgs	<b>Soil-B</b> 2/7/2012 13 ft-bgs	<b>Soil-C</b> 2/7/2012 13 ft-bgs	<b>Soil-D</b> 2/7/2012 13 ft-bgs	<b>Soil-E</b> 2/7/2012 13 ft-bgs	<b>Reportable Concentration (mg/kg)</b>	<b>Soil-to-GW Max Soil Cont. Level (mg/kg)</b>	<b>Residential Max Soil Cont. Level (mg/kg)</b>
<b>Concentration in mg/kg</b>									
<b>Diesel Range Organics</b> (EPA Method 8015 with 3550 extraction)									
DRO	<b>7,730</b>	Not Available	Not Available		Not Available	Not Available	<b>10</b>		
<b>Gasoline Range Organics</b> (EPA Method 8015 with 5030 extraction)									
GRO	Not Available	Not Available	Not Available		Not Available	Not Available	<b>10</b>		
<b>Volatile Organic Compounds</b> (EPA Method 8260)	Not Available	Non-Detect	Non-Detect	Non-Detect	Non-Detect	Non-Detect			
<b>Semivolatile Organic Compounds</b> (EPA Method 8270)	Not Available	Non-Detect	Non-Detect	Non-Detect	Non-Detect	Non-Detect			
<b>Petroleum Hydrocarbon Fractions</b> (MADEP Methods)	Not Available	Non-Detect	Non-Detect	Non-Detect	Non-Detect	Non-Detect			
C5-C8 Aliphatics (VPH)							<b>72</b>	<b>939</b>	
C9-C12 Aliphatics (VPH)									
C9-C18 Aliphatics (EPH)									
<b>Total C9-C18 Aliphatics</b>							<b>3,255</b>	<b>9,386</b>	
C19-C36 Aliphatics (EPH)							Immobile	93,680	
C9-C10 Aromatics (VPH)									
C11-C22 Aromatics (EPH)									
<b>Total C9-C22 Aromatics</b>							<b>34</b>	<b>469</b>	

**Note:** 1. Bolded values indicate concentrations which have exceeded at least one maximum allowable soil concentration. Bolded standards indicate those which have been exceeded.

