
**Preliminary Site Assessment Report
For Highway 221 Widening Project, Ashe County,
State Project: R-2915C
WBS Element: 34518.1.4**

at

**Parcel 106 – Joann Greer Property
Former Herbert's Grocery
6529 Highway 221 South
West Jefferson, NC 28694
Facility I.D. #: 0-021858**

Prepared For:

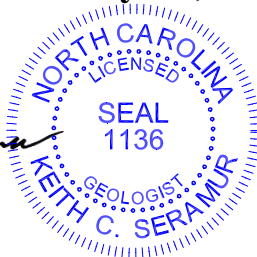
**Mr. Gordon Box
NC DOT, Geotechnical Engineering Unit
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Prepared By:

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May 22, 2015 (Revised 6-2-15)

Keith C. Seramur



Keith C. Seramur, P.G.

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1.0 Introduction

1.1 General Site Background Information

Seramur & Associates, PC was contracted to complete a Preliminary Site Assessment (PSA) at the Greer Property in West Jefferson, North Carolina (Figure 1). The property is:

Parcel 106 – Joann Greer Property
Former Herbert's Grocery, Facility I.D. #: 0-021858
6529 Highway 221 South, West Jefferson, NC 28694

The PSA scope of work included completing geophysical surveys at the property to investigate the potential for underground storage tanks followed by soil sampling to assess soil quality and estimate the volume of potentially contaminated soil at the site.

2.0 Scope of Work

2.1 Geophysical Surveys

Seramur & Associates set up 3 grids for geophysical surveys at the Greer Property. Geophysical data was collected along transects with a 1-foot spacing in Grid 1 and a 2-foot spacing in Grids 2 and 3. Magnetometer surveys were 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 objects. It does not respond to smaller objects such as nails or wire, but responds well to 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 spread sheet and a contour map of the data was drafted using Golden Software's Surfer® modeling program.

A Ground Penetrating Radar (GPR) survey was completed across each grid 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 GSSI's Radan® software. The GPR data processing included adjusting time zero, completing a background removal and adjusting the time variable gain to enhance deep reflections.

Three-dimensional models of the GPR grid data were produced with the Radan software. Three time slices (or depth slices) were imaged in each grid at depths of 1, 2 and 3 feet. These depth slices are horizontal slices or plan views of the GPR grid data at selected depths. The thickness of the horizontal slices can be adjusted to show reflections across particular depth range. We used a 0.5-foot thickness for these time slices. For example, Figure 4a is a 1-foot depth slice with a thickness of 0.5 feet. This image shows GPR reflections in the radar data between depths of 0.75 and 1.25 feet (0.25 feet above and below the slice depth of 1 foot).

2.2 Soil Sampling and Analyses

On May 4, 2015, Geonetics Corporation, Dba: Techdrill mobilized to the site to drill soil test borings and collect soil samples. Our project design called for collecting a shallow and deep soil sample from each boring (Figure 2). The soil borings were located as close as possible to potential source areas while staying within the proposed right of way. Soil borings were drilled in the vicinity of the former tank pit, the former dispenser island, around the existing USTs and adjacent to the existing dispenser island (Figure 2 and 3). Borings B-11 and B-12 were hand auger borings advanced through the existing dispenser island.

A track-mounted rotary drilling rig with hollow-stem augers was used to drill borings B-1 through B-10. Drilling tools were decontaminated between each soil boring. The drilling tools were cleaned with a hot-water pressure wash. Split spoons and the cutter head were decontaminated by washing with non-phosphate detergent, rinsed with de-ionized water, rinsed with isopropyl alcohol and a final rinse with de-ionized water. Soil samples were typically collected from depths of 3.5-5.0 feet and 8.5-10 feet. Soil samples from Boring B-2 were collected from 2-4 feet and from 8-10 feet. The soil samples from the hand auger borings were also collected at different depths depending on soil type and soil staining.

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 sit for a period of time. A calibrated Photoionization detector was used to screen the headspace in each bag and the concentration of volatile petroleum vapors measured by the PID was recorded. The texture and type of soil material for each sample was recorded. Table 1 lists the soil boring data including sample depth, PID reading, soil texture and type for each sample.

A 5-gram terra core soil sampler was used to place the soil samples in containers prepared and supplied by QROS Laboratory. The containers were labeled and immediately placed on ice in a cooler. Chain of Custody (COC) records were completed to document site information and sample collection data. COC records accompanied the samples from the time they were collected until they were delivered to QROS Laboratories in Wilmington, North Carolina. The samples were shipped overnight to the laboratory via FedEx. QROS Laboratory analyzed the soil samples for petroleum constituents by Ultra-Violet Fluorescence using a QED HC-1 analyzer. The laboratory reports and chain of custody records are included in Appendix B.

3.0 Results of Investigation

Seramur and Associates reviewed the NC UST Database for the former Herbert's Grocery. The UST Database shows that two 1,000-gallon gasoline USTs and one 550-gallon kerosene UST were used at the facility between 1964 and 1993. The UST Database lists the two existing USTs as one 8,000 compartmental gasoline UST and one 550 gallon kerosene UST.

We also spoke with the property owner, Ms. Joann Greer. Ms. Greer produced a UST closure report and allowed us to photograph the site plan in the report (Figure 3). The site plan shows the three USTs and the former dispenser island on the north end of the store building. Ms. Greer also showed us a fill pipe for a heating oil UST located in the carport (Figure 2).

3.1 Geophysical Surveys

Several magnetometer anomalies were detected in Grid 1 adjacent to the dispenser island and above two utility manholes (Figure 4). Seramur & Associates personal opened the utility manhole covers and only observed soil in these manholes. Magnetometer readings around the manhole covers were negative. We asked Ms. Greer if she knew the purpose of the manholes and she did not. The magnetometer data also shows an area of anomalies in Grid 2 above the existing USTs (Figure 4).

The GPR grids did a good job of showing areas of excavation below the pavement (Figures 5a through 5c). The 1-foot depth slice shows rectangular areas with few reflections. These areas coincide with the concrete pavement on the property. The concrete pavement extends over the existing USTs and dispenser island indicating that these rectangular areas of low-density GPR reflections are related to the UST closures and UST installations in 1993.

A distinct reflector on the 2-foot depth slice outlines these rectangular areas (Figure 5b). The reported location of the former tank pit is circled with a red dashed line. However, it appears that the yellow dashed line is a more likely location of the former tank pit. This area of a reflection free GPR facies is apparent on the Grid 1, 16-foot GPR transect (A-A' on Figures 5a and 5d).

Reflections on the 3-foot GPR slice show the location of the 8,000-gallon, compartmental gasoline UST and the 550-gallon kerosene UST (Figure 5c). These USTs are also imaged on GPR transects from Grids 2 and 3. Reflections from the two USTs appear on the Grid 2, 12-foot GPR transect (B-B' on Figures 5a and 5d) and the top of the USTs appear on the Grid 3, 0-foot transect (C-C' on Figures 5a and 5d).

3.2 Soil Borings, Sampling and Laboratory Results

Soil material at the Greer property is primarily a sandy silt fill material. A dark, organic rich alluvium was encountered in the base of borings B-1, B-2, B-3, B-4, B-6, B-8 and B-10. Groundwater was not encountered in any of the borings.

Soil borings B-1, B-2, B-3 and B-4 were drilled in the vicinity of the former USTs and dispenser island as shown on the UST Closure Report (Figure 3). Petroleum constituent concentrations were detected above NCDENR Action Levels in soil samples from borings B-1, B-2 and B-4. These petroleum constituents were fingerprinted by QROS laboratory as degraded gas, degraded fuel and very degraded petroleum hydrocarbons (PHC).

Soil boring B-10 was drilled to delineate the western extent of soil contamination associated with the former UST system. Petroleum constituents were detected in shallow soil sample S-25

(470.6 ppm) in boring B-10. There was no odor, staining or PID detection of these petroleum constituents and they were fingerprinted by QROS laboratory as degraded oil. We attribute the petroleum constituents in soil sample S-25 to either residual oil in fill material used at the site or to motor oil spilled at the property in the past.

The two hand augured soil borings B-11 and B-12 were drilled through holes in the concrete dispenser islands (Figure 2). Petroleum constituent concentrations were detected above NCDENR Action Levels in the 1.0 foot soil sample (S-1) from boring B-11 (Figure 6). The DRO in sample S-1 was fingerprinted by QROS laboratory as very degraded PHC.

Soil boring B-9 was drilled to delineate the extent of soil contamination west of the dispenser island. Petroleum constituents were detected at a concentration of 43.2 ppm in soil sample S-23 at a depth of 3.5-5.0 feet. There was no odor or staining noted in this sample and the DRO was fingerprinted by QROS laboratory as degraded oil. We attribute the petroleum constituents in soil sample S-23 to either residual DRO in fill material used at the site or a surface spill at the property in the past. Petroleum constituent concentrations were not detected above 10 ppm in soil sample S-24 from boring B-9.

Soil borings B-6, B-7 and B-8 were drilled around the existing USTs to access soil quality where the tank pit extends into the proposed right of way (Figure 6). Petroleum constituent concentrations were detected at a concentration of 17.9 ppm in the 8.5-10.0 foot soil sample (S-14) collected from boring B-5. Soil boring B-6 was drilled to delineate the extent of soil contamination west of the dispenser island. Petroleum constituent concentrations were detected at a concentration of 17.7 ppm in the 8.5-10.0 foot soil sample (S-16) collected from boring B-6. The DRO in samples S-14 and S-16 were fingerprinted by QROS laboratory as degraded fuel.

3.3 Volumes and Extent of Contaminated Soil

The area of soil contamination related to the former UST system is limited to the vicinity of borings B-1, B-2 and B-4 (Figure 7). This soil contamination probably extends to the store building outside the proposed right of way/easements. We did not investigate the area of the suspect tank pit (Figure 5b) as this area is outside the proposed right of way/easements.

Soil contamination in the vicinity of the former UST system can be estimated using a 5-foot thickness (5-10 feet) in the vicinity of borings B-1 and B-2 and a 10-foot thickness will be used in the vicinity of boring B-4 (Figure 7).

$$\begin{aligned} \text{Borings B-1 and B-2} &= 10.75 \text{ ft.} \times 13.5 \text{ ft.} \times 5 \text{ ft.} \\ &= 725.6 \text{ cubic feet} = 26.9 \text{ cubic yards} \end{aligned}$$

$$\begin{aligned} \text{Boring B-4} &= 3 \text{ ft.} \times 6.5 \text{ ft.} \times 10 \text{ ft.} \\ &= 195 \text{ cubic feet} = 7.2 \text{ cubic yards} \end{aligned}$$

Petroleum constituent concentrations were detected above 10 ppm in the 1.0-foot sample at the dispenser island in soil boring B-11 (Figure 6). The 3.0-foot soil sample did not contain petroleum constituents above 10 ppm (Table B-3). The volume of contaminated soil at the

existing dispenser island within the proposed right of way can be estimated using the volume of one half of a cylinder with a 5 foot radius and a 2 foot thickness of soil contamination (Figure 7).

$$\begin{aligned} & [(2 \pi r) \times 0.5] \times 2 \text{ feet} \\ & = 31.4 \text{ cubic feet} = 1.2 \text{ cubic yards} \end{aligned}$$

Soil contamination in the vicinity of the existing USTs can be estimated using a 5-foot thickness (5 to 10 feet) in the vicinity of borings B-5 and B-6 (Figure 7).

$$\begin{aligned} \text{Borings B-5 and B-6} & = 10.75 \text{ ft.} \times 13.5 \text{ ft.} \times 5 \text{ ft.} \\ & = 725.6 \text{ cubic feet} = 26.9 \text{ cubic yards} \end{aligned}$$

We estimate that there is total of 62.2 cubic yards of contaminated soil related to the UST systems within the proposed right of way. We also found evidence of degraded oil in surficial soil in the vicinity of Boring B-10.

3.4 Conclusions

Contaminated soil is present in the areas of the two UST systems that were used on the Greer Property. Seramur & Associates has reviewed the plans provided for the widening of US 221. It does not appear that contaminated soil will be encountered during the Highway 221 construction at the Greer Property. However, contaminated soil could be encountered during demolition of the former Herbert's Grocery building.

3.5 Recommendations

Contaminated soil is present in the vicinity of the former tank pit at Herbert's Grocery. No excavation work is proposed in this area but it is our understanding that the road widening could include removing the onsite buildings. Removal of the structure could encounter contaminated soil. Seramur & Associates recommends that a licensed geologist or engineer supervise the excavation and removal of any contaminated soil associated with demolition of the onsite building.

Petroleum constituent concentrations were detected in the vicinity of the two USTs on the property. These are commercial USTs and will require that a licensed geologist or engineer supervise the UST closures and collect the required soil samples below the USTs and along the product lines. Contaminated soil removed as part of these UST closures should be sent to a remediation facility.

Appendix A

Tables and Figures

Table 1. Soil Boring Data - 6529 Highway 221 South

Boring No.	Depth (ft)	Lithology	Soil type	Soil Sample	PID ppm	Comments
B-1	3.5 to 5.0	Sandy Silt	Fill	S-2	254	
B-1	8.5 to 10.0	Organic Silt	Alluvium	S-3	406	Old Floodplain
B-2	2.0 to 4.0	Sandy Silt	Fill	S-4	474	
B-2	8.0 to 10.0	Organic Silt	Alluvium	S-5	119	Old Floodplain
B-3	3.5 to 5.0	Sandy Silt	Fill	S-8	347	
B-3	8.5 to 10.0	Organic Silt	Alluvium	S-9	457	Old Floodplain
B-4	1.0	Sandy Silt	Fill	S-10	416	Petroleum Odor
B-4	3.5 to 5.0	Sandy Silt	Fill	S-11	368	
B-4	8.5 to 10.0	Organic Silt	Alluvium	S-12	391	Old Floodplain
B-5	3.5 to 5.0	Sandy Silt	Fill	S-13	91	
B-5	8.5 to 10.0	Sandy Silt	Fill	S-14	335	
B-6	3.5 to 5.0	Sandy Silt	Fill	S-15	107	
B-6	8.5 to 10.0	Organic Silty Sand	Alluvium	S-16	445	Old Floodplain
B-7	3.5 to 5.0	Sand and Gravel	Backfill	S-18	264	Backfill
B-7	8.5 to 10.0	Sandy Silt	Fill	S-19	16	
B-8	3.5 to 5.0	Sandy Silt	Fill	S-20	19	
B-8	8.5 to 10.0	Organic Silt	Alluvium	S-21	61	Old Floodplain
B-9	3.0 to 5.0	Sandy Silt	Fill	S-23	36	
B-9	8.5 to 10.0	Gravelly Silty Sand	Fill	S-24	0	Possible Fill
B-10	3.5 to 5.0	Sandy Silt	Fill	S-25	0	
B-10	8.5 to 10.0	Organic Silty Sand	Alluvium	S-26	0	Old Floodplain
B-11	1.0	Sandy Silt	Fill	S-1	0	
B-11	3.0	Sandy Silt	Fill	S-6	NA	Petroleum Odor
B-11	8.3	Sandy Silt	Fill	S-7	511	
B-12	3.9	Sandy Silt	Fill	S-17	456	
B-12	9.3	Sandy Silt	Fill	S-22	61	

Table 2: NCDENR UST Data - 6529 Highway 221 South

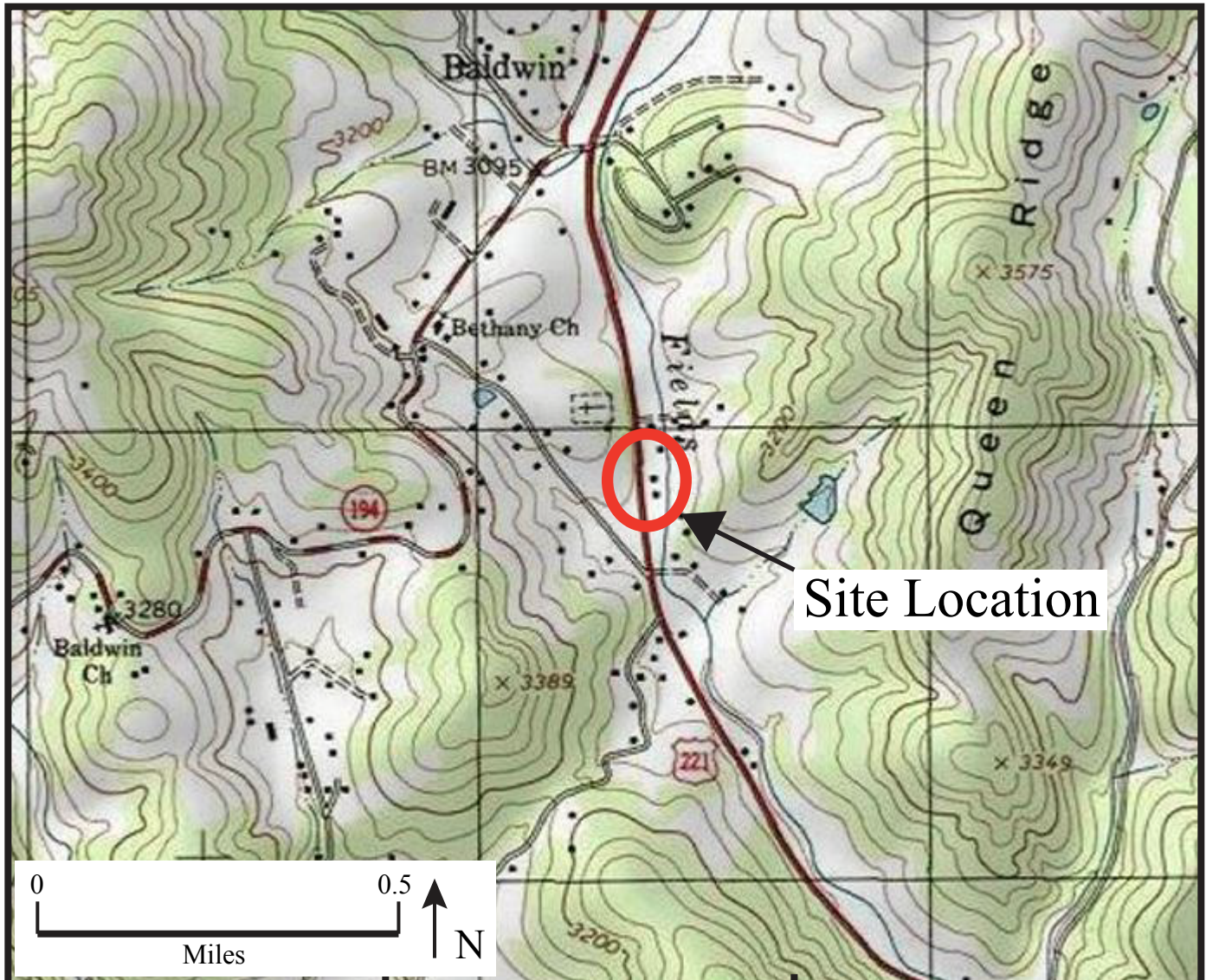
Facility Name	Address	City	State	Zip	Contact	Address	City	State
Herbert's Grocery	6513 US HWY 221 S	West Jefferson	NC	28694-8141	Herbert . Greer	6531 US HWY 221 SOUTH	West Jefferson	NC

Tank ID	Installation Date	Closure Date	Capacity		Commercial	Regulated	Product Name
A	1/1/64	1/31/93	1000	Y	Y	3	Gasoline, Gas Mix
B	1/1/64	1/31/93	1000	Y	Y	3	Gasoline, Gas Mix
C	1/1/64	1/31/93	550	Y	Y	8	Kerosene, Kero Mix
D	1/1/93		4000	Y	Y	3	Gasoline, Gas Mix
D2	1/1/93		4000	Y	Y	3	Gasoline, Gas Mix
E	1/1/93		550	Y	Y	8	Kerosene, Kero Mix

Table B-3: Summary of Soil Sampling Results – Herbert’s Grocery Store

Revision Date: 5-11-2015 Name: Parcel #005 Herbert’s Grocery Store

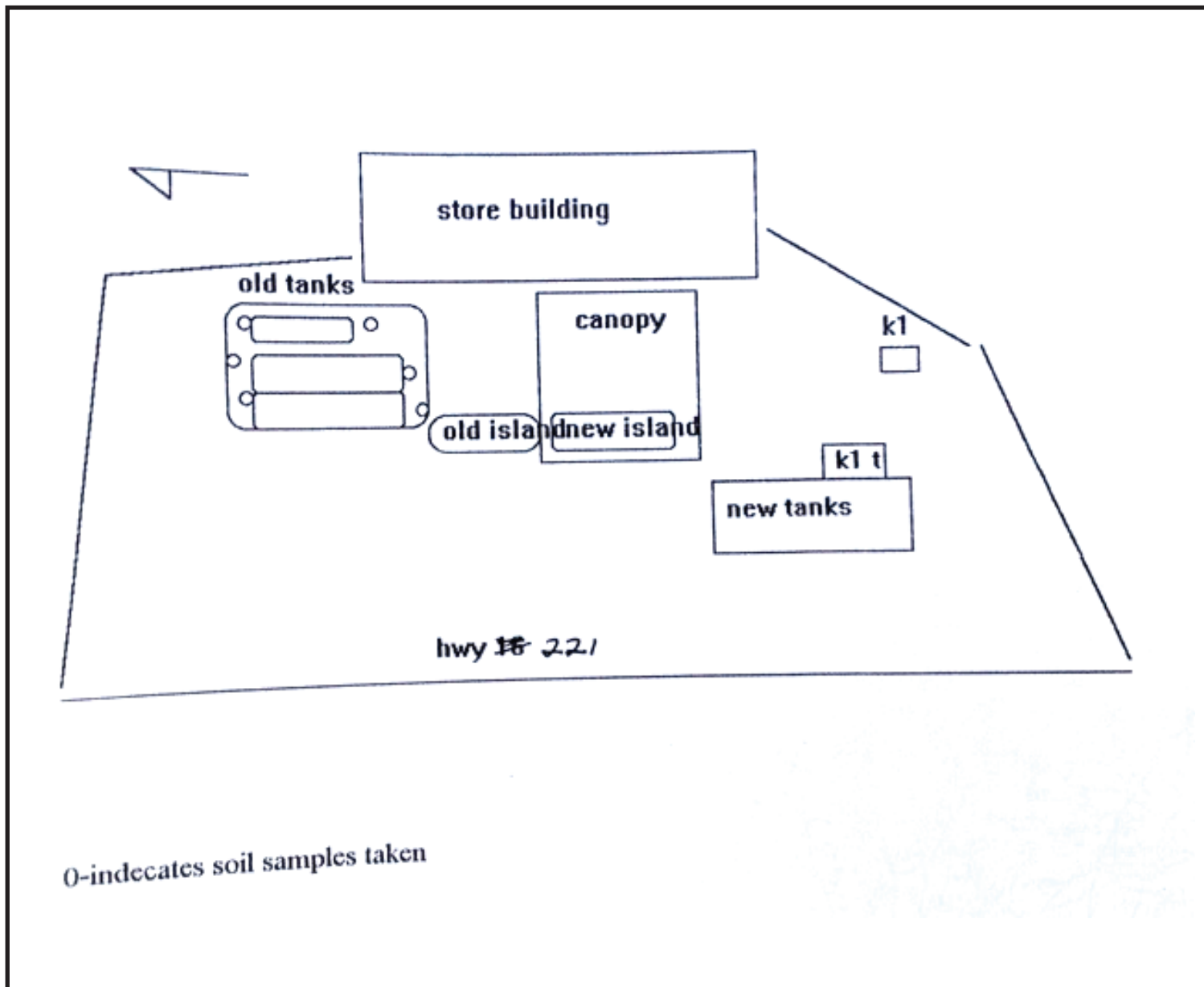
Analytical Method (e.g., VOC by EPA 8260) →					8015C	8015C	
Contaminant of Concern →					TPH GRO (ppm)	TPH DRO (ppm)	Hydro- carbon Fingerprint
Sample ID	Date Collected (m/dd/yy)	Source Area (eg. Tank pit 1)	Sample Depth (ft BGS)	Incident Phase (Closure, 20Day, LSA, etc.)			
S-1	5/4/15	PI-1	10 ft	PSA	<4.8	15.8	PHC
S-2	5/4/15	B-1	3.5-5 ft	PSA	<0.2	2.2	Fuel
S-3	5/4/15	B-1	8.5-10 ft	PSA	<0.46	12.7	PHC
S-4	5/4/15	B-2	2-4 ft	PSA	<0.32	55.5	Fuel
S-5	5/4/15	B-2	8-10 ft	PSA	<0.4	3.4	PHC
S-6	5/4/15	PI-1	3 ft	PSA	5.4	3.5	Gas
S-7	5/4/15	PI-1	8.3 ft	PSA	<0.29	0.26	PHC
S-8	5/4/15	B-3	3.5-5 ft	PSA	<0.32	<0.13	PHC
S-9	5/4/15	B-3	8.5-10 ft	PSA	<4.8	5	PHC
S-10	5/4/15	B-4	1.0 ft	PSA	36.2	29.9	Gas
S-11	5/4/15	B-4	3.5-5 ft	PSA	<0.28	11.7	Fuel
S-12	5/4/15	B-4	8.5-10 ft	PSA	<0.4	10.3	PHC
S-13	5/4/15	B-5	3.5-5 ft	PSA	<0.45	1.9	Fuel
S-14	5/4/15	B-5	8.5-10 ft	PSA	<0.47	17.9	Fuel
S-15	5/4/15	B-6	3.5-5 ft	PSA	<0.46	5.8	PHC
S-16	5/4/15	B-6	8.5-10 ft	PSA	<0.42	17.7	Fuel
S-17	5/4/15	PI-2	3.9 ft	PSA	<0.5	0.46	PHC
S-18	5/4/15	B-7	3.5-5 ft	PSA	<0.5	0.49	PHC
S-19	5/4/15	B-7	8.5-10 ft	PSA	<0.42	0.49	PHC
S-20	5/4/15	B-8	3.5-5 ft	PSA	<0.46	1.1	PHC
S-21	5/4/15	B-8	8.5-10 ft	PSA	<0.47	2.7	PHC
S-22	5/4/15	PI-2	9.3 ft	PSA	<0.42	0.53	PHC
S-23	5/4/15	B-9	3-5 ft	PSA	<0.99	<0.5	Fuel
S-24	5/4/15	B-9	8.5-10 ft	PSA	<0.52	0.48	PHC
S-25	5/4/15	B-10	3.5-5 ft	PSA	<7	470.6	Degraded Oil
S-26	5/4/15	B-10	8.5-10 ft	PSA	<0.48	4.4	PHC
NCDENR Action Level					10	10	



6529 Highway 221
 U.S. Geological Survey,
 The National Map

Figure 1
 Site Location Map

Seramur & Associates, PC
 165 Knoll Drive
 Boone, NC



**NOTE: NOT TO
SCALE**

Figure 3
UST Closure
Map

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC

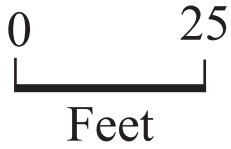
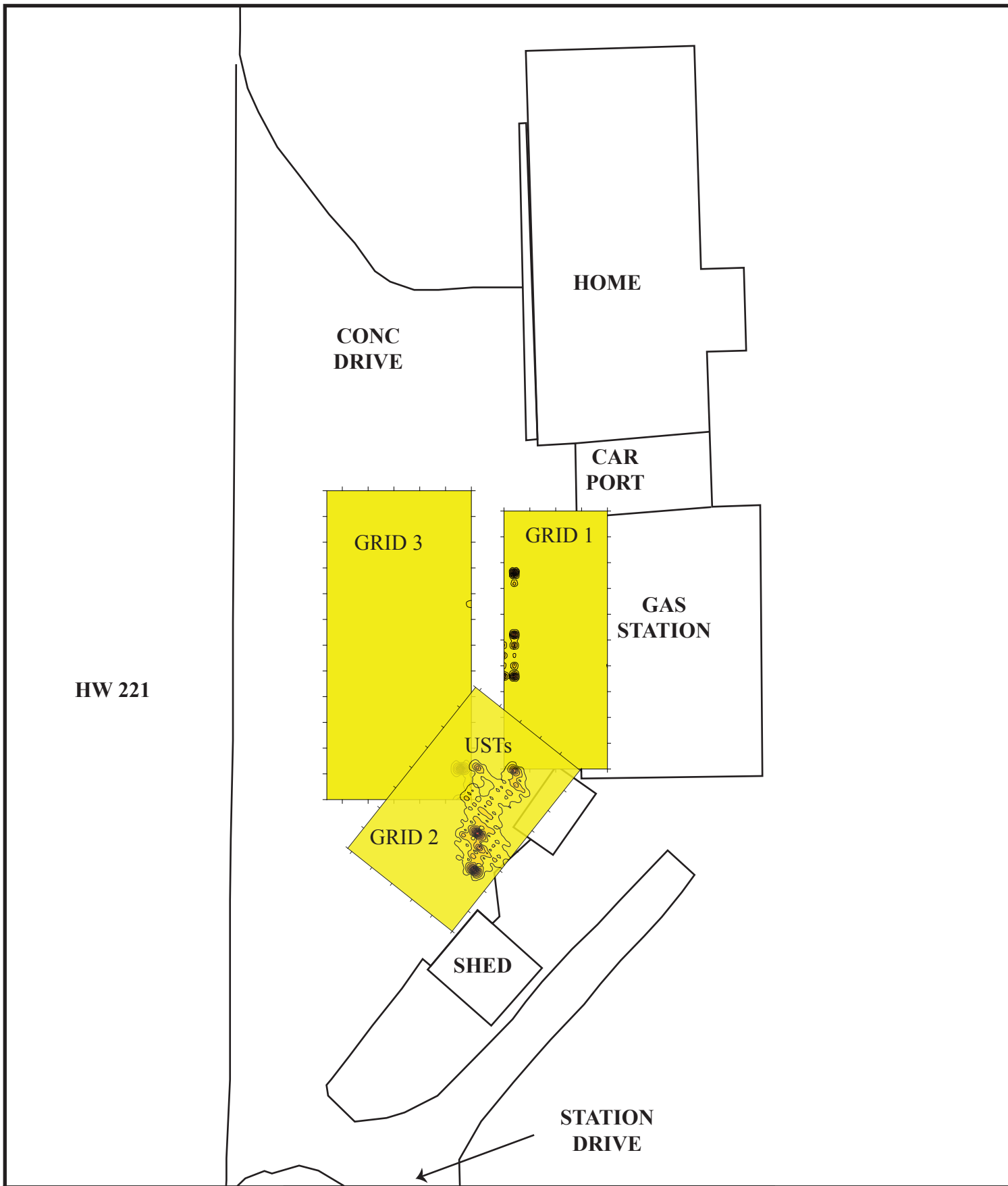
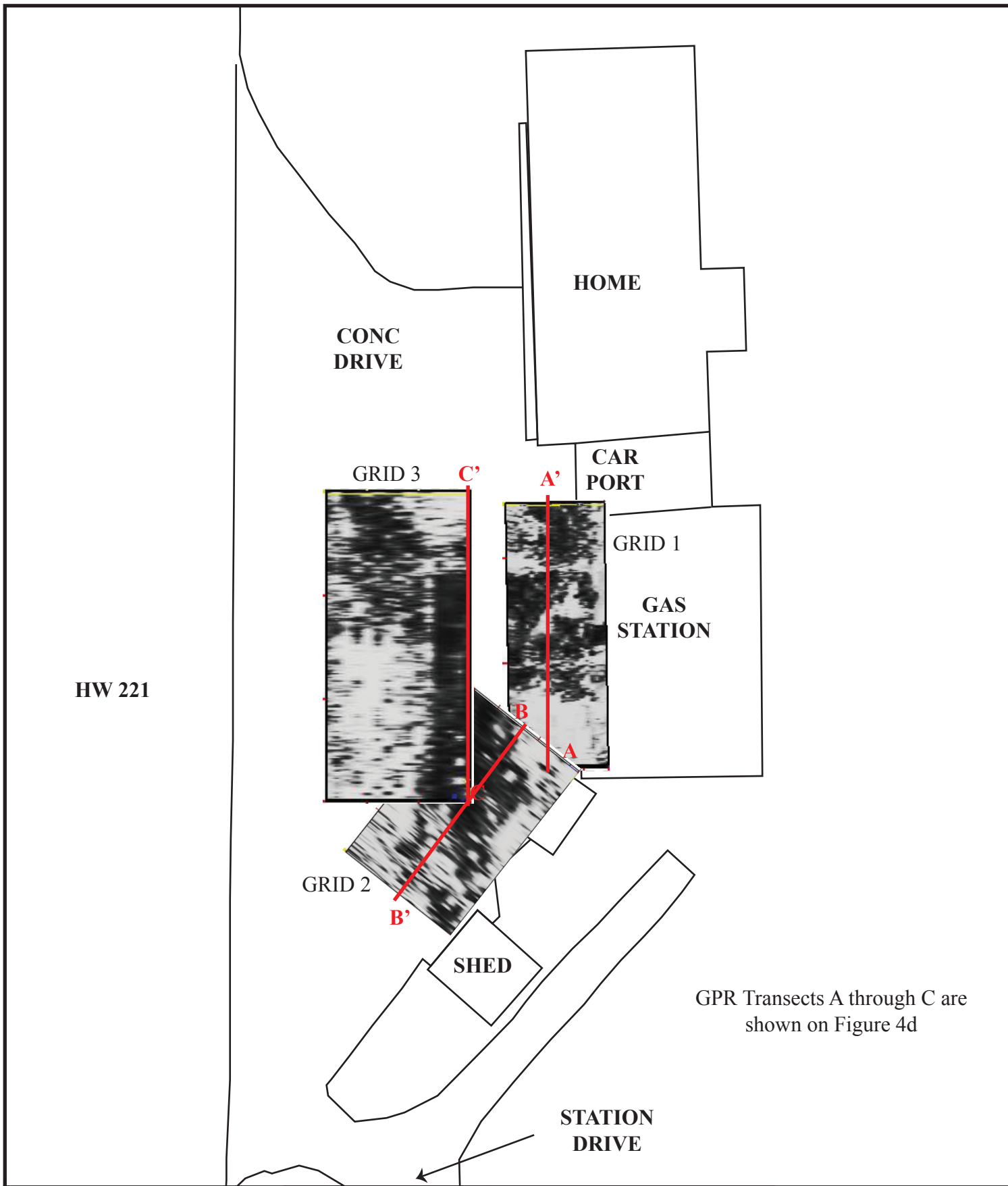


Figure 4
Magnetometer
Contour Map

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC



GPR Transects A through C are shown on Figure 4d

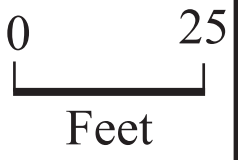


Figure 5a
1-Foot GPR
Depth Slice

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC

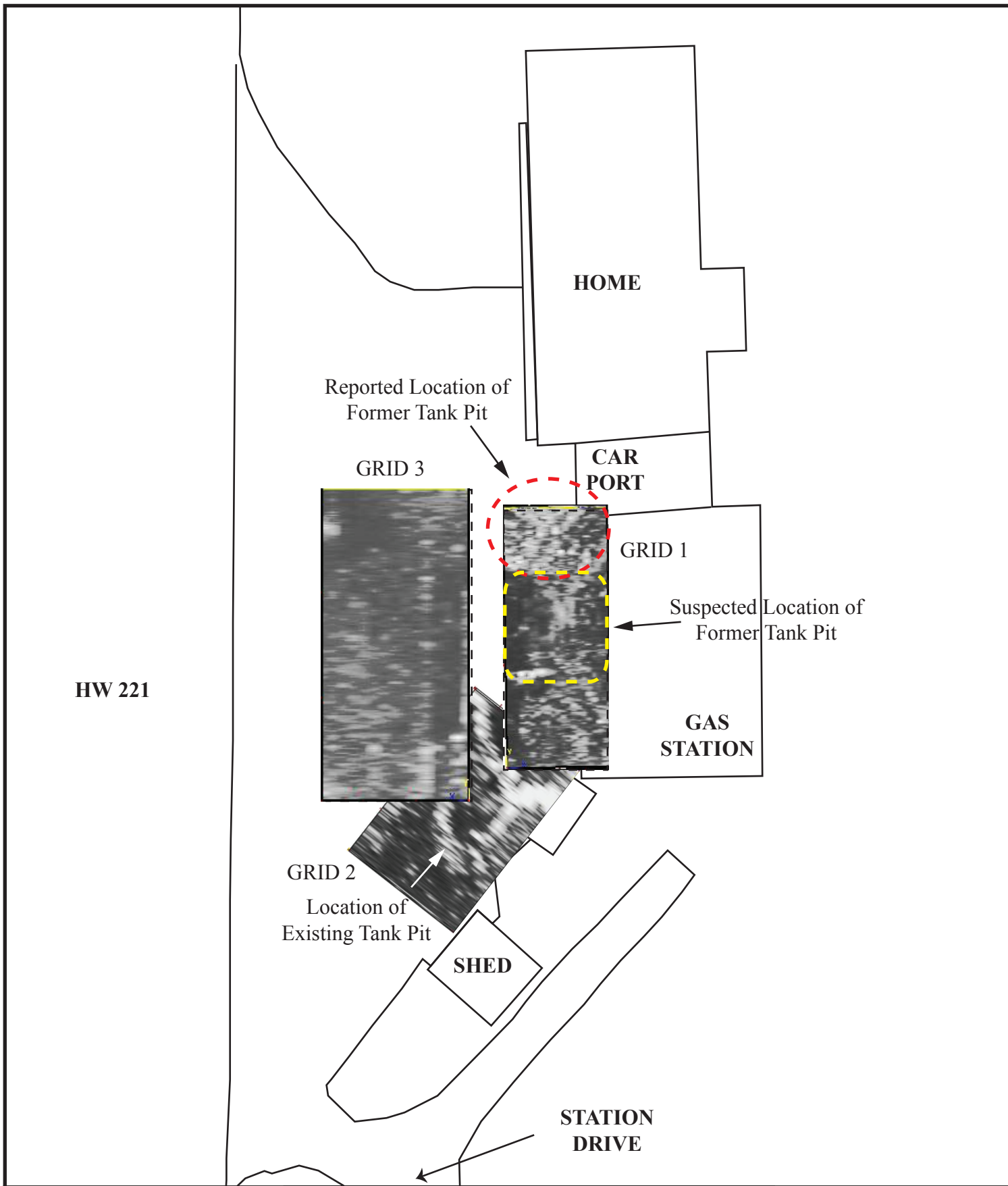


Figure 5b
2-Foot GPR
Depth Slice

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC

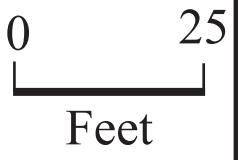
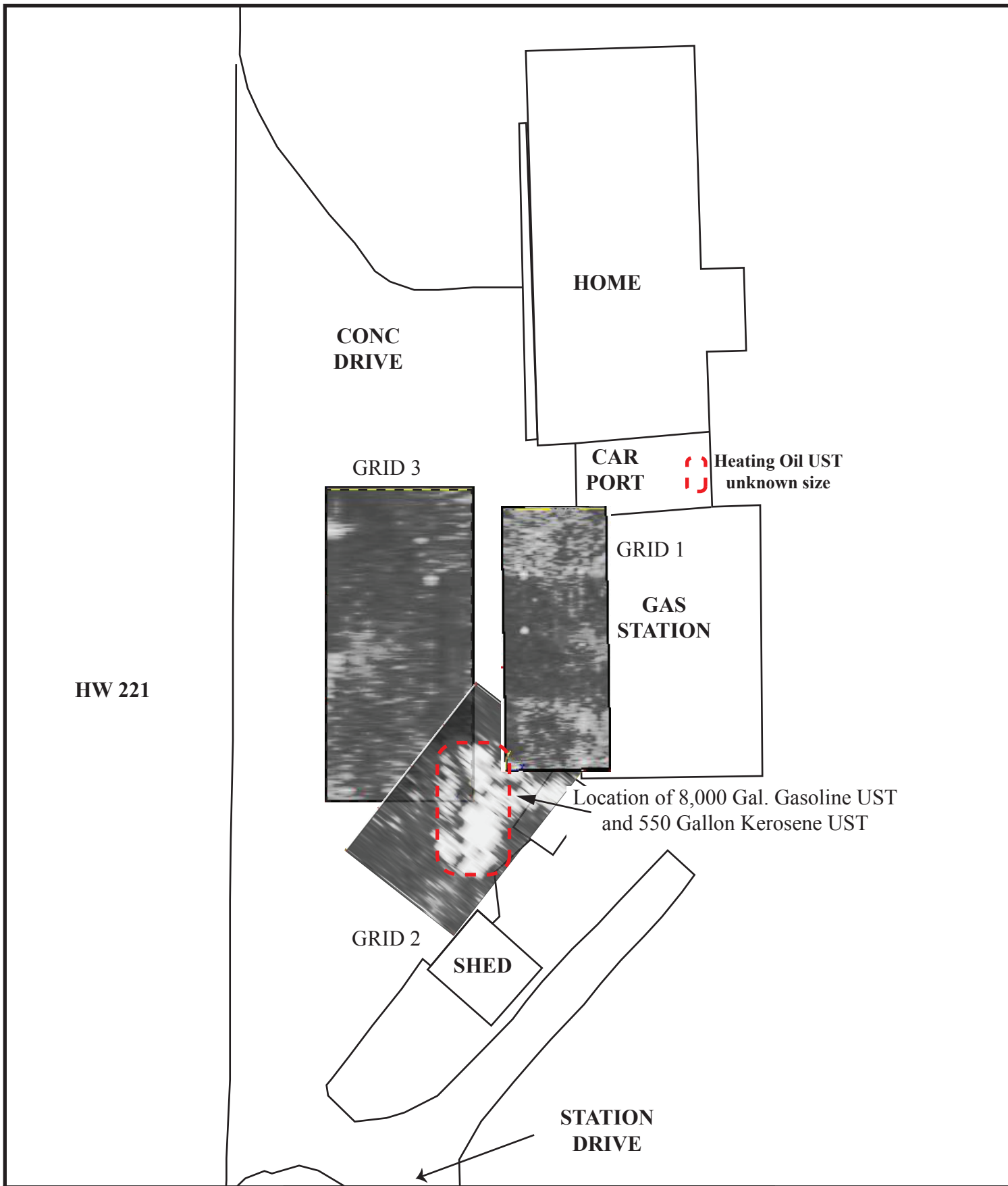
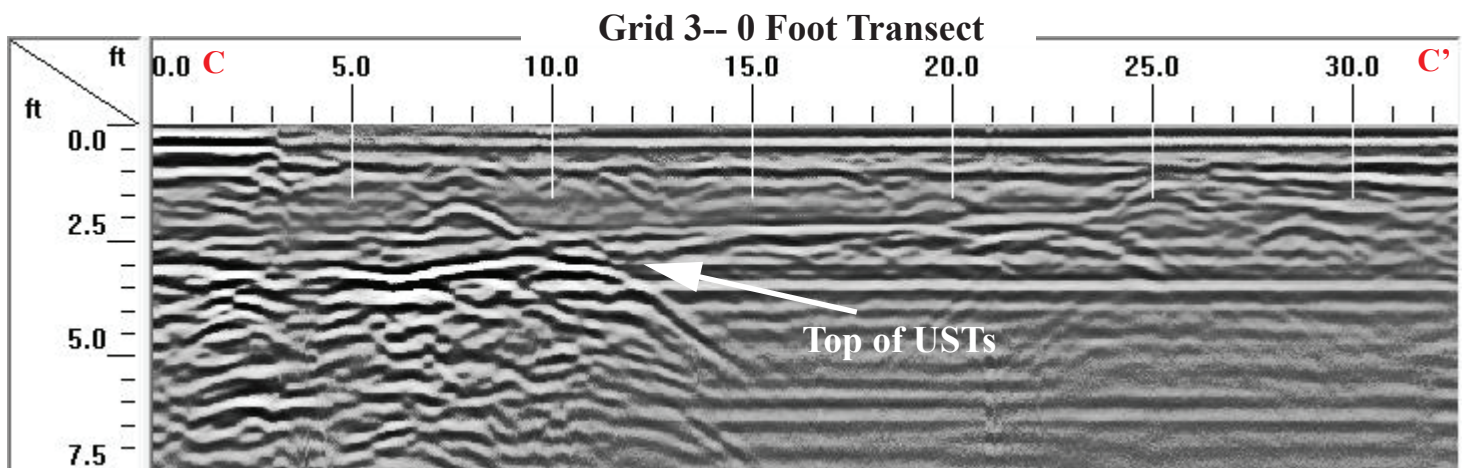
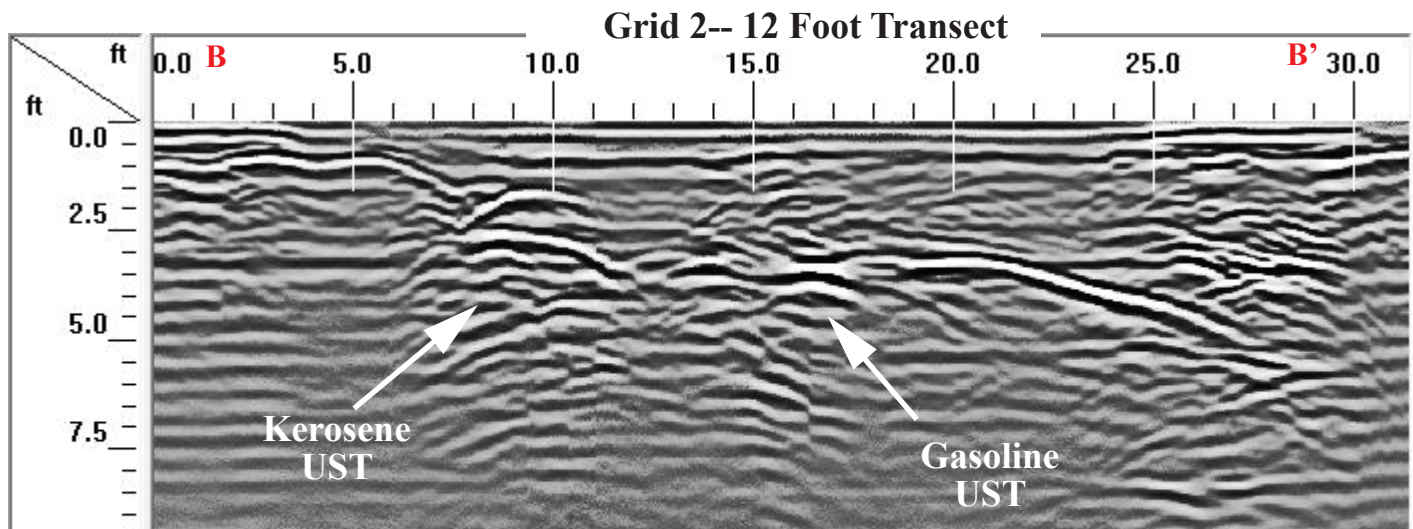
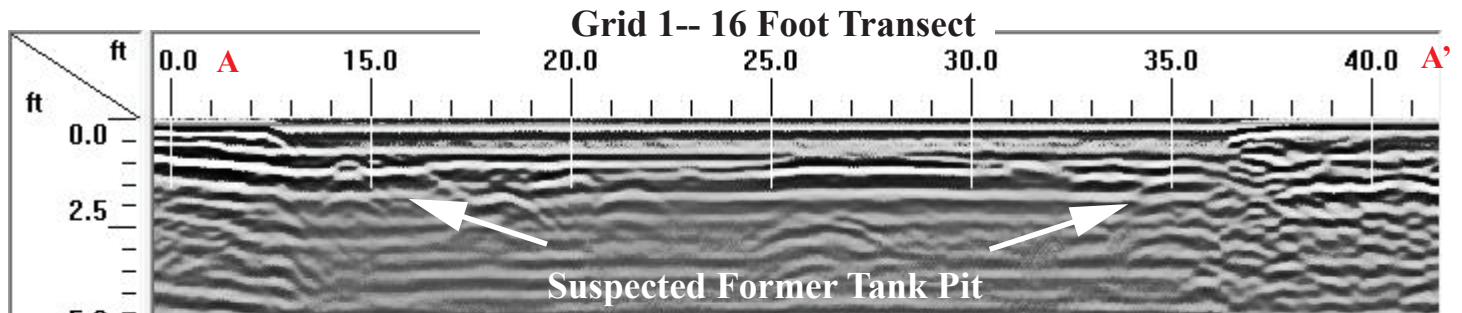


Figure 5c
3-Foot GPR
Depth Slice

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC



Greer Property
6529 Highway 221 South
West Jefferson, NC

Figure 5d
GPR Transects

Seramur & Associates, PC
165 Knoll Drive
Boone, NC

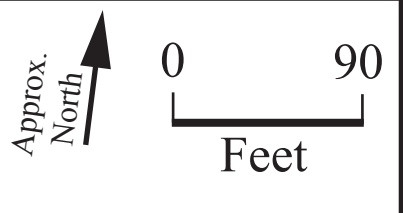
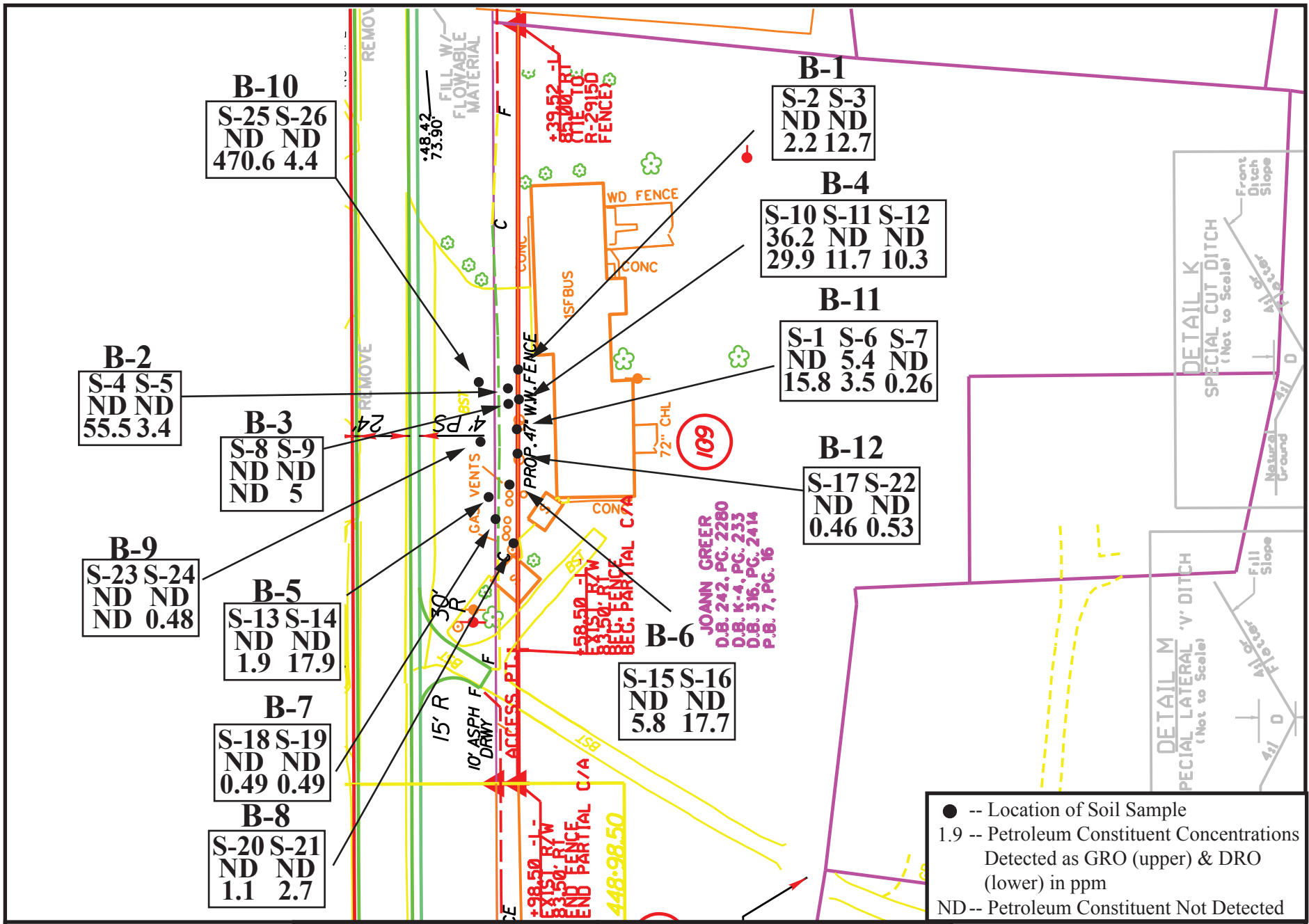


Figure 6
Soil Sampling
Analytical Results

Greer Property
6529 Highway 221 South
West Jefferson, NC

Seramur & Associates, PC
165 Knoll Drive
Boone, NC

Appendix B

Laboratory Reports and Chain of Custody Records



Hydrocarbon Analysis Results

Client: Seramur and Associates
Address: Boone, NC

Samples taken
Samples extracted
Samples analysed

Wednesday, May 6, 15
 Wednesday, May 6, 15
 Thursday, May 7, 15

Contact: Keith Seramur

Operator

F. Owen

Project: NC DOT R-2915-C

Fingerprints Only													
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	S1	191.0	<4.8	<4.8	15.8	15.8	15.2	0.75	<0.095	0	92.6	7.4	V.Deg.PHC (FCM) 93.4%
s	S2	12.0	<0.6	<0.3	2.2	2.2	0.59	0.02	<0.006	0	72.7	27.3	Deg Fuel (FCM) 63.9%
s	S3	18.4	<0.46	<0.46	12.7	12.7	9.4	0.43	<0.009	0	92.5	7.5	V.Deg.PHC (FCM) 75%
s	S4	12.6	<0.63	<0.32	55.5	55.5	18.6	0.72	0.005	0	94.4	5.6	Deg Fuel (FCM) 93.4%
s	S5	16.0	<0.8	<0.4	3.4	3.4	2.5	0.12	<0.008	0	88.8	11.2	V.Deg.PHC (FCM) 82.2%
s	S6	11.4	<0.57	5.4	3.5	8.9	1.8	0.09	<0.006	75.4	23.4	1.2	Deg Gas (PFM) (FCM) 13.7%
s	S7	11.6	<0.58	<0.29	0.26	0.26	0.26	<0.01	<0.006	0	93.4	6.6	V.Deg.PHC (FCM)
s	S8	12.9	<0.64	<0.32	<0.13	<0.32	<0.06	<0.01	<0.006	59.5	40.5	0	V.Deg.PHC (FCM)
s	S9	191.0	<9.5	<4.8	5	5	2.5	0.26	<0.095	0	100	0	V.Deg.PHC (PFM) (FCM)
s	S10	11.8	<0.59	36.2	29.9	66.1	14.9	1.1	0.003	68.8	30.4	0.8	Deg Gas (FCM) 79.7%
Initial Calibrator QC check			OK			Final FCM QC Check			OK			108.8%	

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 and Associates
Address: Boone, NC

Samples taken
Samples extracted
Samples analysed

Wednesday, May 6, 15
 Wednesday, May 6, 15
 Thursday, May 7, 15

Contact: Keith Seramur

Operator

F. Owen

Project: NC DOT R-2915-C

Fingerprints Only													
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	S11	11.2	<0.56	<0.28	11.7	11.7	3.8	0.15	0.001	0	92.7	7.3	Deg Fuel (FCM) 88.4%
s	S12	16.0	<0.8	<0.4	10.3	10.3	7.6	0.35	<0.008	0	91.9	8.1	V.Deg.PHC (FCM) 75.1%
s	S13	17.8	<0.89	<0.45	1.9	1.9	0.54	0.02	<0.009	0	93.7	6.3	Deg.Fuel (FCM) 11.9%
s	S14	18.8	<0.94	<0.47	17.9	17.9	5.8	0.25	0.003	0	97.3	2.7	Deg Fuel (FCM) 94.8%
s	S15	18.4	<0.92	<0.46	5.8	5.8	4.3	0.2	<0.009	0	96.8	3.2	V.Deg.PHC (FCM) 93.1%
s	S16	17.0	<0.85	<0.42	17.7	17.7	2.2	0.1	<0.008	0	88.6	11.4	Deg Fuel (FCM) 83.1%
s	S17	20.0	<1	<0.5	0.46	0.46	0.46	0.05	<0.01	0	94.7	5.3	V.Deg.PHC (FCM)
s	S18	19.8	<0.5	<0.5	0.49	0.49	0.49	0.05	<0.01	0	100	0	V.Deg.PHC (FCM)
s	S19	17.0	<0.85	<0.42	0.49	0.49	0.49	0.05	<0.008	0	89.2	10.8	V.Deg.PHC (FCM)
s	S20	18.6	<0.93	<0.46	1.1	1.1	1.1	0.12	<0.009	0	91	9	V.Deg.PHC (FCM)
Initial Calibrator QC check			OK			Final FCM QC Check			OK			100.7%	

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 and Associates
Address: Boone, NC

Samples taken
Samples extracted
Samples analysed

Wednesday, May 6, 15
 Wednesday, May 6, 15
 Thursday, May 7, 15

Contact: Keith Seramur

Operator

F. Owen

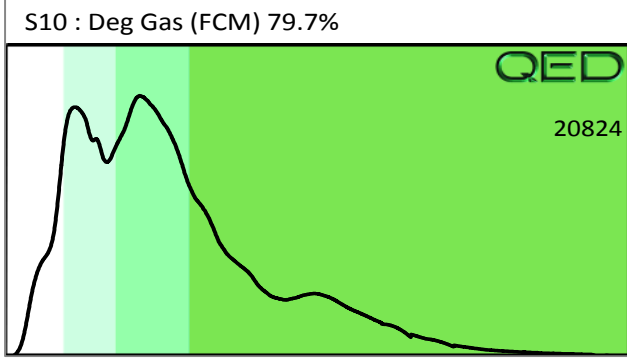
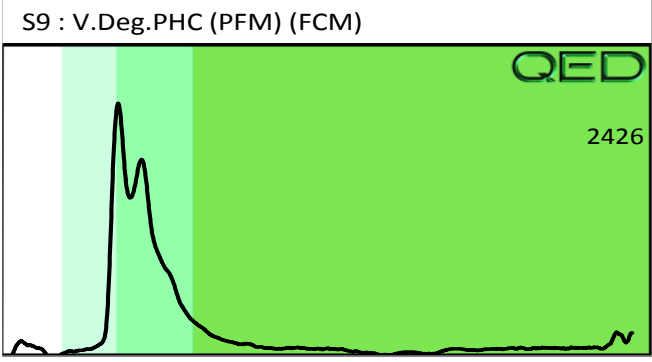
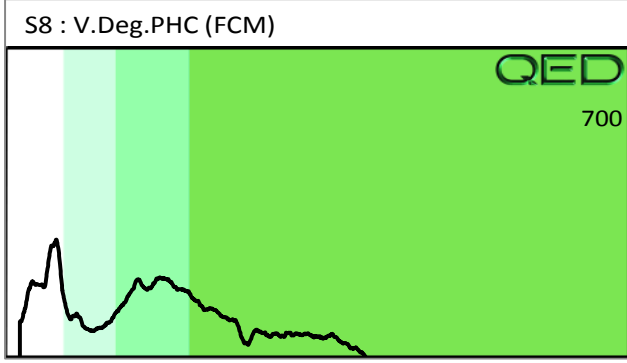
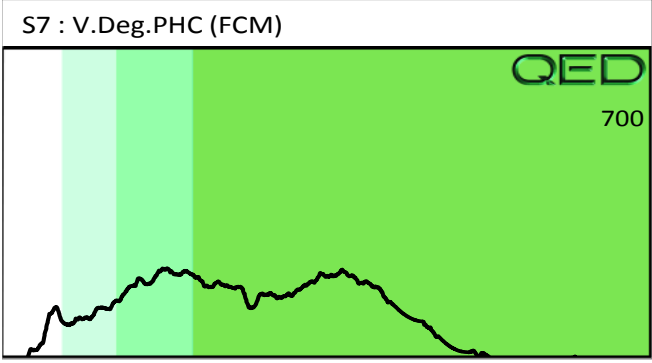
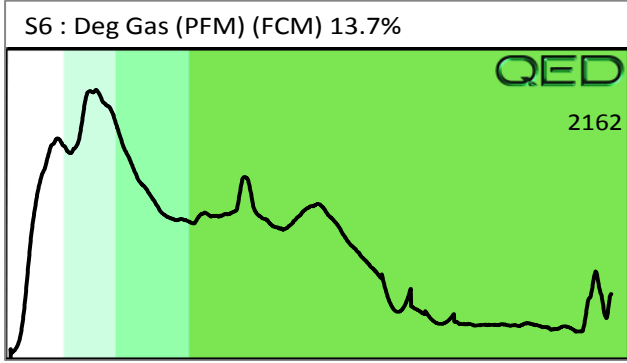
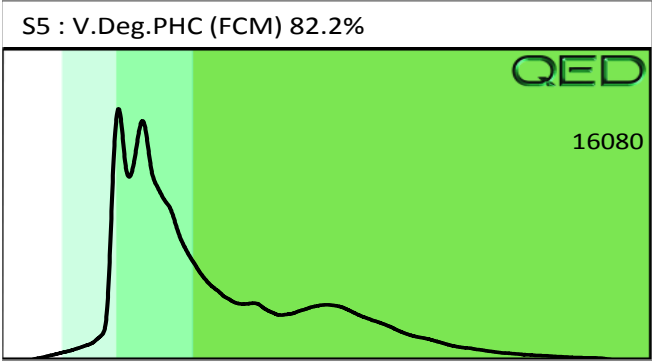
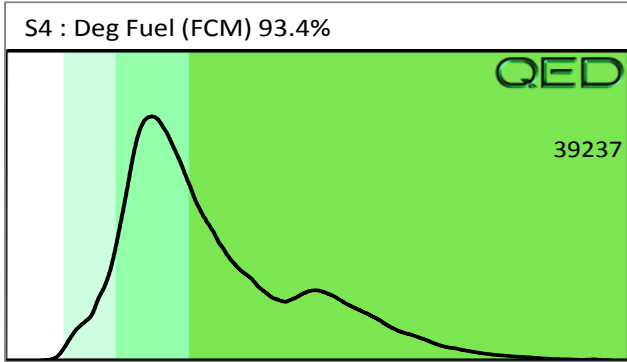
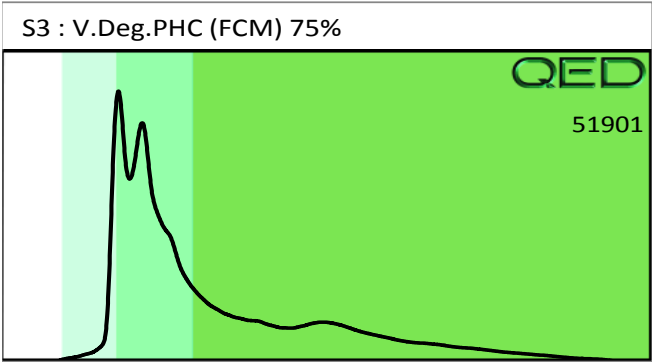
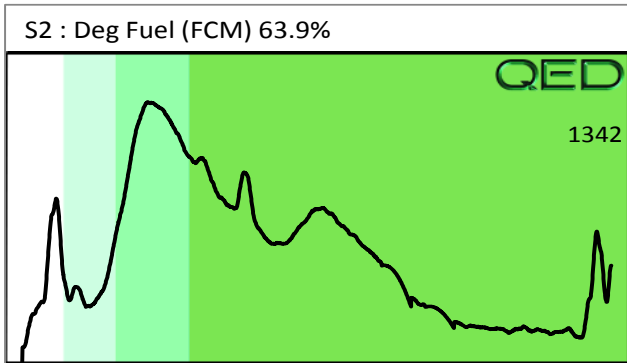
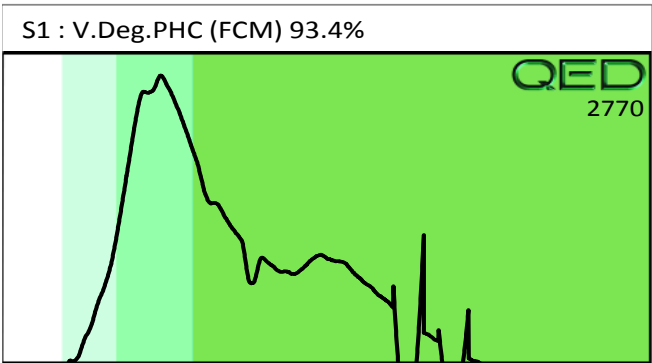
Project: NC DOT R-2915-C

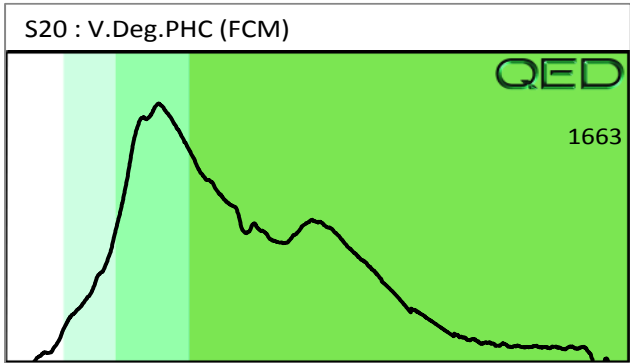
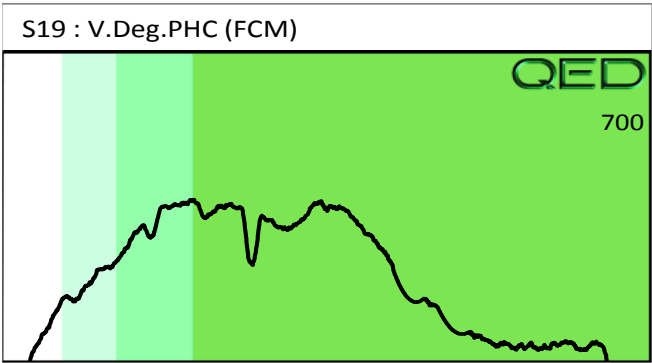
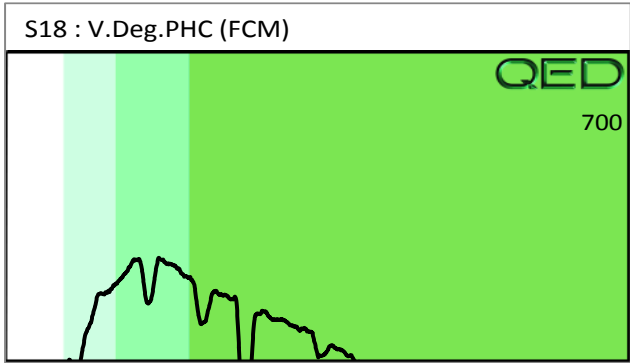
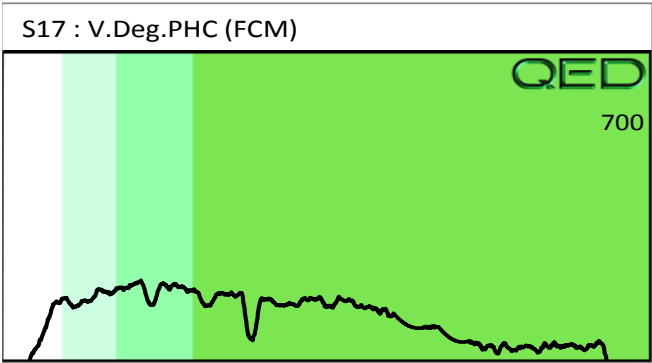
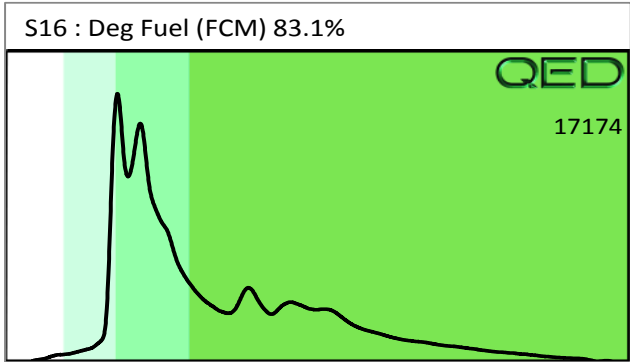
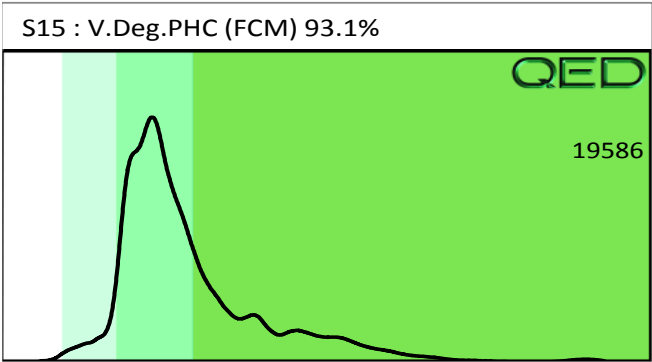
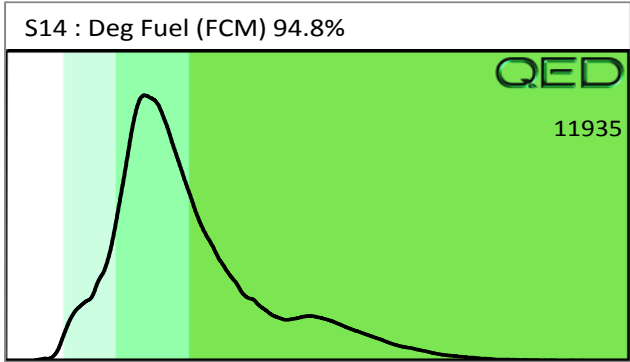
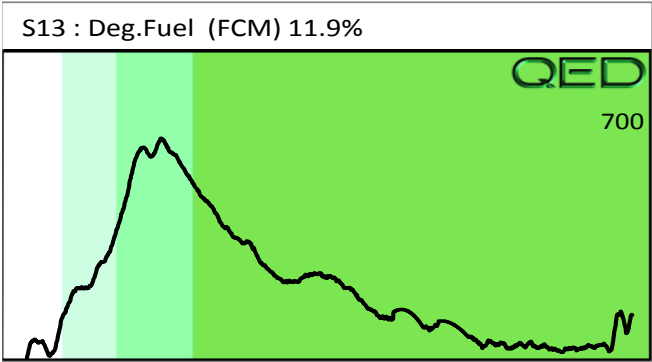
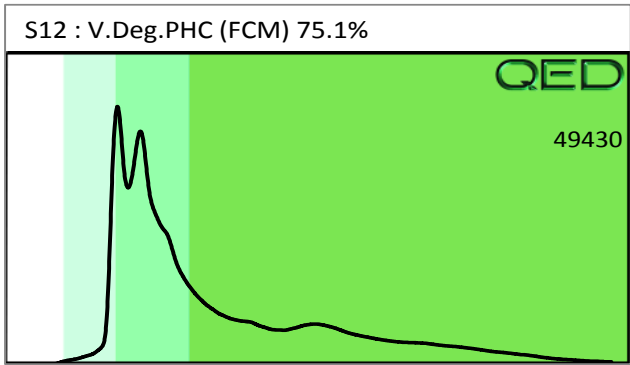
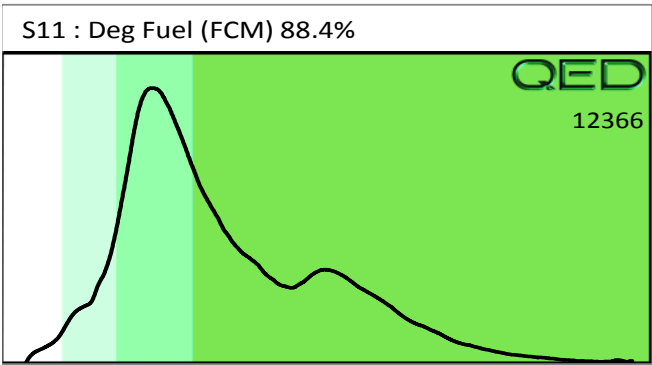
Fingerprints Only													
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	S21	19.0	<0.95	<0.47	2.7	2.7	2	0.1	<0.009	0	83.6	16.4	V.Deg.PHC (FCM) 78.8%
s	S22	16.8	<0.42	<0.42	0.53	0.53	0.53	0.06	<0.008	0	96.5	3.5	V.Deg.PHC (FCM)
s	S23	19.8	<0.99	<0.5	43.2	43.2	12.5	0.52	0.006	0	97.5	2.5	Deg Fuel (FCM) 84.3%
s	S24	20.8	<0.52	<0.52	0.48	0.48	0.48	0.05	<0.01	0	100	0	V.Deg.PHC (FCM)
s	S25	279.3	<14	<7	470.6	470.6	14.6	0.72	<0.14	0	100	0	Degraded Oil (PFM) (FCM) 67.3%
s	S26	19.3	<0.96	<0.48	4.4	4.4	3.4	0.16	<0.01	0	81.2	18.8	V.Deg.PHC (FCM) 88.3%
s	S27	25.7	<1.3	<0.64	0.47	0.47	0.47	<0.03	<0.013	0	100	0	V.Deg.PHC (FCM)
s	S28	26.3	<1.3	<0.66	0.5	0.5	0.5	0.06	<0.013	0	100	0	V.Deg.PHC (FCM)
s	S28A	19.3	<0.48	<0.48	1.4	1.4	0.84	0.04	<0.01	0	93.8	6.2	Road Tar (PFM) (FCM) 93.2%
s	S29	20.2	<1	<0.5	14.3	14.3	10.6	0.51	0.016	0	91.9	8.1	V.Deg.PHC (FCM) 89.4%
Initial Calibrator QC check OK										Final FCM QC Check OK			98,3%

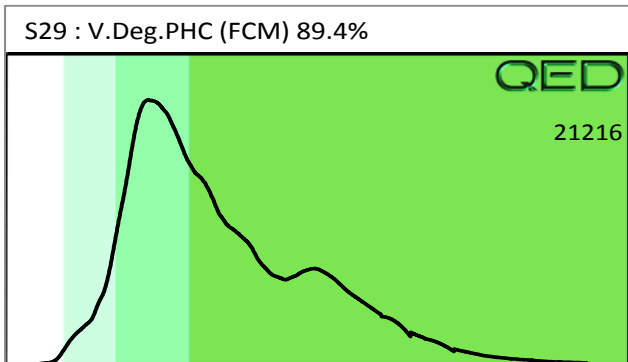
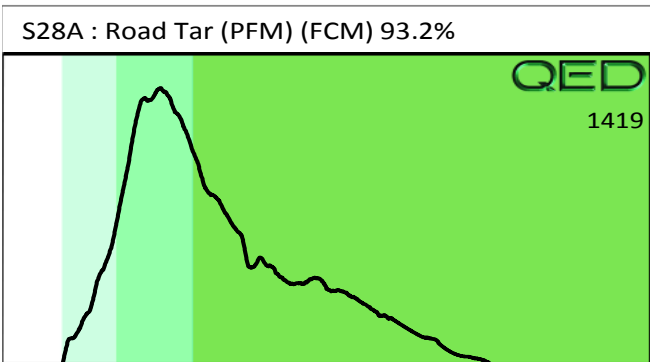
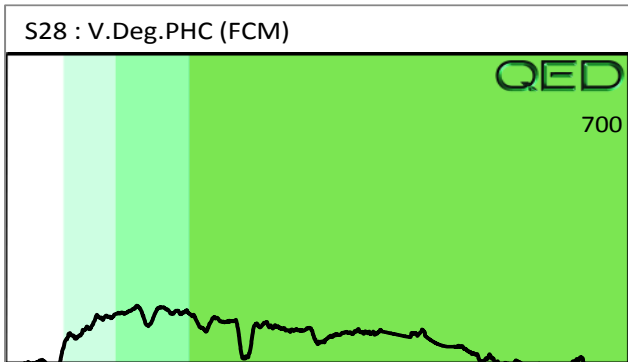
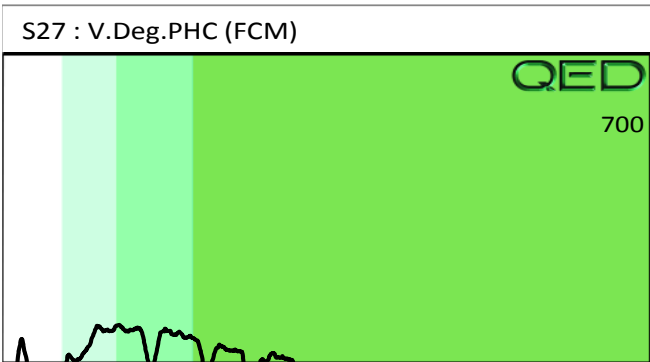
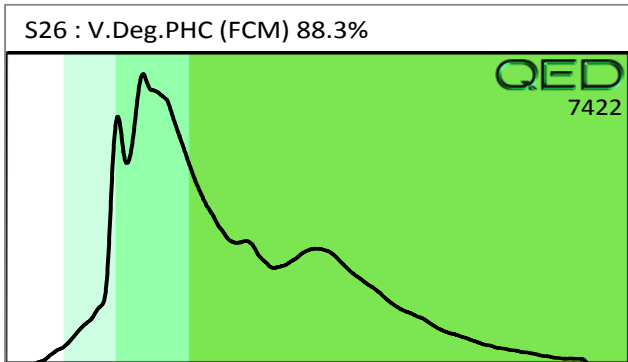
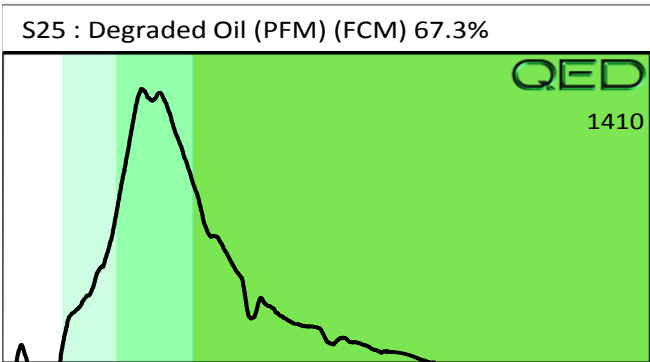
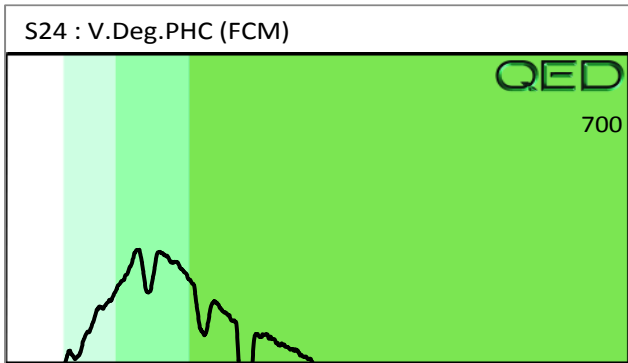
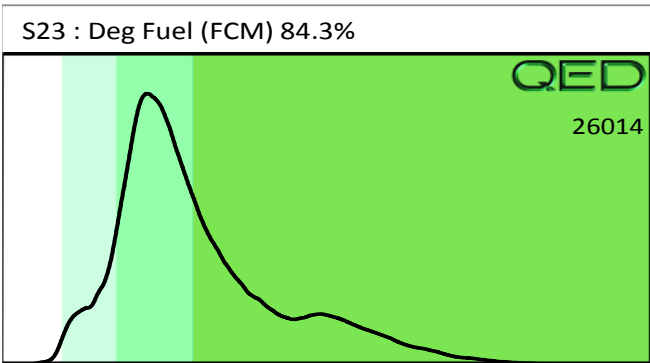
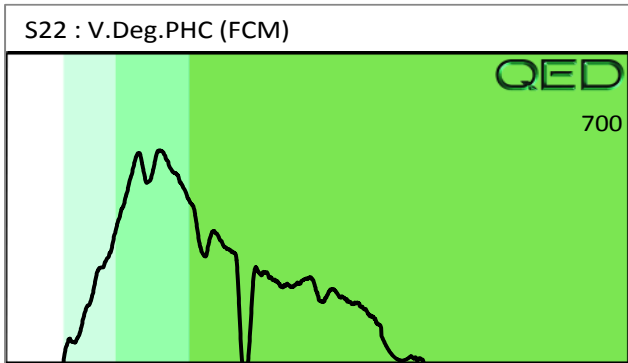
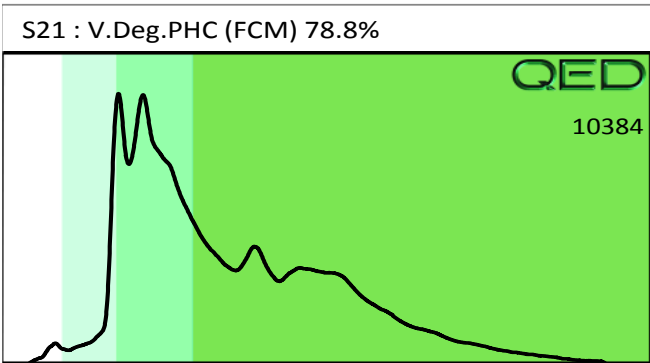
Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

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










Chain of Custody Record and Analytical Request Form

Sample ID QED UVF	Sample Collection		Initials	TAT Requested	
	Date	Time		24 Hour	48 Hour
S-1	5/4/15	10:19	KCS		X
S-2	5/4/15	10:22	KCS		X
S-3	5/4/15	10:35	KCS		X
S-4	5/4/15	10:49	KCS		X
S-5	5/4/15	11:06	KCS		X
S-6	5/4/15	11:15	KCS		X
S-7	5/4/15	11:38	KCS		X
S-8	5/4/15	11:41	KCS		X
S-9	5/4/15	11:44	KCS		X
S-10	5/4/15	12:20	KCS		X
S-11	5/4/15	12:50	KCS		X
S-12	5/4/15	13:01	KCS		X
S-13	5/4/15	13:32	KCS		X
S-14	5/4/15	13:50	KCS		X
S-15	5/4/15	14:27	KCS		X
S-16	5/4/15	14:38	KCS		X
S-17	5/4/15	14:42	KCS		X

Client: Sevamar & Associates
 Contact: Keith Sevamar
 Phone: 828 773 0499
 Email: sevamar@icloud.com
 Project Reference: NCDOT R-2915-C

Each Sample will be analyzed for total BTEX, GRO, DRO, TPH, and PAH
 Each Sample will generate a fingerprint representative of the petroleum product within the sample. Electronic Data will be submitted to the email above.

	5/6/15	Fed Ex	5/6/15 1500
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time

SHIP TO: QROS
 420 Raleigh Street Suite E
 Wilmington, NC 28412
 Contact: Leila Tabatabai
leilat@qrosllc.com
 910-508-1940



Chain of Custody Record and Analytical Request Form

Sample ID	Sample Collection		Initials	TAT Requested	
	Date	Time		24 Hour	48 Hour
S-18	5/4/15	15:25	KCS		X
S-19	5/4/15	15:46	KCS		X
S-20	5/4/15	16:08	KCS		X
S-21	5/4/15	16:15	KCS		X
S-22	5/4/15	16:10	KCS		X
S-23	5/4/15	16:30	KCS		X
S-24	5/4/15	16:45	KCS		X
S-25	5/4/15	17:11	KCS		X
S-26	5/4/15	17:35	KCS		X
S-27	5/4/15	19:11	KCS		X
S-28	5/4/15	19:45	KCS		X
S-28A	5/5/15	9:49	KCS		X
S-29	5/5/15	10:09	KCS		X
S-30	5/5/15	10:43	KCS		X
S-31	5/5/15	10:51	KCS		X
S-32	5/5/15	11:07	KCS		X
S-34	5/5/15	11:18	KCS		X

Client: Seaman & Associates

Contact: Keith Seaman

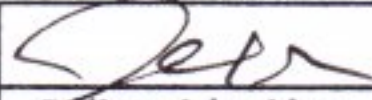
Phone: 828 723 0499

Email: seaman@idaid.com

Project Reference: NC DOT R-2915-C

Each Sample will be analyzed for total BTEX, GRO, DRO, TPH, and PAH

Each Sample will generate a fingerprint representative of the petroleum product within the sample. Electronic Data will be submitted to the email above.

	5/6/15	PaEx	5/6/15 15:00
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time

SHIP TO: QROS

420 Raleigh Street Suite E
 Wilmington, NC 28412

Contact: Leila Tabatabai
leilat@qrosllc.com

910-508-1940

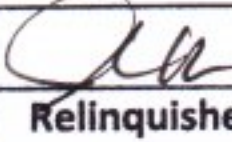


Chain of Custody Record and Analytical Request Form

Sample ID	Sample Collection		Initials	TAT Requested	
	Date	Time		24 Hour	48 Hour
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S-36	5/5/15	11:54	KCS		X
S-37	5/5/15	12:08	KCS		X
S-38	5/5/15	12:20	KCS		X
S-39	5/5/15	13:17	KCS		X
S-40	5/5/15	13:31	KCS		X
S-41	5/5/15	14:57	KCS		X
S-42	5/5/15	15:04	KCS		X
S-43	5/5/15	15:30	KCS		X
S-44	5/5/15	15:52	KCS		X
S-45	5/5/15	16:10	KCS		X
S-46	5/5/15	16:27	KCS		X
S-47	5/5/15	16:37	KCS		X
S-48	5/5/15	16:45	KCS		X
S-49	5/6/15	9:13	KCS		X
S-50	5/6/15	9:29	KCS		X
S-51	5/6/15	10:36	KCS		X

Client: ~~QROS~~ Serafin & Associates
 Contact: Keith Serafin
 Phone: 828 723 0499
 Email: serafin@icloud.com
 Project Reference: NC DOT R-2915-C

Each Sample will be analyzed for total BTEX, GRO, DRO, TPH, and PAH
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	5/6/15	Fed Ex	5/6/15 1500
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time

SHIP TO: QROS
 420 Raleigh Street Suite E
 Wilmington, NC 28412
 Contact: Leila Tabatabai
leilat@qrosllc.com
 910-508-1940

