

Phase II Site Assessment Report
May 12, 2023
WBS Element: 44354.1.R1
State Project: U-5783
Henderson County

At

Parcel #: 019
Duane and Margaret McKibbin Family Limited Partnership Property
1734 Brevard Road, Hendersonville, NC 28792
PIN #: 9558893840
Facility ID #: 00-0-0000017491
Groundwater Incident #: 14520 (Closed 2017)

Prepared For:

Mr. Ashley B. Cox, LG
GeoEnvironmental Project Engineer
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, NC 27699-1589

Prepared By:

Seramur & Associates, PC
165 Knoll Drive
Boone, NC 28607



DocuSigned by:
Keith C. Seramur
9C4E690078CE462...

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 Geophysical Surveys	4
2.3 Soil Sampling and Analyses	4
3.0 Results of Investigation	5
3.1 Plate 1 – Photographs of Parcel #019	6
3.2 Geophysical Surveys	6
3.3 Soil Borings, Sampling and Laboratory Results	7
3.4 Volume and Extent of Soil Contamination	8
3.5 Conclusions	8
4.0 Recommendations	9
Appendix A – Tables and Figures	
Table 1 – Soil Boring Data	
Table 2 – UST System Information	
Table B-3 – Summary of Soil Sampling Results	
Figure 1 – Site Location Map	
Figure 2 – Site Plan	
Figure 3 – Site Plan with Features and Soil Boring Locations	
Figure 4 – Site Plan with Geophysical Grid and Transect Locations	
Figure 5 – Magnetometer Survey Hillshade Map	
Figure 6 – Shallow GPR Depth Slices	
Figure 7 – Intermediate GPR Depth Slices	
Figure 8 – Deep GPR Depth Slices	
Figure 9a – GPR Transect Profiles 1 through 6	
Figure 9b – GPR Transect Profiles 7 through 9	
Figure 10 – Soil Analytical Results	
Figure 11 – Approximate Extent of Soil Contamination	

Appendix B – Laboratory Reports

1.0 Introduction

1.1 General Site Background Information

Seramur & Associates, PC was contracted to complete a Phase II Environmental Site Assessment at:

Parcel #: 019
Duane and Margaret McKibbin Family Limited Partnership Property
1734 Brevard Road, Hendersonville, NC 28792
PIN #: 9558893840
Facility ID #: 00-0-0000017491
Groundwater Incident #: 14520 (Incident Closed as of 2017)

Parcel #019 is located at the corner east of Daniel Drive at the intersection with Brevard Road / US Highway 64 in Hendersonville, NC (Figure 1). Our study area was limited to the north side of the gas station and a small section on the east and west sides of the building. Part of our GPR survey extended onto Parcel 019A in order to include the UST system that straddles the two properties (Figure 2). The property is currently an active Gas Station (Energy Mart #3). Bedrock in the area is mapped as the Henderson Gneiss; a biotite-microcline augen gneiss (Hadley, J.B. and Nelson, A.E., 1971, Geologic map of the Knoxville quadrangle, North Carolina, Tennessee, and South Carolina, U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-654).

A Notice to Proceed was obtained on February 17, 2023. Our area of investigation focused on the proposed and existing Right-of-Way (R/W) and Control-of-Access (C/A) along the southern side of Brevard Road and the eastern side of Daniel Drive as well as the proposed Permanent Utility Easement (PUE) and Temporary Construction Easement (E) north of the gas station building. The Phase II Site Assessment scope of work included completing a geophysical survey, soil sample collection, and laboratory analysis. The geophysical survey evaluated the potential for underground storage tanks and remnant UST system infrastructure. The purpose of soil sampling and laboratory analysis is to assess soil quality across the proposed and existing R/W and C/A and the proposed Easements (Figure 3). Background research for this project included reviewing historic aerial photographs and NCDEQ databases.

2.0 Scope of Work

2.1 Background Research

According to the Henderson County Tax Administration records, the property owner is listed as Duane & Margaret McKibbin Family Limited Partnership. Available historic aerial photographs from the USGS EarthExplorer website and Google Earth were reviewed.

The following NCDEQ databases were queried for incidents at Parcel #019:

- Dry Cleaners
- UST Incident Map
- Hazardous Waste Sites
- Active USTs
- UST Database

2.2 Geophysical Surveys

Seramur & Associates used the Pythagorean Theorem to establish two rectangular grids covering the proposed and existing R/W, C/A and Easements along Brevard Road (Figure 4). Geophysical grid data was collected along transects at a two-foot spacing. Many transects were extended past the established rectangular grid corners in the GPR survey of Grid 2.

Nine additional transects of GPR data were collected in the areas that were unable to be covered with grid data or perpendicular to grids so as to cross important site features (i.e. product lines in Transects 3 and 4) (Figure 4). A Schonstedt GA-72Cd Magnetic Locator was also used over these transects to search for magnetic anomalies that could be related to a former UST System.

The magnetometer data was collected with a GEM Systems GSM-19W Walking Overhauser magnetometer. The data was compiled in Excel spreadsheets and grayscale hillshade maps of the magnetic data were drafted using Golden Software's Surfer® modeling program. The lighter shades are lower magnetic readings, and the darker colors are higher magnetic readings (Figure 5). Ferrous objects in the subsurface have a magnetic field distinct from the surrounding soil and produce magnetic anomalies on the hillshade maps.

The Ground Penetrating Radar (GPR) data was collected with a Geophysical Survey Systems, Inc. UtilityScan GPR System with a 350 MHz hyperstacking antenna. This GPR system is equipped with a calibrated survey wheel. The GPR data was downloaded and saved onto a computer. The GPR grid and transect 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. Three-dimensional models of the GPR grid data were produced with GPR Slice® software. Three time slices (or depth slices) were imaged in each 3D model at depths of 0.2 to 0.5 feet, 2.0 to 2.3 feet and 3.4 to 3.7 feet (Figures 6, 7, & 8). Each depth slice is a horizontal slice or plan view of the reflections across a 0.3-foot thickness of the subsurface. For example, the deep GPR depth slices show reflections in the radar data between depths of 3.4 and 3.7 feet. The profiles of the GPR transects show the subsurface directly under the path of the antenna to a depth of about 8.0 feet (Figures 9a and 9b).

2.3 Soil Sampling and Analyses

Carolina Soil Investigations, LLC mobilized to the site on April 6, 2023, to drill Geoprobe borings and collect soil samples. Our project design typically calls 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 and fuel dispensers. The purpose of collecting samples at a depth of ~9.0 feet is to test for petroleum releases related to underground storage tanks. Soil borings were drilled within the proposed and existing R/W and proposed easements along Brevard Road and Daniel Drive.

A track-mounted Geoprobe rig was used to drill nine soil borings. The texture and type of soil material in the Geoprobe cores was described and recorded. 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 PhoCheck Tiger 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). Table 1 lists the boring data including sample number, depth, PID reading, lithology, and type of soil material.

Following collection of soil samples in the field, samples were placed in laboratory provided sample jars with Terra-Core samplers and shipped on ice to REDLab, LLC in Wilmington, NC for laboratory analyses. REDLab analyzed the soil samples for petroleum constituents with the Ultra-Violet Fluorescence (UVF) Method using a QED HC-1 analyzer. The analytical results are reported as Gasoline Range Organics (GRO), Diesel Range Organics (DRO) and Total Petroleum Hydrocarbons (TPH). REDLab provides a hydrocarbon fingerprint spectrum with the sample results. This spectrum is used for a tentative identification of the type of hydrocarbon detected by the analytical method. The hydrocarbon fingerprint is interpreted by REDLab 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 #019 currently operates as a convenience store and gas station (Energy Mart #3) and also a store that sells honey (Carolina Bee Farm). Aerial photographs from the years 1951 and 1964 show two different structures on the property. One of these could be a canopy for a gas station but it is hard to distinguish from the quality of the images. The 1984 aerial photograph shown on the Henderson County GIS Website shows the current building but with a different canopy over the fuel dispensers. The Henderson County Tax Records indicate that the current building was constructed in 1983 and does not provide information about the previous structures on the property.

The property is listed in both the NCDEQ UST Registered Tanks and Underground Storage Tank Incidents databases. The UST Registered Tanks database shows that six USTs were used at Parcel #019 between September 1979 and March 1995 prior to the installation of the current UST system (see Table 2 in Appendix A for tank data). One of the property owners, Mr. Bill McKibbin stated that the former UST system was located near the northwest corner of the property. The dates of use listed in the UST Registered Tanks Database would indicate that the property was used as a gas station prior to its redevelopment in 1983. A groundwater incident related to this facility was reported in 1995, presumably at the time of the closure of the former UST system. The incident files are not available on the NCDEQ Laserfiche Site and the summary of the incident in the UST Incident Database states only that the incident was closed in October of 2017. The property does not appear on other NCDEQ Databases or Incident Maps.

SAPC personnel made a pedestrian reconnaissance of the property during the initial site visit on March 1, 2023. The existing UST system appears to be completely out of the existing and proposed R/W and easements and extends mostly onto Parcel #019A. The fuel dispensers and the product lines are within the proposed Permanent Utility Easement and Temporary Construction Easement.

3.1 Plate 1 – Photographs of Parcel #019 taken on March 1 and April 6, 2023.



Photo 1. View to the southwest across Parcel #019. Geoprobe is drilling boring B-5.



Photo 2. Collecting GPR data at Parcel #019.



Photo 3. Collecting magnetometer data Parcel #019.

3.2 Geophysical Surveys

The two grids of magnetometer data show a background of low amplitude fluctuations in the magnetic field across Grid 1 and 2 (Figure 5). This background of magnetic noise is attributed to iron in the reinforced concrete. Significant magnetic anomalies related to buried USTs was not detected in these two grids. Magnetic data was not collected across the existing UST system.

The shallow GPR depth slices (0.2-0.5 feet) are primarily reflection free. The excavations for the

UST system and the product lines are apparent in the form of reflection free rectangular patterns. The small, high-amplitude reflections shown in the footprint of the UST excavation are the steel tank lids. A few medium-to-high amplitude reflections along the west side of Grid 1 are indicative of soil with different properties below the pavement (Figure 6). The shallow GPR depth slices do not show evidence of additional USTs or other abandoned gas station infrastructure.

The intermediate GPR depth slices (2.0-2.3 feet) are almost entirely reflection free. A few small medium-to-high amplitude reflections are present across the two grids but are not the correct size or shape to be related to a UST system. The only notable anomalies are those linear medium-to-high amplitude reflections primarily in Grid 2 that are related to the product lines. The product lines show up very faintly in Grid 1 and were most likely obscured due to the concrete slab underneath the dispenser canopy. It is our understanding that these product lines are fiberglass. The ethanal-free gasoline product line does appear somewhat more distinctly as it is only under asphalt (Figure 7).

The deep GPR depth slices (3.4-3.7 feet) are almost entirely reflection free with the exception of the UST system in the southeast corner of Grid 2. A few small medium-to-high amplitude reflections in the northern part of Grid 1 could be related to rubble backfill in the former UST pit (Figure 8). No other anomalies are present that indicate the presence of abandoned USTs or related infrastructure.

GPR Transects 1 and 2 were collected over a steel plate on the east side of the store building. A structure is present at this location in the 2000's. Transects 3 and 4 were collected over the product lines in a North-South direction in contrast to the grid transects which were collected in an East-West direction. These transects show the product lines with reinforced concrete surrounding them. Transects 5 and 6 were collected on the west side of the gas station building. These transects appear to cross a utility line (Figure 9a). Transect 7 was collected north of Grid 1 and appears to show chaotic backfill that could be related to the former UST pit. Transects 8 and 9 begin over the chaotic backfill from the potential former UST system and extend across the area underneath the canopy, crossing the product lines (Figure 9b). No abandoned USTs or unexpected gas station infrastructure was observed in any of the Transects collected at Parcel #019.

3.3 Soil Borings, Sampling and Laboratory Results

The soil at Parcel #019 consists of fill material over alluvium and residuum (saprolite) (Table 1). The fill material is made up of silt loam with gravel and sand and gravel. Alluvium is primarily silt loam and the residuum is primarily sandy loam. Groundwater was not encountered at this site.

Nine borings were drilled, and seventeen soil samples were collected. Two 5-foot cores were collected from each boring and one sample was collected from each core. The exception to this is that only one partial core was collected from boring B-4 where refusal was encountered at 1.5 feet. Three of the borings had limited recovery (i.e. <3.0 feet) in the deep cores (B-7, B-8 and B-9). The soil samples collected from the cores were analyzed for GRO and DRO by REDLab, LLC in Wilmington, NC (Table B-3).

Soil borings B-2, B-3 and B-8 were drilled in the proposed R/W along Brevard Road. Borings B-1, B-4 and B-5 were drilled between the proposed R/W and PUE on the northeast side of the property (Figure 3). Borings B-6 and B-9 were drilled between the PUE and E in the western central part of the property. Boring B-7 was drilled just within the existing R/W near the corner of the intersection with Brevard Road and Daniel Drive.

Petroleum constituents were detected above the NCDEQ Action Levels in seven of the seventeen soil samples collected at Parcel #019 (Table B-3, Figure 10, and Laboratory Results in Appendix B).

3.4 Volume and Extent of Soil Contamination

Contaminated soil defined as GRO concentrations above 50 ppm and DRO concentrations above 100 ppm was detected in seven soil samples, collected from six borings. The highest concentrations of petroleum constituents were detected in Borings B-8 and B-9 along the western side of the property.

Our estimate of the volume of contaminated soil only considers soil within the proposed R/W and easements on Parcel #019. It is possible that contaminated soil extends into the existing R/W on Parcel #019 and into the proposed easements on Parcel #019A. An estimate of the volume of contaminated soil in the vicinity of borings B-1, B-2, B-4, B-6, B-8 and B-9 can be calculated using the estimated thickness of the contaminated soil horizon and the horizontal extent (Figure 11).

An average estimated soil contamination thickness of four feet will be used for our calculation. The area of contaminated soil within the proposed R/W and easements is approximately 4,440 square feet. This number was estimated using rectangles and triangles overlain onto the area of contamination (Figure 11). Contamination within the proposed R/W and easements is likely from leaks from the dispenser islands and the former and existing UST systems. The estimated volume of contaminated soil in the proposed R/W and easements is calculated as follows:

$$\begin{aligned} 4.0 \text{ ft.} \times 4,400.0 \text{ ft}^2 &= 17,600 \text{ ft}^3 \\ 17,600 \text{ ft}^3 / 27.0 \text{ ft}^3/\text{yd}^3 &= 651.9 \text{ yd}^3 \\ 651.9 \text{ yd}^3 \times 1.5 \text{ tons}/\text{yd}^3 &= 977.8 \text{ tons} \end{aligned}$$

The total volume of contaminated soil detected at Parcel #019 is estimated to be 651.9 yd³ or 977.8 tons.

3.5 Conclusions

Parcel #019 currently operates as a gas station and has done so since at least the early 1980's. A former UST system was removed in 1995 and replaced with the existing tanks that now sit on the southeast side of Parcel #019 and the southwest side of Parcel #019A. A groundwater incident was opened in 1995, presumably following the removal of the former UST system. This incident was closed in December of 2017.

Petroleum constituents were detected at concentrations above the NCDEQ Action Levels in six borings drilled across Parcel #019. The likely source of this soil contamination is from leaking dispensers, leaking product lines and the former and existing UST systems. The total volume of contaminated soil within the proposed R/W and easements at Parcel #019 is estimated to be 651.9 yd³ or 977.8 tons.

4.0 Recommendations

The CAD plans for the property appear to show that the only grading work due to take place is filling. No cut lines are shown on the plans. It is possible that some shallow excavation will take place during the course of road construction. If this is the case, it is likely that only shallow contaminated soil in the vicinity of Borings B-1, B-4 and B-8 will be encountered. However, any excavation that has the potential to encounter contaminated soil should be monitored.

Seramur & Associates recommends that a licensed geologist or engineer supervise the removal of any contaminated soil associated with excavation work in the vicinity of borings B-1, B-2, B-4, B-6, B-8 and B-9. Contaminated soil removed from Parcel #019 should be sent to a remediation facility.

Appendix A

Tables and Figures

Table 1. Soil Boring Data - Parcel #019 - Duane & Margaret McKibbin Family Limited Partnership Property						
Boring No.	Depth (ft)	Lithology	Soil type	Soil Sample	PID ppm	Comments
B-1	0.0 to 2.0	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.3 feet.
B-1	2.0 to 5.0	Silt loam	Alluvium	S-1	23.0	Sample at 3.5 feet.
B-1	5.0 to 8.0	Silt loam	Alluvium	S-2	777.0	Sample at 7.5 feet.
B-1	8.0 to 8.6	Sandy loam	Residuum	--	--	
B-1	8.6 to 10.0	N/A	N/A	--	--	No recovery.
B-2	0.0 to 1.6	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.9 feet.
B-2	1.6 to 5.0	Silt loam to clay loam	Alluvium	S-3	69.1	Sample at 3.3 feet.
B-2	5.0 to 8.1	Silt loam to clay loam	Alluvium	S-4	550.0	Sample at 6.6 feet.
B-2	8.1 to 9.2	Sandy loam	Residuum	--	--	
B-2	9.2 to 10.0	N/A	N/A	--	--	No recovery.
B-3	0.0 to 1.0	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.7 feet.
B-3	1.0 to 5.0	Silt loam	Alluvium	S-5	94.7	Sample at 2.5 feet.
B-3	5.0 to 6.1	Silt loam	Alluvium	--	--	
B-3	6.1 to 8.0	Sandy loam	Residuum	S-6	90.1	Sample at 7.0 feet.
B-3	8.0 to 10.0	N/A	N/A	--	--	No recovery.
B-4	0.0 to 1.5	Sandy loam w/ gravel	Fill	S-7	12.7	Asphalt from 0.0 to 0.4 feet. Refusal at 1.5 feet. Sample at 1.3 feet.
B-5	0.0 to 2.2	Silt loam w/ gravel	Fill	--	--	Concrete from 0.0 to 0.6 feet.
B-5	2.2 to 5.0	Silt loam	Alluvium	S-8	56.2	Sample at 3.3 feet.
B-5	5.0 to 7.8	Silt loam	Alluvium	--	--	
B-5	7.8 to 8.4	Sandy loam	Residuum	S-9	35.6	Sample at 8.4 feet.
B-5	8.4 to 10.0	N/A	N/A	--	--	No recovery.
B-6	0.0 to 3.3	Silt loam w/ gravel	Fill	S-10	20.2	Asphalt from 0.0 to 0.6 feet. Brick throughout. Sample at 3.2 feet.
B-6	3.3 to 5.0	N/A	N/A	--	--	No recovery.
B-6	5.0 to 8.4	Sandy loam to clay loam	Alluvium	S-11	22.9	Sample at 8.3 feet.
B-6	8.4 to 10.0	N/A	N/A	--	--	No recovery.
B-7	0.0 to 2.9	Sand w/ gravel	Fill	S-12	54.0	Asphalt from 0.0 to 0.4 feet. Sample at 2.8 feet.
B-7	2.9 to 5.0	N/A	N/A	--	--	No recovery.
B-7	5.0 to 7.3	Sand and gravel	Alluvium	S-13	25.0	Strong petroleum odor from 6.2 to 7.3 feet. Sample at 7.1 feet.
B-7	7.3 to 10.0	N/A	N/A	--	--	No recovery.
B-8	0.0 to 1.8	Sand and gravel	Fill	--	--	Asphalt from 0.0 to 0.3 feet.
B-8	1.8 to 2.6	Silt loam	Alluvium	S-14	40.0	Sample at 2.4 feet.
B-8	2.6 to 5.0	N/A	N/A	--	--	No recovery.
B-8	5.0 to 7.6	Sandy loam	Residuum	S-15	189.9	Sample at 6.7 feet.
B-8	7.6 to 10.0	N/A	N/A	--	--	No recovery.
B-9	0.0 to 3.2	Sand and gravel	Fill	S-16	15.0	Asphalt from 0.0 to 0.9 feet. Sample at 3.0 feet.
B-9	3.2 to 5.0	N/A	N/A	--	--	No recovery.
B-9	5.0 to 6.5	Sand and gravel	Fill	S-17	700.0	Strong petroleum odor. Sample at 5.6 feet.
B-9	6.5 to 6.9	Sandy loam	Alluvium	--	--	
B-9	6.9 to 10.0	N/A	N/A	--	--	No recovery.

Note: Blue shading is shallow core and orange shading is the deep core for each boring.

Table 2. UST System Information - Parcel #019 - Duane and Margaret McKibbin Family Limited Partnership Property				
Facility ID	Facility Name	Address	City	State
00-0-0000017491	ENERGY MART 3	1734 BREVARD ROAD	HENDERSONVILLE	NC
Contact		Contact Address	Contact City	Contact State
HENDERSONVILLE OIL COMPANY, INC		745 ASHE STREET	HENDERSONVILLE	NC
Tank ID	Installation Date	Closure Date	Capacity	Product Name
1	4/22/1981	1/1/1988 (Removed)	4,000 Gallons	Gasoline
1A	9/23/1983	3/31/1995 (Removed)	8,000 Gallons	Gasoline
2	4/22/1981	3/31/1995 (Removed)	4,000 Gallons	Gasoline
3	4/21/1985	3/31/1995 (Removed)	1,000 Gallons	Gasoline
4	9/24/1979	3/31/1995 (Removed)	1,000 Gallons	Diesel
5	9/24/1979	3/31/1995 (Removed)	550 Gallons	Kerosene
A1	3/25/1995	Active	12,000 Gallons	Gasoline
A1B	3/25/1995	Active	8,000 Gallons	Gasoline
A2	3/25/1995	Active	6,000 Gallons	Diesel
A2B	3/25/1995	Active	2,000 Gallons	Kerosene*

*Listed as Kerosene in UST Database but this tank actually holds ethanol-free gasoline.

Table B-3: Summary of Soil Sampling Results

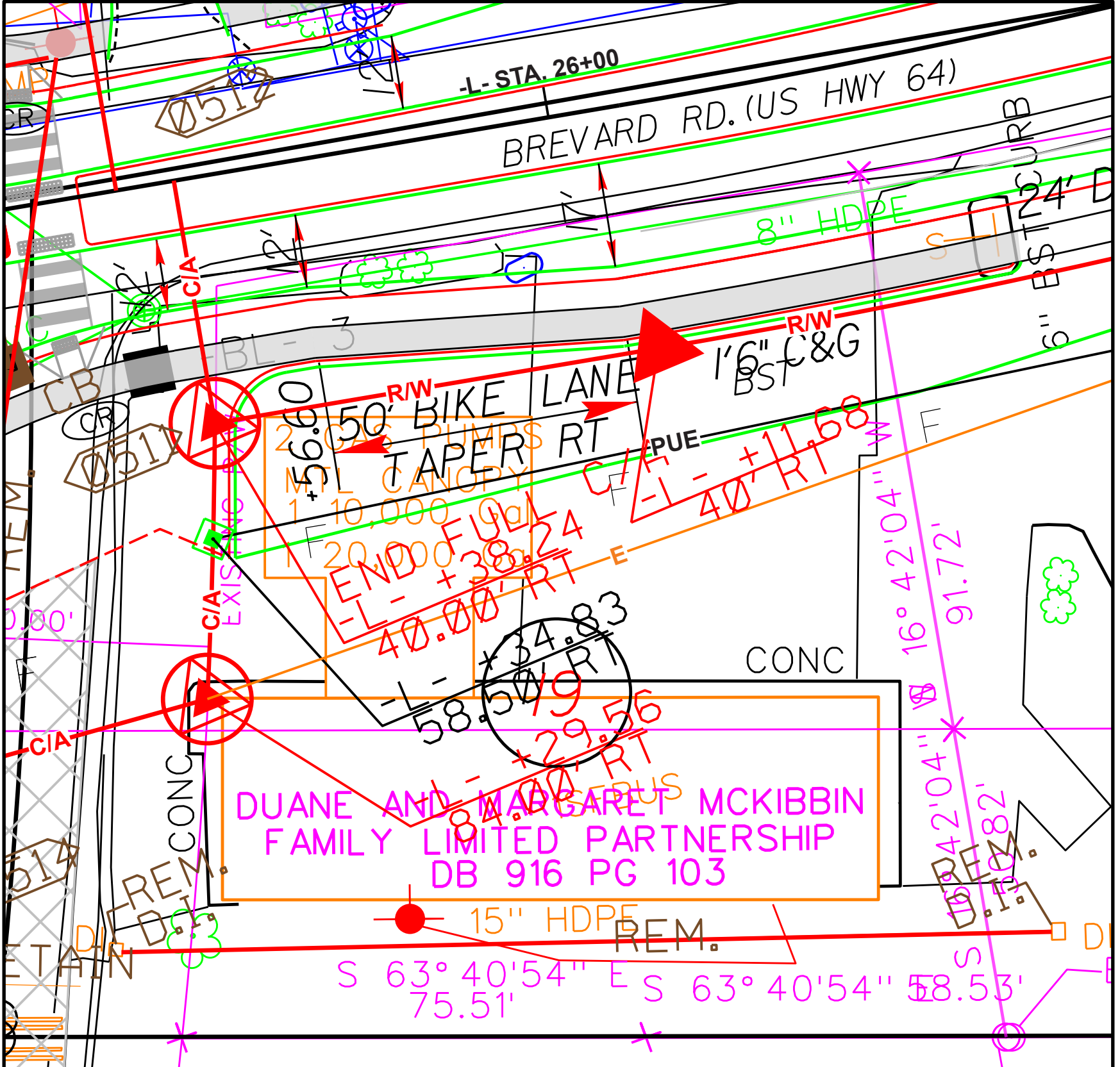
Revision Date: 04/14/23

Site Name: Parcel #019 – Duane and Margaret McKibbin Family Limited Partnership Property

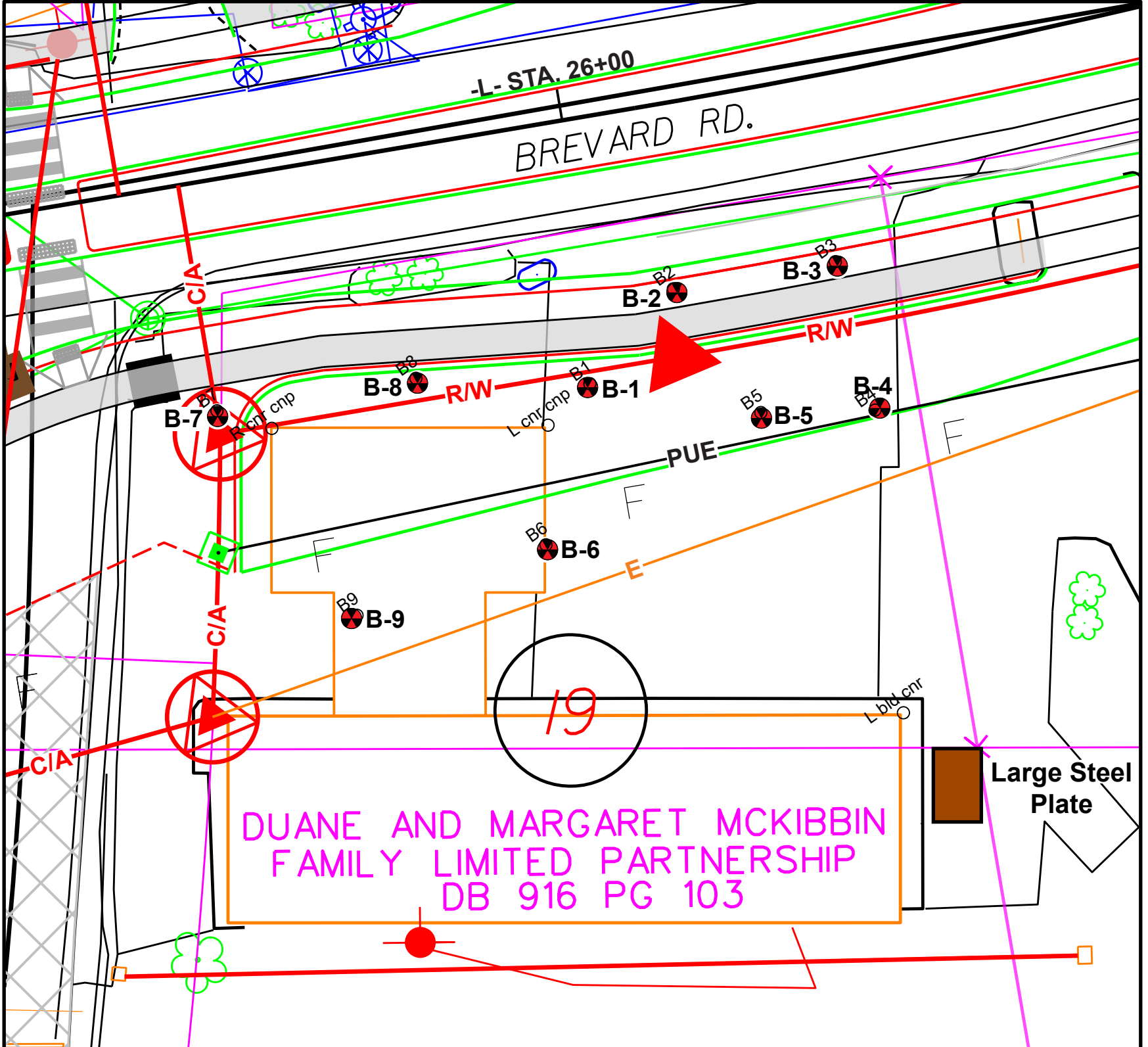
Analytical Method (e.g., VOC by EPA 8260) →					UVF		
Contaminant of Concern →					GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)
Sample ID	Date Collected (mm/dd/yy)	Source Area	Sample Depth (ft. BGS)	Incident Phase			
S-1	04/06/23	B-1	3.5	Phase II	56.8	145.3	202.1
S-2	04/06/23	B-1	7.5	Phase II	18.6	8.0	26.6
S-3	04/06/23	B-2	3.3	Phase II	<0.14	1.2	1.2
S-4	04/06/23	B-2	6.6	Phase II	457.0	330.3	787.3
S-5	04/06/23	B-3	2.5	Phase II	3.2	0.26	3.46
S-6	04/06/23	B-3	7.0	Phase II	10.9	3.5	14.4
S-7	04/06/23	B-4	1.3	Phase II	8.1	136.3	144.4
S-8	04/06/23	B-5	3.3	Phase II	<0.18	0.18	0.18
S-9	04/06/23	B-5	8.4	Phase II	<0.27	<0.27	<0.27
S-10	04/06/23	B-6	3.2	Phase II	<3.4	197.7	197.7
S-11	04/06/23	B-6	8.3	Phase II	<0.27	2.8	2.8
S-12	04/06/23	B-7	2.8	Phase II	<0.33	1.4	1.4
S-13	04/06/23	B-7	7.1	Phase II	<0.28	3.4	3.4
S-14	04/06/23	B-8	2.4	Phase II	90.0	329.9	419.9
S-15	04/06/23	B-8	6.7	Phase II	83.2	619.1	702.3
S-16	04/06/23	B-9	3.0	Phase II	<3.9	71.0	71.0
S-17	04/06/23	B-9	5.6	Phase II	616.3	1,706	2,322
NC DEQ Action Level (mg/kg)					50	100	N/A

ft. BGS = feet below ground surface

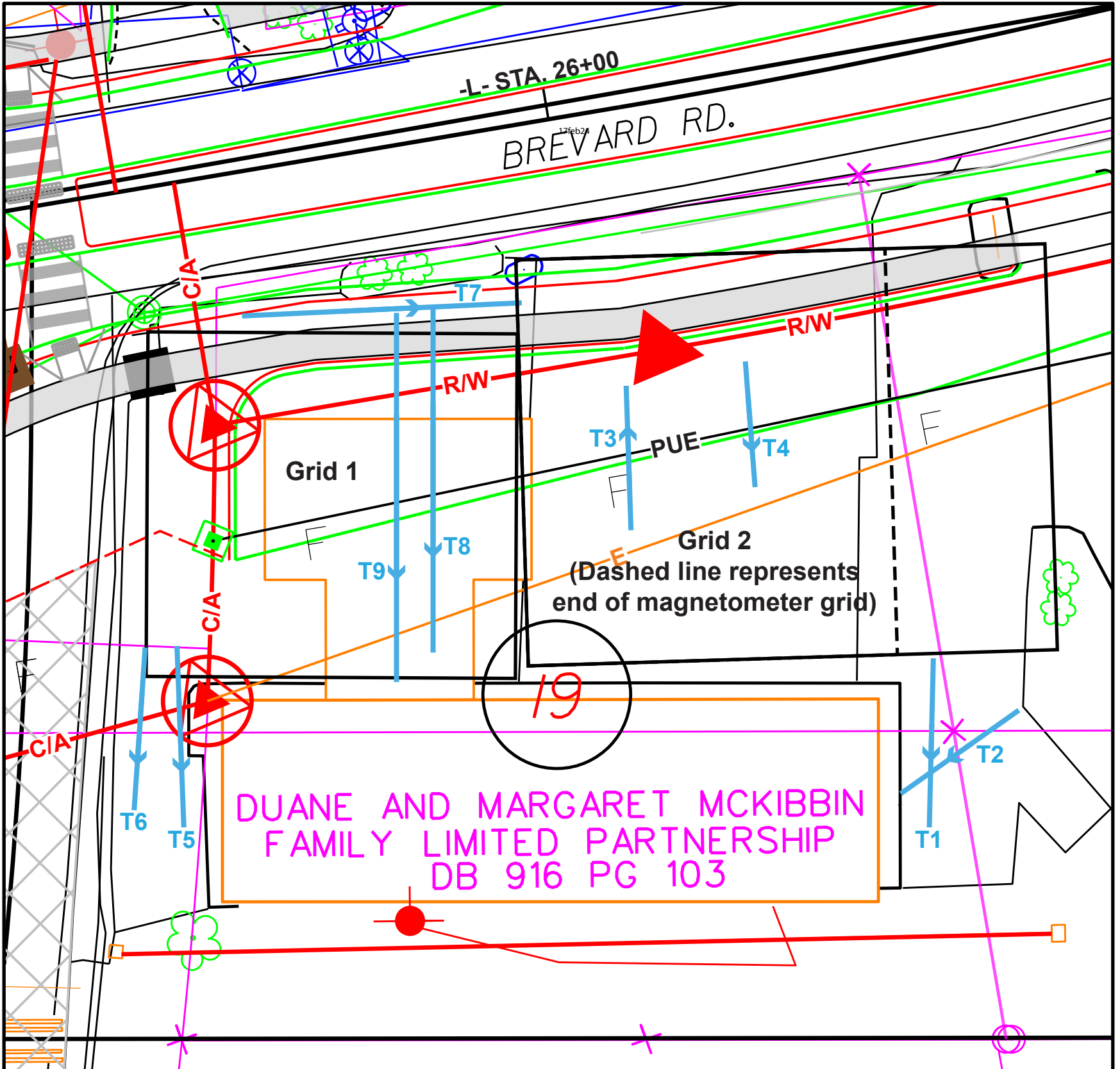
mg/kg =milligrams per kilogram



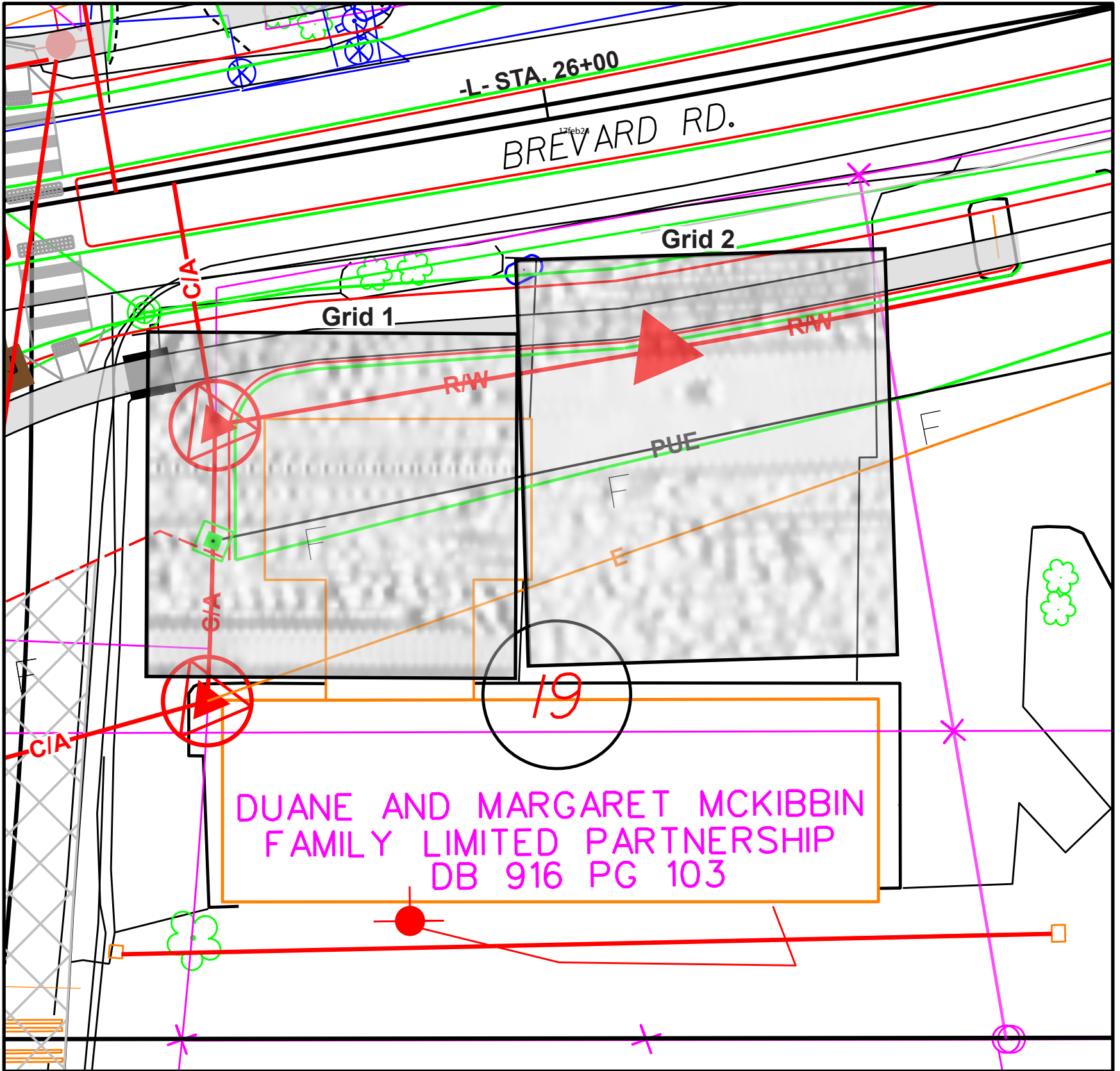
<p>Figure 2 Site Plan</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>	
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p>	




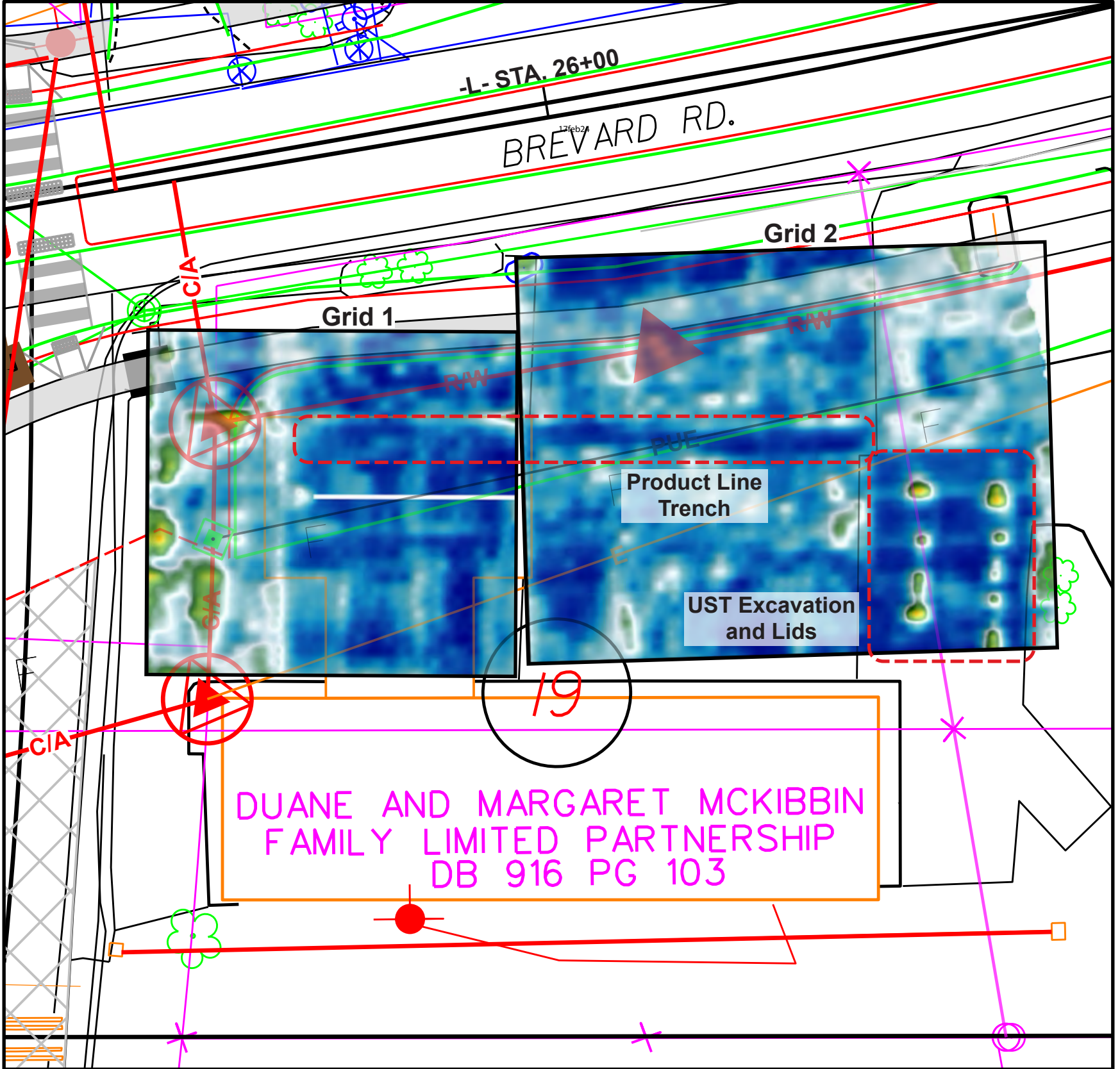
- Soil Boring Locations		
Figure 3 Site Plan with Features and Soil Boring Locations	TIP Number: U-5783 Henderson County, NC	Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC
Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491	Seramur & Associates, PC Boone, NC	




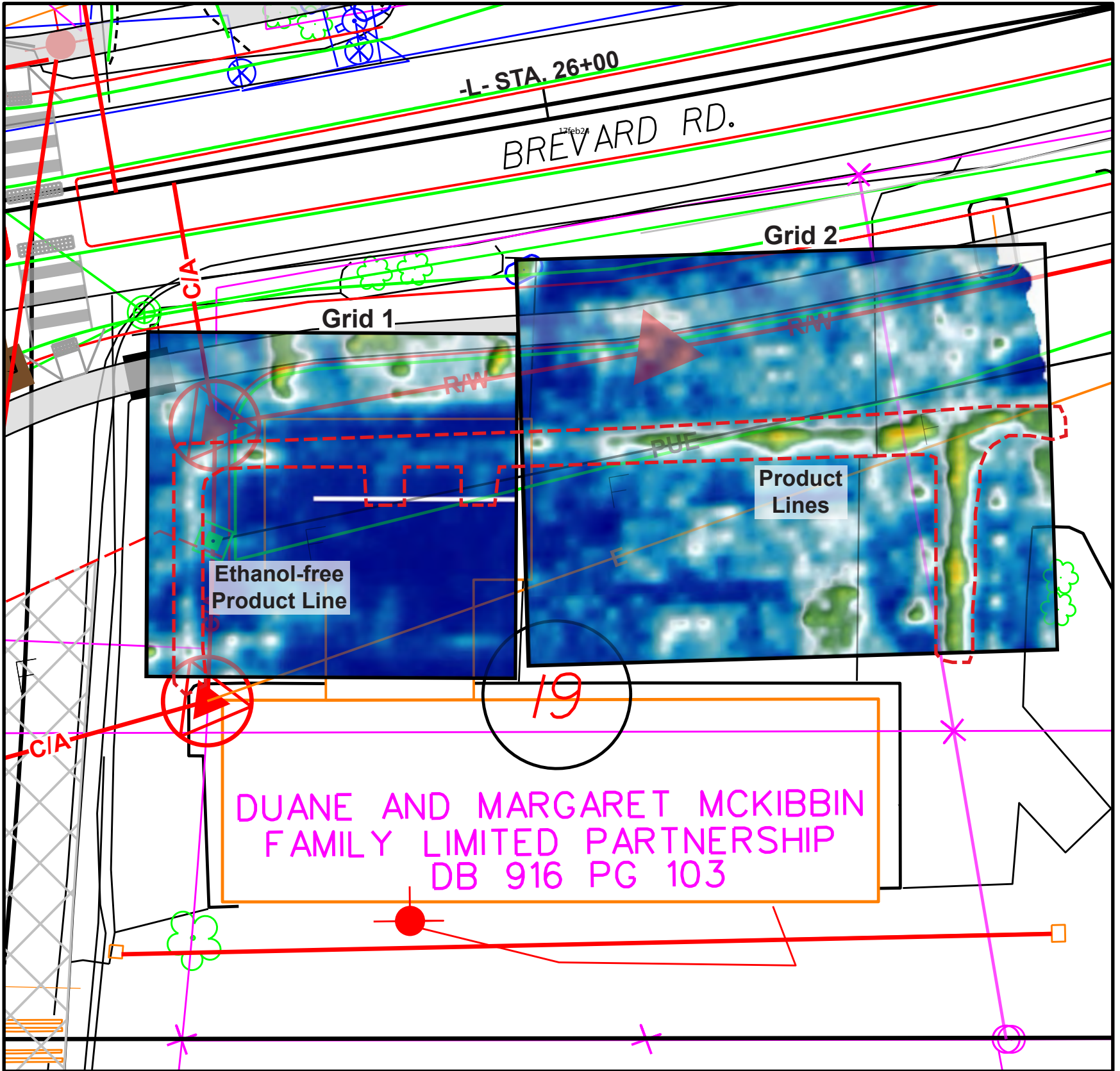
<p>Figure 4 Site Plan with Geophysical Grid and Transect Locations</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p>



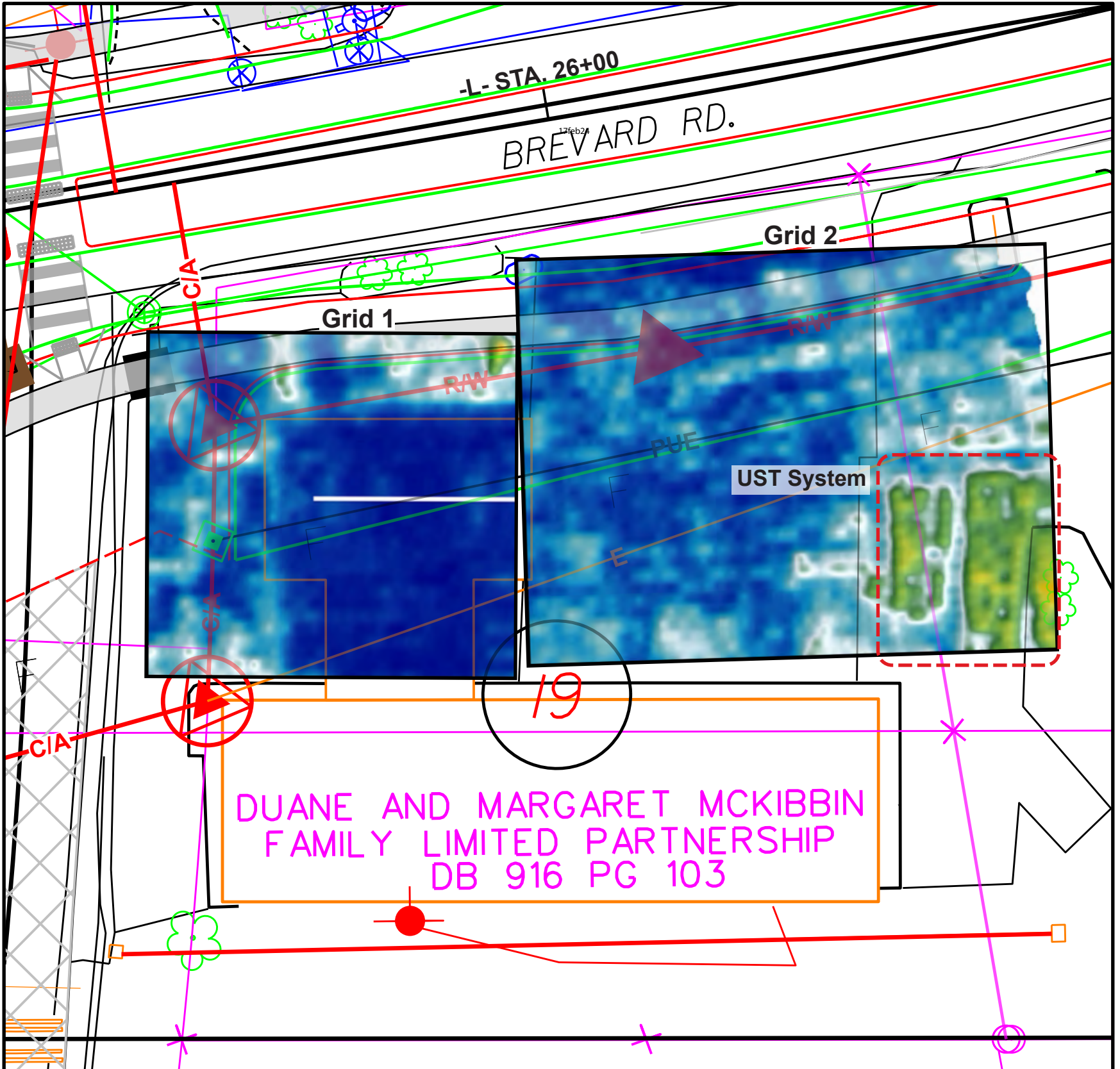
<p>Figure 5 Magnetometer Survey Hillshade Map</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p> 




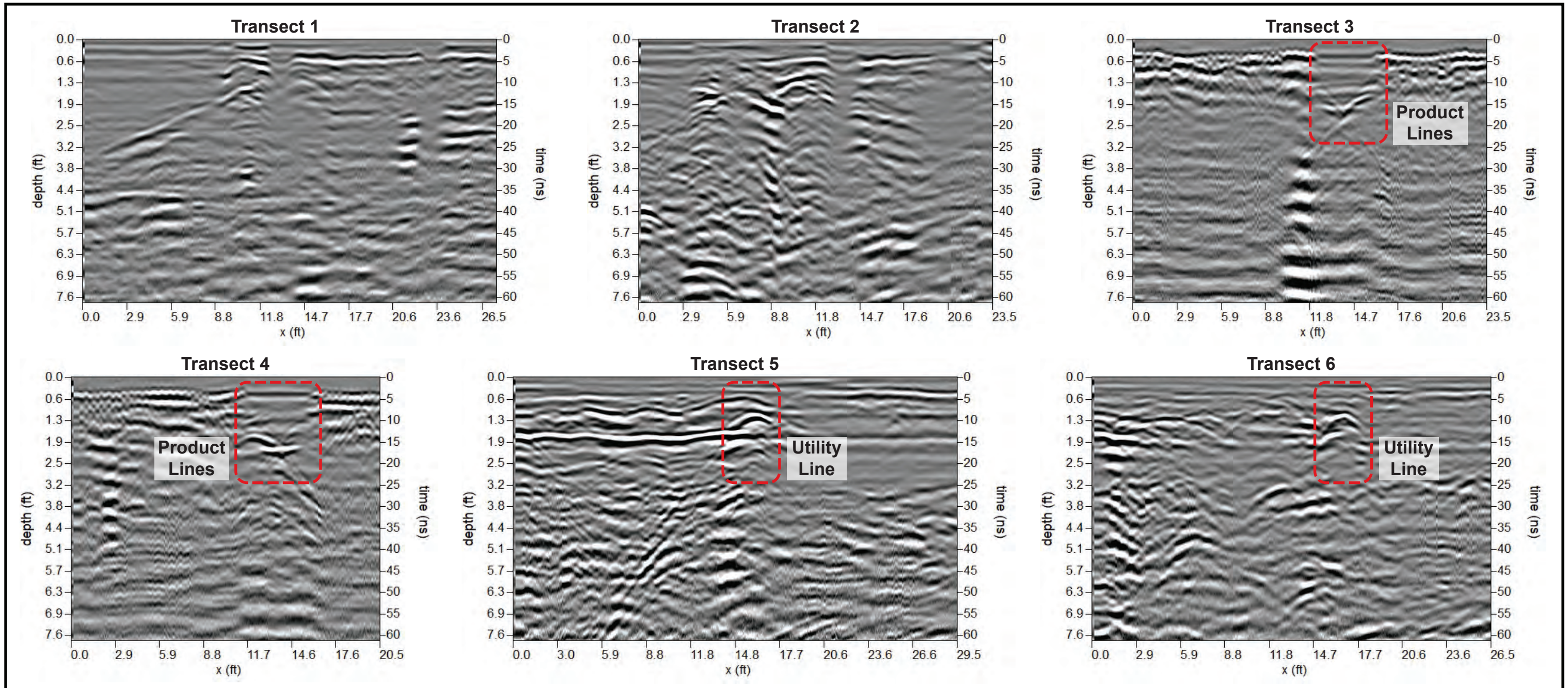
<p>Figure 6 Shallow GPR Depth Slices (0.2 - 0.5 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p> 



<p>Figure 7 Intermediate GPR Depth Slices (2.0 - 2.3 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p>



<p>Figure 8 Deep GPR Depth Slices (3.4 - 3.7 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p> 



<p>Figure 9a GPR Transects 1 through 6</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>
---	--	---	---	---

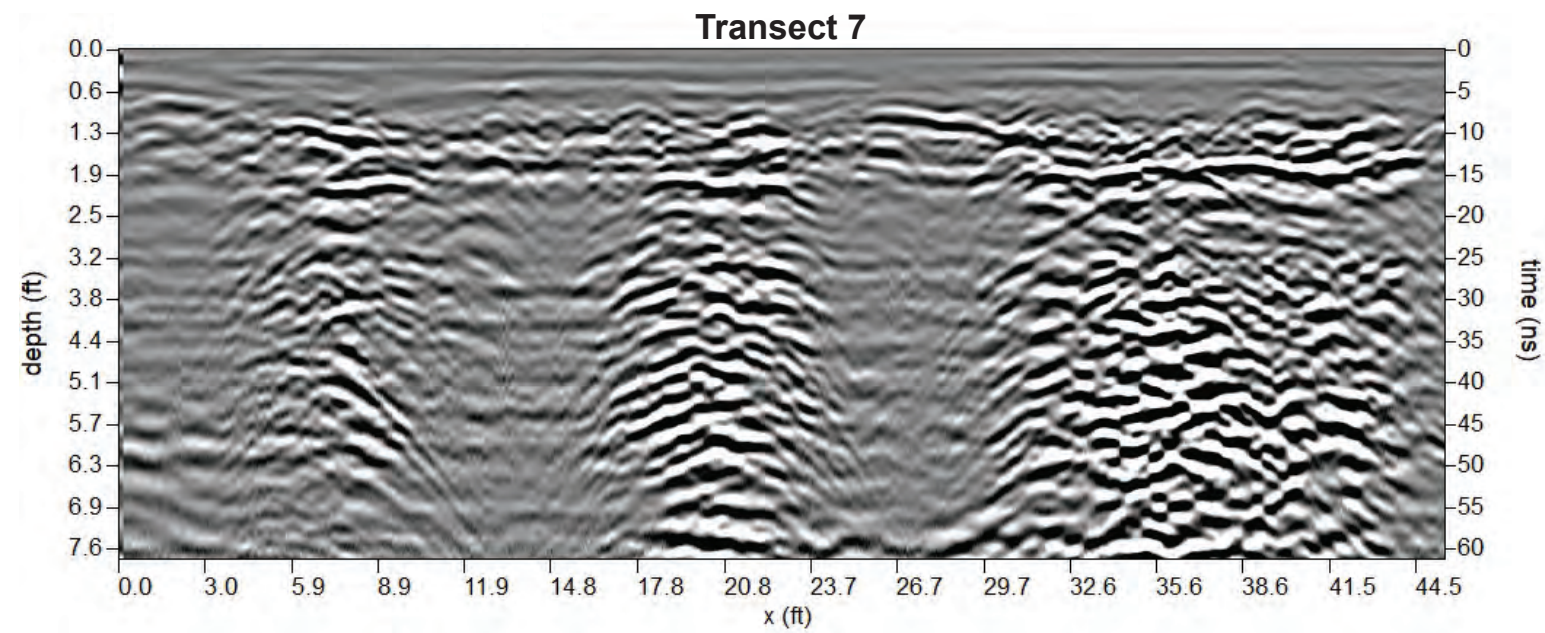
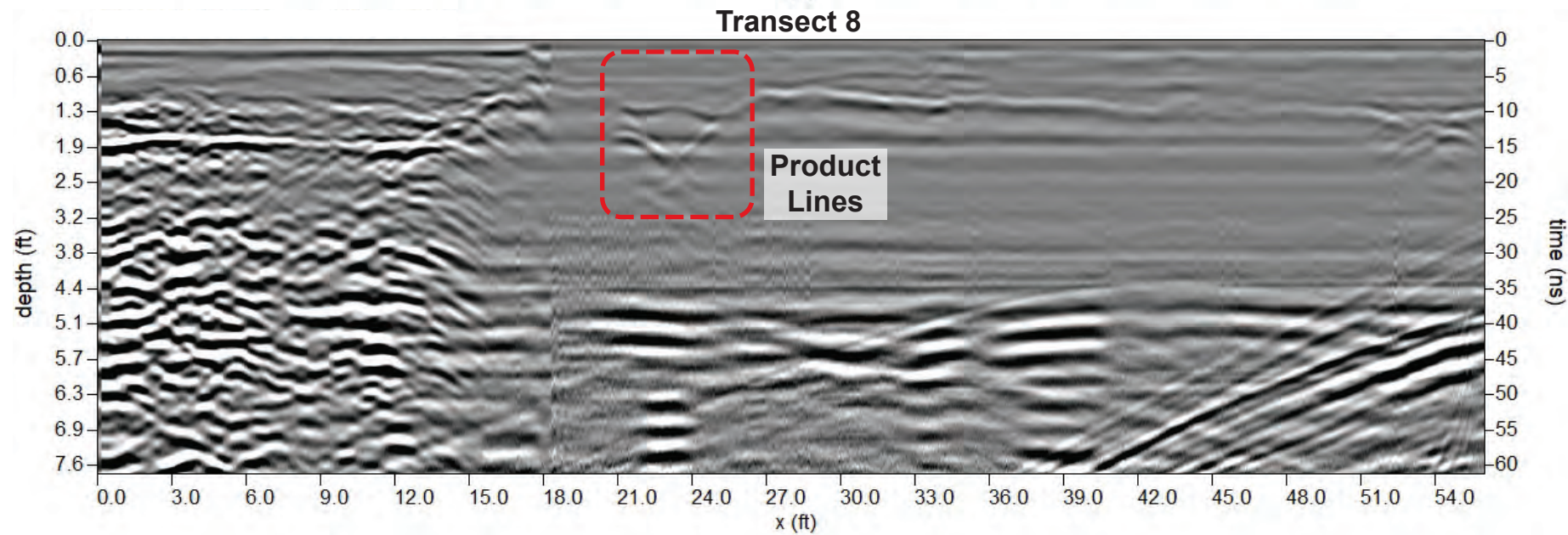
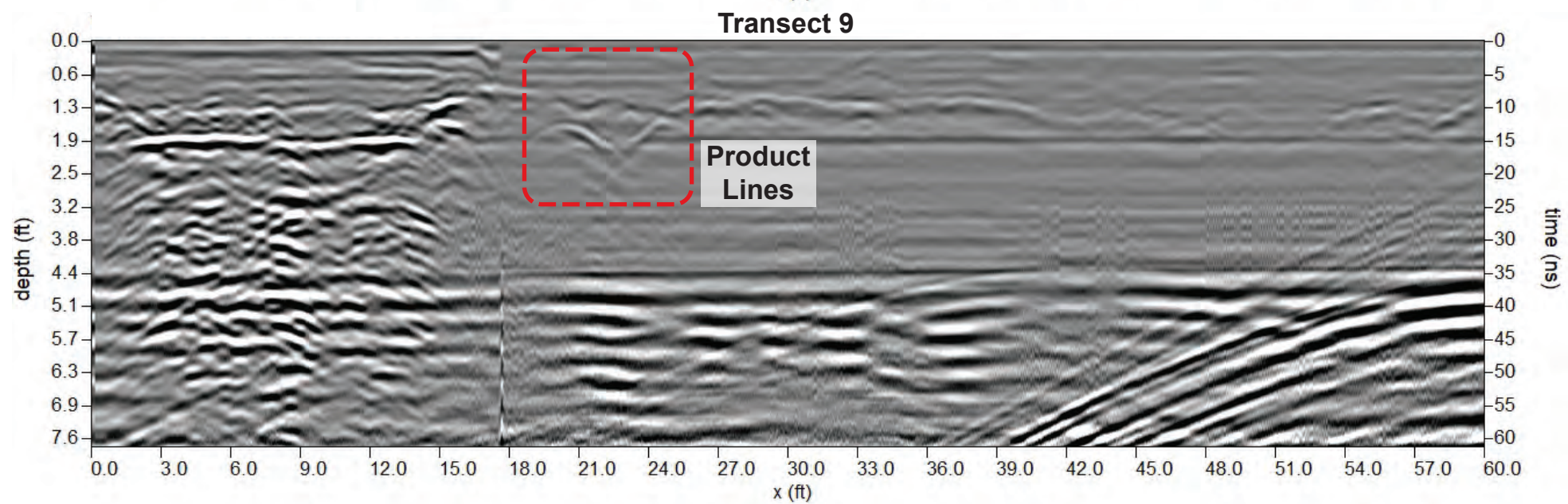


Figure 9b
GPR Transects 7 through 9

TIP Number: U-5783
Henderson County, NC

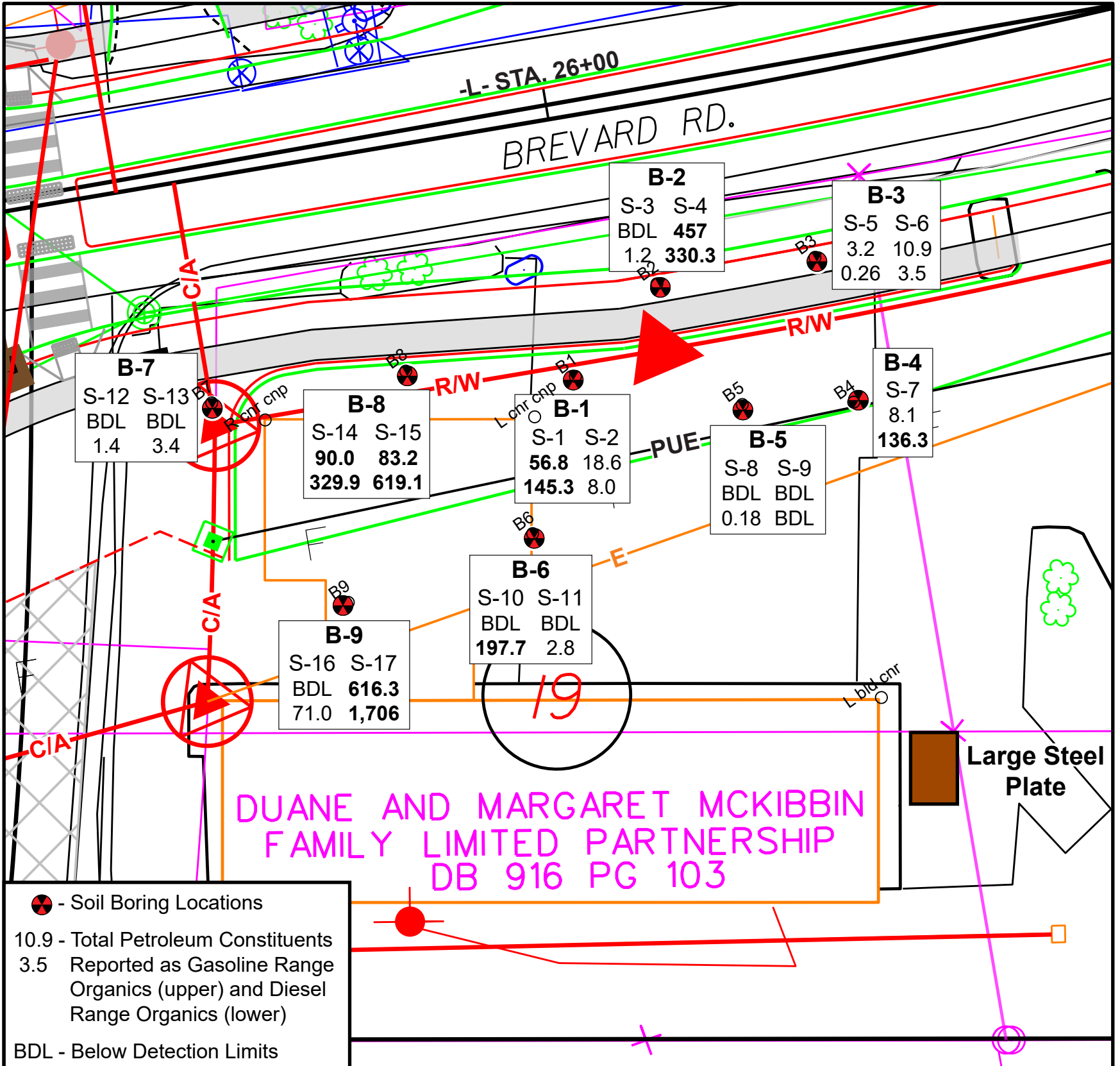


Duane and Margaret McKibbin Family
Limited Partnership Property
1734 Brevard Road
Hendersonville, NC

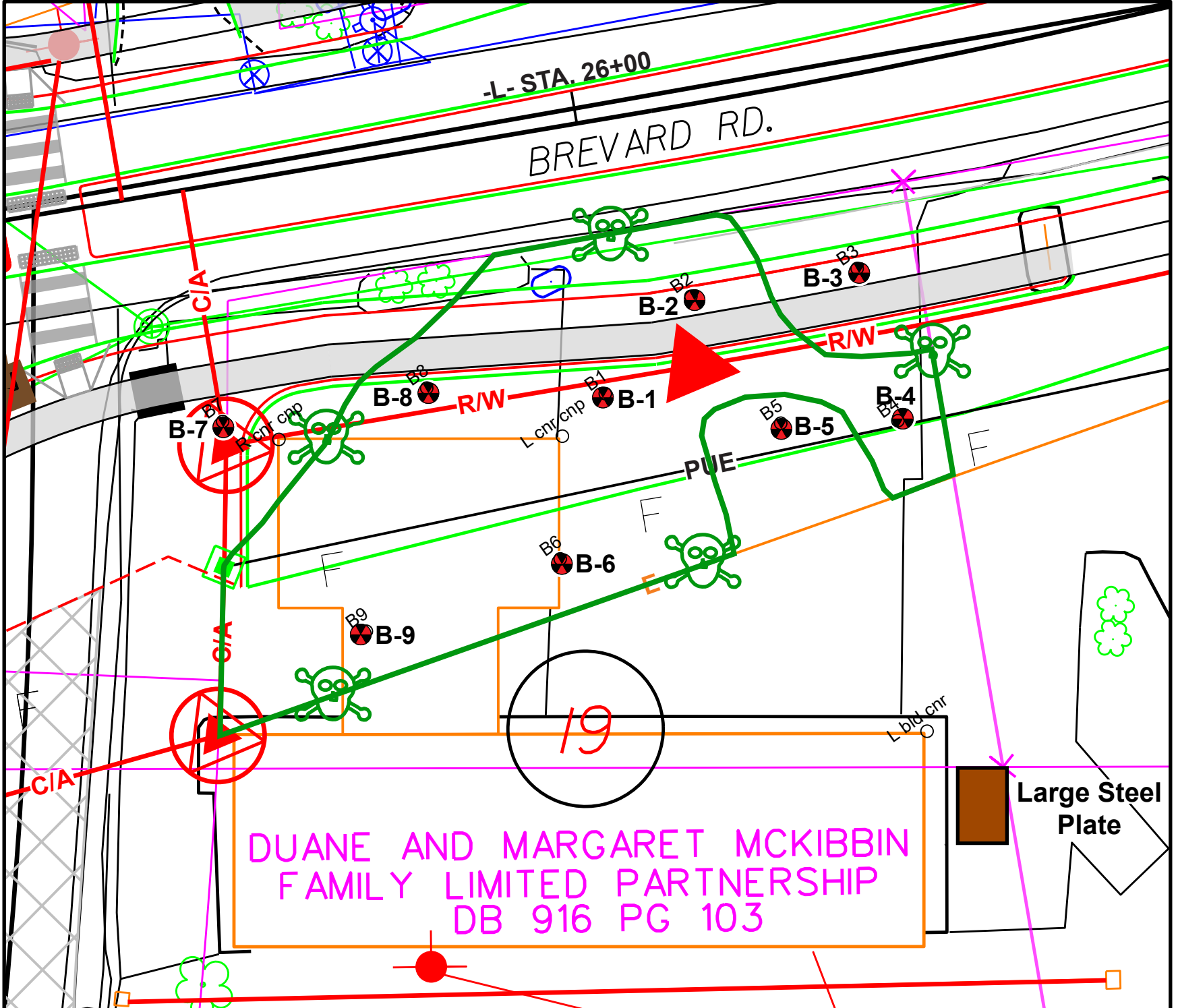


Parcel I.D. #: 019B
Facility I.D. #: 00-0-0000017491

Seramur & Associates, PC
Boone, NC



<p>Figure 10 Soil Analytical Results</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet</p>



- Soil Boring Locations
- Approximate Extent of Soil Contamination

<p>Figure 11 Approximate Extent of Soil Contamination</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1734 Brevard Road Hendersonville, NC</p>
<p>Parcel I.D. #: 019 Facility I.D. #: 00-0-0000017491</p>	<p>Seramur & Associates, PC Boone, NC</p>	<p>0 15 30 Feet </p>

Appendix B

Laboratory Reports and Chain of Custody Records



Hydrocarbon Analysis Results

Client: SAPC
Address: 165 KNOLL DR
 BOONE, NC 28607

Samples taken Thursday, April 6, 2023
Samples extracted Thursday, April 6, 2023
Samples analysed Wednesday, April 12, 2023

Contact: KEITH SERAMUR

Operator CLAIRE NAKAMURA

Project: NCDOT U5783 PARCEL 019

											F03640							
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match					
										% light	% mid	% heavy						
s	S-1	12.9	<0.32	56.8	145.3	202.1	13.3	0.48	<0.013	99.4	0.5	0.1	Deg.Kerosene 87%,(FCM)					
s	S-2	15.5	<0.39	18.6	8	26.6	6	0.33	<0.015	78.7	19.4	1.9	Deg.Fuel 79.2%,(FCM)					
s	S-3	5.8	<0.14	<0.14	1.2	1.2	0.41	<0.05	<0.006	0	66.2	33.8	V.Deg.Diesel 64.3%,(FCM),(BO)					
s	S-4	15.1	126.8	457	330.3	787.3	82.1	3	<0.015	99.7	0.3	0.1	Deg.Kerosene 71.4%,(FCM)					
s	S-5	10.4	<0.26	3.2	0.26	3.46	0.15	<0.08	<0.01	99	1	0	Deg.Gas,(FCM),(T)					
s	S-6	10.6	1.2	10.9	3.5	14.4	0.47	<0.08	<0.011	99.6	0.4	0	Deg.Gas 85.5%,(FCM),(T)					
s	S-7	11.0	<0.28	8.1	136.3	144.4	15.5	1.6	<0.011	66.7	30.7	2.6	Waste Oil 74.6%,(FCM),(BO),(T)					
s	S-8	7.4	<0.18	<0.18	0.18	0.18	0.11	<0.06	<0.007	0	57.1	42.9	Road Tar 59.5%,(FCM),(BO),(T)					
s	S-9	10.8	<0.27	<0.27	<0.27	<0.27	<0.05	<0.09	<0.011	0	0	0	(FCM),(T)					
s	S-10	137.0	<3.4	<3.4	197.7	197.7	189.8	8.3	<0.14	0	87.9	12.1	Deg.Fuel 80.8%,(FCM)					
Initial Calibrator QC check										OK			Final FCM QC Check		OK		98.4 %	

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: SAPC
Address: 165 KNOLL DR
 BOONE, NC 28607

Samples taken Thursday, April 6, 2023
Samples extracted Thursday, April 6, 2023
Samples analysed Wednesday, April 12, 2023

Contact: KEITH SERAMUR

Operator CLAIRE NAKAMURA

Project: NCDOT U5783 PARCEL 019

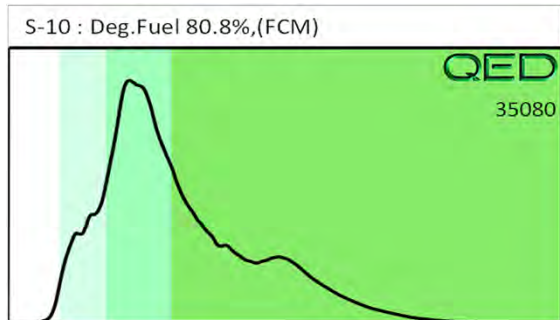
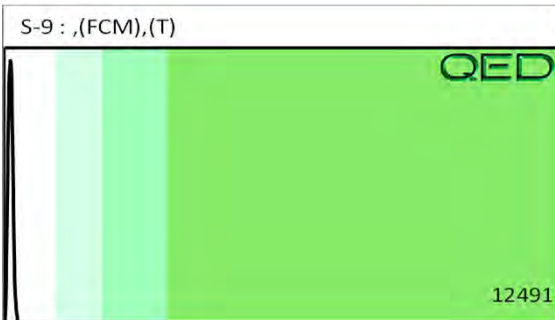
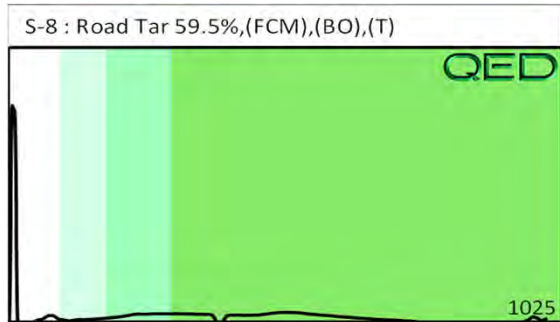
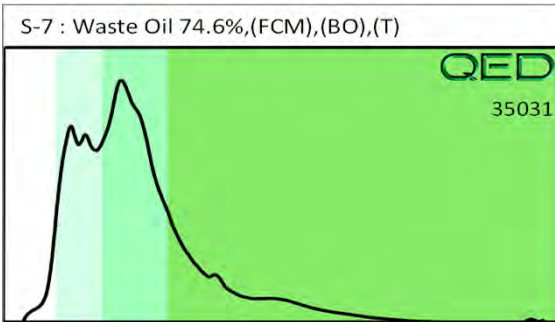
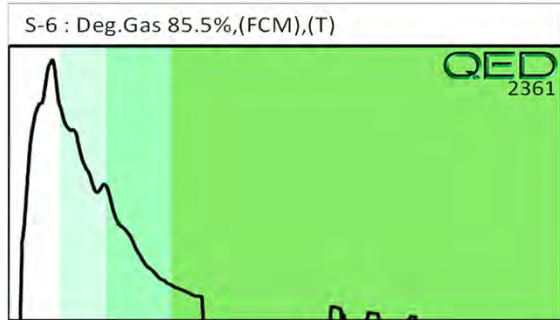
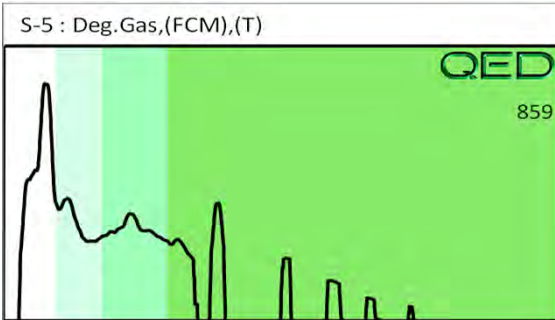
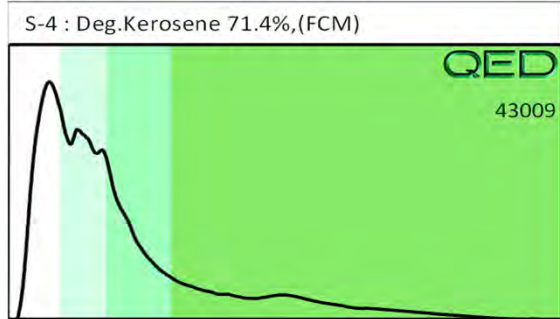
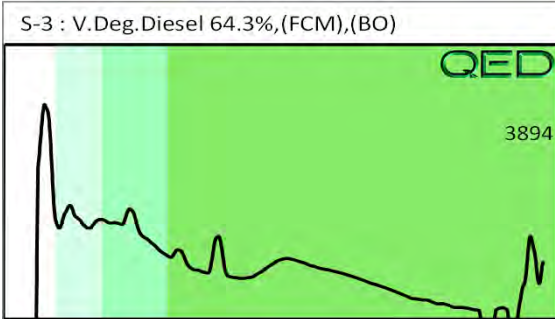
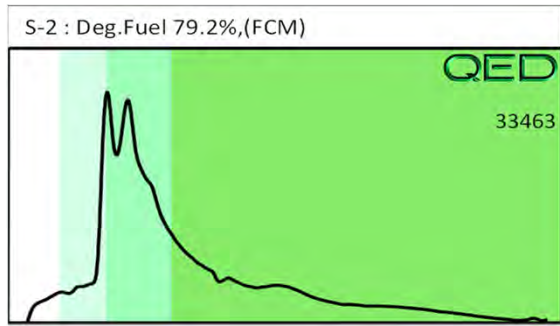
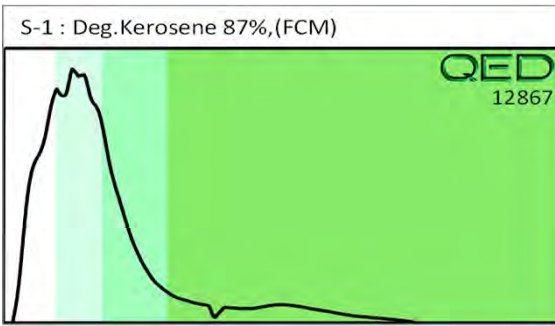
											F03640						
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match				
										% light	% mid	% heavy					
s	S-11	10.7	<0.27	<0.27	2.8	2.8	1.2	<0.09	<0.011	0	75.8	24.2	Deg.Fuel 69.7%,(FCM)				
s	S-12	13.0	<0.33	<0.33	1.4	1.4	0.64	<0.1	<0.013	0	75.1	24.9	Deg.PHC 82.4%,(FCM)				
s	S-13	11.1	<0.28	<0.28	3.4	3.4	2.2	0.11	<0.011	0	84.2	15.8	Deg.Fuel 95.2%,(FCM)				
s	S-14	11.2	9.6	90	329.9	419.9	18.2	0.68	<0.011	99	0.9	0.1	Deg.Kerosene 85.3%,(FCM)				
s	S-15	10.4	<0.26	83.2	619.1	702.3	28.3	1.1	<0.01	98.5	1.5	0	Undeg.Kerosene 92.4%,(FCM)				
s	S-16	156.0	<3.9	<3.9	71	71	34.1	3.4	<0.16	0	86.1	13.9	Road Tar 81.4%,(FCM)				
s	S-17	140.0	<3.5	616.3	1706	2322	178.5	18.3	<0.14	89.9	9.3	0.8	Waste Oil 73.4%,(FCM),(T)				
Initial Calibrator QC check											OK		Final FCM QC Check		OK		101.1 %

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

QED Hydrocarbon Fingerprints

Project: NCDOT U5783 PARCEL 019

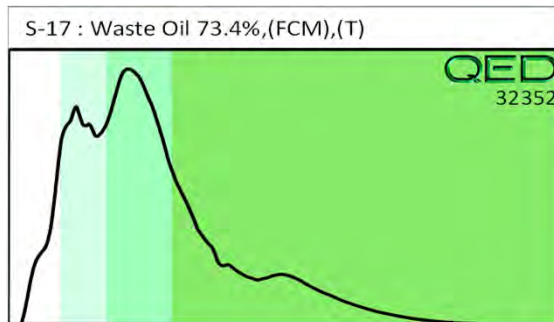
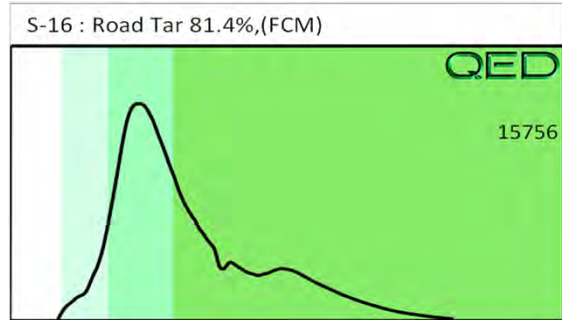
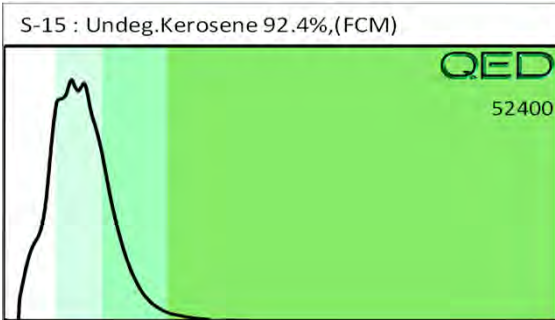
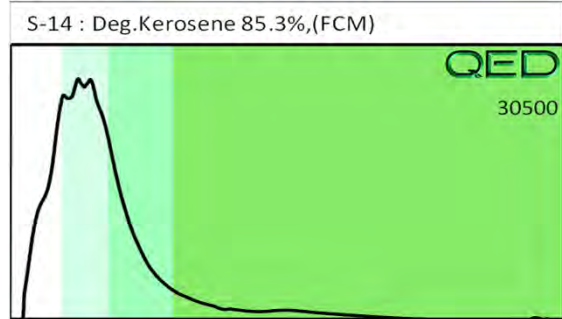
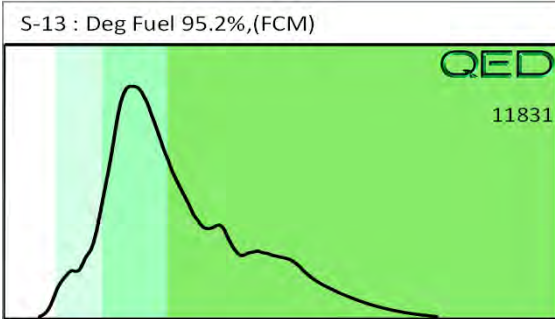
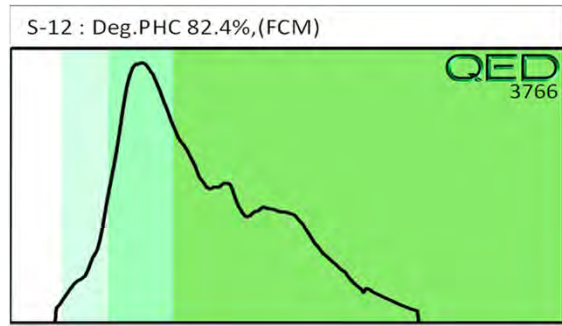
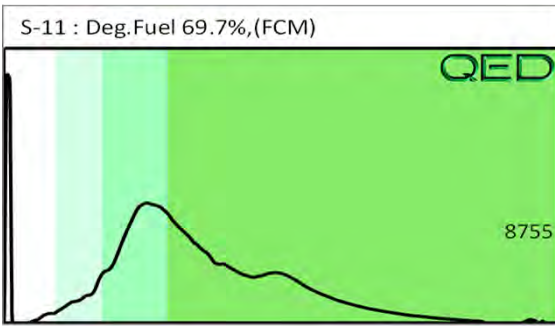
Wednesday, April 12, 2023



QED Hydrocarbon Fingerprints

Project: NCDOT U5783 PARCEL 019

Wednesday, April 12, 2023



Client Name: **SAPC**
 Address: **165 Knoll Dr Boone NC 28607**
 Contact: **Keith Seramur**
 Project Ref.: **NC DOT 45783 Parcel**
 Email: **seramur@icloud.com 0109**
 Phone #: **828 773 0499**
 Collected by: **Keith Seramur**



RED Lab, LLC
 105 Portwatch Way
 Suite F
 Wilmington, NC 28412

Each UVF sample will be analyzed for total BTEX, GRO, DRO, TPH, PAH total aromatics and BaP. Standard GC Analyses are for BTEX and Chlorinated Solvents: VC, 1,1 DCE, 1,2 cis DCE, 1,2 trans DCE, TCE, and PCE. Specify target analytes in the space provided below.

CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM

Sample Collection	TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	Date/Time	24 Hour	48 Hour	UVF					
4-6-23	900	X	X		KCS	S-1	46.4	36.3	10.1
4-6-23	905	X	X		KCS	S-2	45.0	36.6	8.4
4-6-23	910	X	X		KCS	S-3	48.2	36.1	12.1
4-6-23	918	X	X		KCS	S-4	45.1	36.2	8.6
4-6-23	915	X	X		KCS	S-5	49.0	36.5	12.5
4-6-23	920	X	X		KCS	S-6	48.4	36.1	12.3
4-6-23	925	X	X		KCS	S-7	48.3	36.5	11.8
4-6-23	930	X	X		KCS	S-8	45.6	36.1	9.5
4-6-23	935	X	X		KCS	S-9	48.2	36.2	12.0
4-6-23	940	X	X		KCS	S-10	48.5	36.2	12.3
4-6-23	943	X	X		KCS	S-11	48.4	36.3	12.1
4-6-23	945	X	X		KCS	S-12	46.0	36.0	10.0
4-6-23	950	X	X		KCS	S-13	48.1	36.4	11.7
4-6-23	955	X	X		KCS	S-14	48.2	36.6	11.6
4-6-23	1000	X	X		KCS	S-15	48.8	36.3	12.5
4-6-23	1005	X	X		KCS	S-16	47.2	36.4	10.8
4-6-23	1010	X	X		KCS	S-17	48.6	36.1	12.1

COMMENTS/REQUESTS: **10 ml MeOH**

TARGET GC/UVF ANALYTES:

Relinquished by	Accepted by	Date/Time
<i>KCS</i>	<i>Fed Ex</i>	
Relinquished by	Accepted by	Date/Time
	<i>MM</i>	<i>4/11/23</i>
		<i>1210</i>

RED Lab Use Only
 (17)
 4-2023-1

Phase II Site Assessment Report
May 15, 2023
WBS Element: 44354.1.R1
State Project: U-5783
Henderson County

At

Parcel #: 019B
Duane and Margaret McKibbin Family Limited Partnership Property
1724 Brevard Road, Hendersonville, NC 28792
PIN #: 9558896790
Facility ID #: N/A
Groundwater Incident #: N/A

Prepared For:

Mr. Ashley B. Cox, LG
GeoEnvironmental Project Engineer
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, NC 27699-1589

Prepared By:

Seramur & Associates, PC
165 Knoll Drive
Boone, NC 28607



DocuSigned by:
Keith Seramur
9C4E690078CE462...

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 Geophysical Surveys	3
2.3 Soil Sampling and Analyses	4
3.0 Results of Investigation	5
3.1 Plate 1 – Photographs of Parcel #019B	6
3.2 Geophysical Surveys	7
3.3 Soil Borings, Sampling and Laboratory Results	8
3.4 Conclusions	8
4.0 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 Features and Soil Boring Locations	
Figure 4 – Site Plan with Geophysical Grid and Transect Locations	
Figure 5 – Magnetometer Survey Hillshade Map	
Figure 6 – Shallow GPR Depth Slices	
Figure 7 – Intermediate GPR Depth Slices	
Figure 8 – Deep GPR Depth Slices	
Figure 9 – GPR Transect Profiles 1 through 6	
Figure 10 – Soil Analytical Results	
Appendix B – Laboratory Reports	

1.0 Introduction

1.1 General Site Background Information

Seramur & Associates, PC was contracted to complete a Phase II Environmental Site Assessment at:

Parcel #: 019B
Duane and Margaret McKibbin Family Limited Partnership Property
1724 Brevard Road, Hendersonville, NC 28792
PIN #: 9558896790
Facility ID #: N/A
Groundwater Incident #: N/A

Parcel #019B is located on the south side of Brevard Rd to the west of the Coats North America factory in Hendersonville (Figure 1). Our study area was limited to the area north of the restaurant building (Figure 2). The property currently operates as The Dixie Diner, a restaurant that serves breakfast and lunch. Bedrock in the area is mapped as the Henderson Gneiss; a biotite-microcline augen gneiss (Hadley, J.B. and Nelson, A.E., 1971, Geologic map of the Knoxville quadrangle, North Carolina, Tennessee, and South Carolina, U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-654).

A Notice to Proceed was obtained on February 17, 2023. Our area of investigation focused on the proposed Right-of-Way (R/W) along the southern side of Brevard Road as well as the proposed Permanent Drainage Easement (PDE), Drainage Utility Easement (DUE) and Temporary Construction Easement (E) north of the restaurant building. The Phase II Site Assessment scope of work included completing a geophysical survey, soil sample collection, and laboratory analysis. The geophysical survey evaluated the potential for underground storage tanks and remnant UST system infrastructure. The purpose of soil sampling and laboratory analysis is to assess soil quality across the proposed R/W and the proposed Easements (Figure 3). Background research for this project included reviewing historic aerial photographs and NCDEQ databases.

2.0 Scope of Work

2.1 Background Research

According to the Henderson County Tax Administration records, the property owner is listed as Duane & Margaret McKibbin Family Limited Partnership. Available historic aerial photographs from the USGS EarthExplorer website and Google Earth Pro were reviewed.

The following NCDEQ databases were queried for incidents at Parcel #019B:

- Dry Cleaners
- UST Incident Map
- Hazardous Waste Sites
- Active USTs
- UST Database

2.2 Geophysical Surveys

Seramur & Associates used the Pythagorean Theorem to establish two rectangular grids covering the proposed R/W and Easements along Brevard Road (Figure 4). Geophysical grid data was

collected along transects at a two-foot spacing. Many transects were extended past the established rectangular grid corners in the GPR survey of Grid 2.

Six additional transects of GPR data were collected in the areas that were unable to be covered with grid data (Figure 4). A Schonstedt GA-72Cd Magnetic Locater was also used over these transects to search for magnetic anomalies that could be related to a former UST System.

The magnetometer data was collected with a GEM Systems GSM-19W Walking Overhauser magnetometer. The data was compiled in Excel spreadsheets and grayscale hillshade maps of the magnetic data were drafted using Golden Software's Surfer® modeling program. The lighter shades are lower magnetic readings, and the darker colors are higher magnetic readings (Figure 5). Ferrous objects in the subsurface have a magnetic field distinct from the surrounding soil and produce magnetic anomalies on the hillshade maps.

The Ground Penetrating Radar (GPR) data was collected with a Geophysical Survey Systems, Inc. UtilityScan GPR System with a 350 MHz hyperstacking antenna. This GPR system is equipped with a calibrated survey wheel. The GPR data was downloaded and saved onto a computer. The GPR grid and transect 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. Three-dimensional models of the GPR grid data were produced with GPR Slice® software. Three time slices (or depth slices) were imaged in each 3D model at depths of 0.2 to 0.5 feet, 1.8 to 2.1 feet and 3.3 to 3.6 feet (Figures 6, 7, & 8). Each depth slice is a horizontal slice or plan view of the reflections across a 0.3-foot thickness of the subsurface. For example, the deep GPR depth slices show reflections in the radar data between depths of 3.3 and 3.6 feet. The profiles of the GPR transects show the subsurface directly under the path of the antenna to a depth of about 8.0 feet (Figure 9).

2.3 Soil Sampling and Analyses

Carolina Soil Investigations, LLC mobilized to the site on April 6, 2023, to drill Geoprobe borings and collect soil samples. Our project design typically calls 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 and fuel dispensers. The purpose of collecting samples at a depth of ~9.0 feet is to test for petroleum releases related to underground storage tanks. Soil borings were drilled within the proposed R/W and easements along Brevard Road.

A track-mounted Geoprobe rig was used to drill eight soil borings. The texture and type of soil material in the Geoprobe cores was described and recorded. 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 PhoCheck Tiger 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). Table 1 lists the boring data including sample number, depth, PID reading, lithology, and type of soil material.

Following collection of soil samples in the field, select samples were placed in laboratory provided sample jars with Terra-Core samplers and shipped on ice to REDLab, LLC in Wilmington, NC for laboratory analyses. REDLab analyzed the soil samples for petroleum constituents with the Ultra-Violet Fluorescence (UVF) Method using a QED HC-1 analyzer. The analytical results are reported as Gasoline Range Organics (GRO), Diesel Range Organics (DRO) and Total Petroleum Hydrocarbons (TPH). REDLab provides a hydrocarbon fingerprint spectrum with the sample results. This spectrum is used for a tentative identification of the type of hydrocarbon detected by the analytical method. The hydrocarbon fingerprint is interpreted by REDLab 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 #019B currently operates as The Dixie Diner, a restaurant that serves breakfast and lunch. The 1951 aerial photograph shown on the Henderson County GIS Website shows a small square building in the location of the existing building. A 1964 aerial photograph shows at least one different structure on the property in the same location and possibly a second south of the building; it is possible that this is just a trailer. The 1984 aerial photograph shown on the Henderson County GIS Website shows the building from 1964 with an addition on the west side and a fuel dispenser canopy to the north. There are additional structures to the south, including one that appears to be a residence. The Henderson County Tax Records indicate that the current building was constructed in 1915 and significantly remodeled in 1970. It would appear based on the aerial photographs that the original building was demolished sometime between 1951 and 1964. It is not known if either building was constructed as a gas station, or if the property was repurposed for use as a gas station at a later date.

The property is not listed in either the NCDEQ UST Registered Tanks or Underground Storage Tank Incidents databases. Mr. Bill McKibbin (one of the property owners) stated that the former UST system was located along the east side of the property and the fuel dispensers were located in the front of the building. Mr. McKibbin recalled that the tanks were removed by Singleton Environmental many years ago and that three monitoring wells were installed in the vicinity of the tanks following their closure. Mr. McKibbin did not remember how many tanks were on the property or their sizes and is not aware of any other USTs located on the property. The tanks were likely removed before NCDEQ regulations require registration of tanks and reporting of petroleum releases. As a result, the tanks are not listed in the UST Database and we were not able to find any incident files related to the UST system or monitoring wells on the property. The property does not appear on other NCDEQ Databases or Incident Maps.

SAPC personnel made a pedestrian reconnaissance of the property during the initial site visit on February 28, 2023. The three abandoned groundwater monitoring wells were observed along the east side of the property (see Figure 3 for locations). A possible fuel dispenser base was observed underneath a patch in the concrete near the northwest side of the building (see Photo 4 in Plate 1). Some cut-off, 2" iron pipes were observed in the sidewalk near this potential dispenser that could have possibly been related to vent lines for a former UST system (see Figure 3 for locations).

3.1 Plate 1 – Photographs of Parcel #019B taken on February 28 and April 6, 2023.



Photo 1. View to the southeast across Parcel #019B.



Photo 2. Collecting GPR data at Parcel #019B.



Photo 3. Collecting magnetometer data at Parcel #019B.



Photo 4. Patched concrete showing possible former dispenser.

3.2 Geophysical Surveys

The magnetometer data shows elevated magnetic readings along the northern and southern portions of Grids 1 and 2. (Figure 5). These areas appear to be underlain by re-enforced concrete under the modern asphalt pavement.

The two localized areas of elevated magnetic readings include near the former dispenser islands in the southeast corner of Grid 1 and at the steel manhole along the northern edge of Grid 2 (Figure 5). Elevated magnetic readings were not recorded in Grid 2 across the reported location of the corrugated metal stream culvert. Mr. McKibbin stated that the culvert was buried 4-5 feet deep and that there was not much left of the metal pipe. Patches in concrete across the parking lot indicated that this pipe has been excavated and repaired. It is likely that much of the culvert across the subject property has been excavated and replaced with concrete pipe.

The shallow GPR depth slices (0.2-0.5 feet) are primarily reflection free with some medium-to-high amplitude reflections around the outside of the grids. The manhole cover for the culvert appears on the north side of Grid 2 as a small high amplitude reflection. High amplitude reflections near the south-central edge of Grid 1 could be backfill near the possible UST. The area where the former dispensers were located appears as a reflection-free rectangle straddling the two grids (Figure 6).

The intermediate GPR depth slices (1.8-2.1 feet) are mostly reflection free with a few exceptions. Dispersed medium-to-high amplitude reflections straddle Grids 1 and 2 in the location of the former fuel dispensers (Figure 7). An area of high amplitude reflections is present along one portion of the culvert path. These reflections are too shallow to be the culvert which is shown at a depth of about 3.8 feet on the GPR transects (see Inset A on Figure 7). These shallow reflections are produced by backfill above the culvert. The culvert is shown as an area of soil disturbance on the 4-foot GPR transect, a large diameter pipe on the 14-foot transect and as a smaller reflection on the 28-foot transect. The changing reflection characteristics of the culvert is further evidence that the culvert has been excavated and repaired on more than one occasion. A rectangular reflection-free area in the northeast corner of Grid 2 could represent the location of the former USTs (Figure 7).

The deep GPR depth slices (3.3-3.6 feet) shows dispersed medium to high amplitude reflections except in the area of the culvert in Grid 2 (Figure 8). Inset B is a portion of the culvert at a depth of 4.2 to 4.5 feet. A distinct reflection is not present on the north end of the culvert and a wide high amplitude reflection is present in the central portion of the culvert. The southern portion of the culvert is represented by a narrow linear high amplitude reflection. The changes in the reflection characteristics on the GPR profiles (Inset A on Figure 7) match the reflection characteristics observed on the GPR depth in Inset B (Figure 8).

GPR Transects 1 through 5 were collected on the east side of the restaurant building where a grid could not be collected due to a construction trailer and ongoing renovation work. Transect 2 crosses directly over one of the abandoned monitoring wells. Transect 3 appears to cross a utility

line and Transect 5 crosses the buried culvert that carries a creek underneath the property. No anomalies are present in these five transects that would represent a UST. Transect 6 was collected over the sidewalk on the northwest side of the building near the possible former dispenser island and cut-off metal pipes. This transect was collected outside of the proposed Temporary Construction Easement in an effort to image a possible UST buried underneath the sidewalk and footprint of the restaurant. Transect 6 shows the presence of a horizontal reflection that is 5 feet in length and buried at a depth of about 5 feet (Figure 9). This anomaly or possible UST is about 4 or 5 feet south of the easement.

3.3 Soil Borings, Sampling and Laboratory Results

The soil at Parcel #019B consists of fill material over alluvium and residuum (saprolite) (Table 1). The fill material is primarily made up of silt loam with gravel. Alluvium is primarily sandy loam to silt loam and the residuum is sandy loam. Groundwater was not encountered at this site.

Eight borings were drilled, and twenty-nine soil samples were described (Table 1). Two 5-foot cores were collected from each boring and one sample was collected from each core. Eleven samples were labeled and jarred for laboratory analyses. These eleven soil samples were analyzed for GRO and DRO by REDLab, LLC in Wilmington, NC (Table B-3).

Soil borings B-1, B-2, B-3, B-6, B-7 and B-8 were drilled in the proposed E along Brevard Road. Borings B-3 and B-4 were drilled just within the proposed R/W on the northwest side of the property. Boring B-1 was drilled near the end of the possible UST (Figure 3).

Petroleum constituents were not detected above the NCDEQ Action Levels in any of the soil samples collected at Parcel #019B. Slightly elevated concentrations (>10.0 ppm) of petroleum constituents were detected in the deep samples from Borings B-2 and B-3 (Table B-3, Figure 10 and Laboratory Results in Appendix B). These borings were drilled in the approximate location of the former fuel dispensers.

3.4 Conclusions

Parcel #019B currently operates as a restaurant called The Dixie Diner. The property previously operated as a gas station. The geophysical surveys did not image an existing UST system within the proposed R/W or easements. A possible tank located under the west side of the building appears to be 4 or 5 feet south of the Temporary Construction Easement. Evidence of the previous UST system was observed in the GPR depth slices along the eastern side of the property. Historical aerial photographs show a possible canopy north of the restaurant building between the proposed R/W and E. Petroleum constituents were not detected above the NCDEQ Action Levels in any of the soil samples collected at Parcel #019B.

4.0 Recommendations

Seramur & Associates does not recommend any further assessment work for Parcel #019B.

Appendix A Tables and Figures

Table 1. Soil Boring Data - Parcel #019B - Duane & Margaret McKibbin Family Limited Partnership Property						
Boring No.	Depth (ft)	Lithology	Soil type	Soil Sample	PID ppm	Comments
B-1	0.0 to 2.9	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.3 feet.
B-1	2.9 to 3.7	Silt loam to loamy sand	Alluvium	--	0.2	Sample at 3.6 feet.
B-1	3.7 to 5.0	N/A	N/A	--	--	No recovery.
B-1	5.0 to 6.4	Silt loam to loamy sand	Alluvium	--	--	
B-1	6.4 to 7.5	Sandy loam	Residuum	S-1	0.1	Sample at 7.3 feet.
B-1	7.5 to 10.0	N/A	N/A	--	--	No recovery.
B-2	0.0 to 1.8	Silt loam w/ gravel	Fill	--	0.2	Asphalt from 0.0 to 0.8 feet.
B-2	1.8 to 5.0	N/A	N/A	--	--	Sample at 1.7 feet.
B-2	5.0 to 5.9	Silt loam w/ gravel	Fill	--	--	No recovery.
B-2	5.9 to 6.8	Sandy loam	Alluvium	S-2	13.8	Sample at 6.3 feet.
B-2	6.8 to 7.0	Sandy loam	Residuum	--	--	
B-2	7.0 to 10.0	N/A	N/A	--	--	No recovery.
B-3	0.0 to 2.7	Silt loam w/ gravel	Fill	S-3	0.4	Asphalt from 0.0 to 0.7 feet.
B-3	2.7 to 5.0	N/A	N/A	--	--	Sample at 2.6 feet.
B-3	5.0 to 7.3	Silt loam w/ gravel	Fill	S-4	1.7	No recovery.
B-3	7.3 to 10.0	N/A	N/A	--	--	Sample at 6.4 feet.
B-4	0.0 to 2.1	Silt loam w/ gravel	Fill	--	--	No recovery.
B-4	2.1 to 3.7	Sandy loam	Alluvium	--	0.1	Gravel from 0.0 to 0.3 feet.
B-4	3.7 to 5.0	N/A	N/A	--	--	Sample at 3.5 feet.
B-4	5.0 to 6.3	Sandy loam w/ sand and gravel	Alluvium	--	--	No recovery.
B-4	6.3 to 7.5	Sandy loam	Residuum	--	0.2	Sample at 7.4 feet.
B-4	7.5 to 10.0	N/A	N/A	--	--	No recovery.
B-5	0.0 to 2.0	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.3 feet.
B-5	2.0 to 3.6	Sandy loam	Alluvium	S-5	0.8	Sample at 3.5 feet.
B-5	3.6 to 5.0	N/A	N/A	--	--	No recovery.
B-5	5.0 to 6.1	Sandy loam w/ sand and gravel	Alluvium	S-6	0.5	Sample at 5.4 feet.
B-5	6.1 to 7.9	Sandy loam	Residuum	--	--	
B-5	7.9 to 10.0	N/A	N/A	--	--	No recovery.
B-6	0.0 to 2.8	Silt loam w/ gravel	Fill	--	--	Asphalt from 0.0 to 0.2 feet.
B-6	2.8 to 3.4	Sandy loam	Alluvium	S-7	0.4	Sample at 3.3 feet.
B-6	3.4 to 5.0	N/A	N/A	--	--	No recovery.
B-6	5.0 to 6.9	Silt loam	Alluvium	S-8	0.0	Sample at 6.2 feet.
B-6	6.9 to 7.8	Sandy loam	Residuum	--	--	
B-6	7.8 to 10.0	N/A	N/A	--	--	No recovery.
B-7	0.0 to 3.2	Loam w/ gravel	Fill	S-9	5.7	Gravel from 0.0 to 0.3 feet. Sample at 3.1 feet.
B-7	3.2 to 5.0	N/A	N/A	--	--	No recovery.
B-7	5.0 to 5.6	Loam w/ gravel	Fill	--	--	
B-7	5.6 to 7.9	Clay loam to silt loam	Alluvium	S-10	2.5	Sample at 6.7 feet.
B-7	7.9 to 8.5	Sandy loam	Residuum	--	--	
B-7	8.5 to 10.0	N/A	N/A	--	--	No recovery.
B-8	0.0 to 2.0	Sandy loam w/ gravel	Fill	--	0.1	Asphalt from 0.0 to 0.3 feet.
B-8	2.0 to 5.0	N/A	N/A	--	--	Sample at 1.8 feet.
B-8	5.0 to 7.0	Silt loam	Alluvium	S-11	0.3	No recovery.
B-8	7.0 to 7.2	Sandy loam	Residuum	--	--	Sample at 5.6 feet.
B-8	7.2 to 10.0	N/A	N/A	--	--	No recovery.

Note: Blue shading is shallow core and orange shading is the deep core for each boring.

Table B-3: Summary of Soil Sampling Results

Revision Date: 04/14/23

Site Name: Parcel #019B

Analytical Method (e.g., VOC by EPA 8260) →					UVF		
Contaminant of Concern →					GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)
Sample ID	Date Collected (mm/dd/yy)	Source Area	Sample Depth (ft. BGS)	Incident Phase			
S-1	04/06/23	B-1	7.3	Phase II	1.5	<0.13	1.5
S-2	04/06/23	B-2	6.3	Phase II	18.7	29.4	48.1
S-3	04/06/23	B-3	2.6	Phase II	1.3	1.8	3.1
S-4	04/06/23	B-3	6.4	Phase II	14.3	20.3	34.6
S-5	04/06/23	B-5	3.5	Phase II	<0.28	1.7	1.7
S-6	04/06/23	B-5	5.4	Phase II	<0.28	0.28	0.28
S-7	04/06/23	B-6	3.3	Phase II	<0.28	0.96	0.96
S-8	04/06/23	B-6	6.2	Phase II	<0.14	<0.14	<0.14
S-9	04/06/23	B-7	3.1	Phase II	<0.27	7.0	7.0
S-10	04/06/23	B-7	6.7	Phase II	<0.26	<0.26	0.16
S-11	04/06/23	B-8	5.6	Phase II	<0.29	0.58	0.58
NC DEQ Action Level (mg/kg)					50	100	N/A

ft. BGS = feet below ground surface

mg/kg =milligrams per kilogram

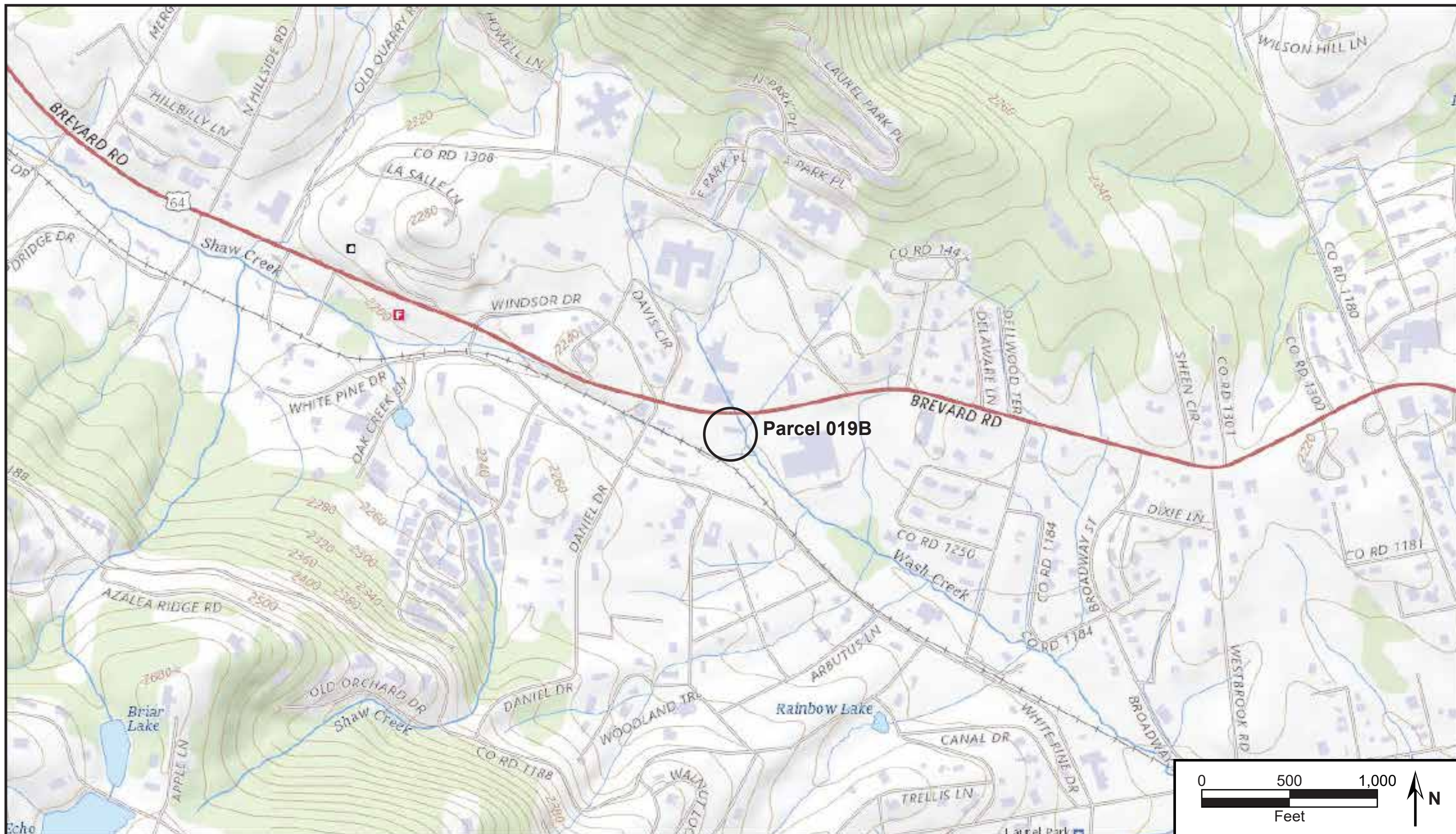


Figure 1
 Site Location Map
 Source: U.S.G.S.
 The National Map

TIP Number: U-5783
 Henderson County, NC

Duane and Margaret McKibbin Family
 Limited Partnership Property
 1724 Brevard Road
 Hendersonville, NC

Parcel I.D. #: 019B
 Facility I.D. #: N/A

Seramur & Associates, PC
 Boone, NC

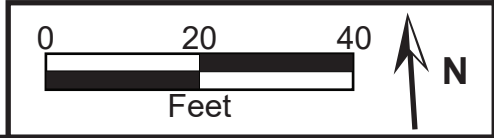
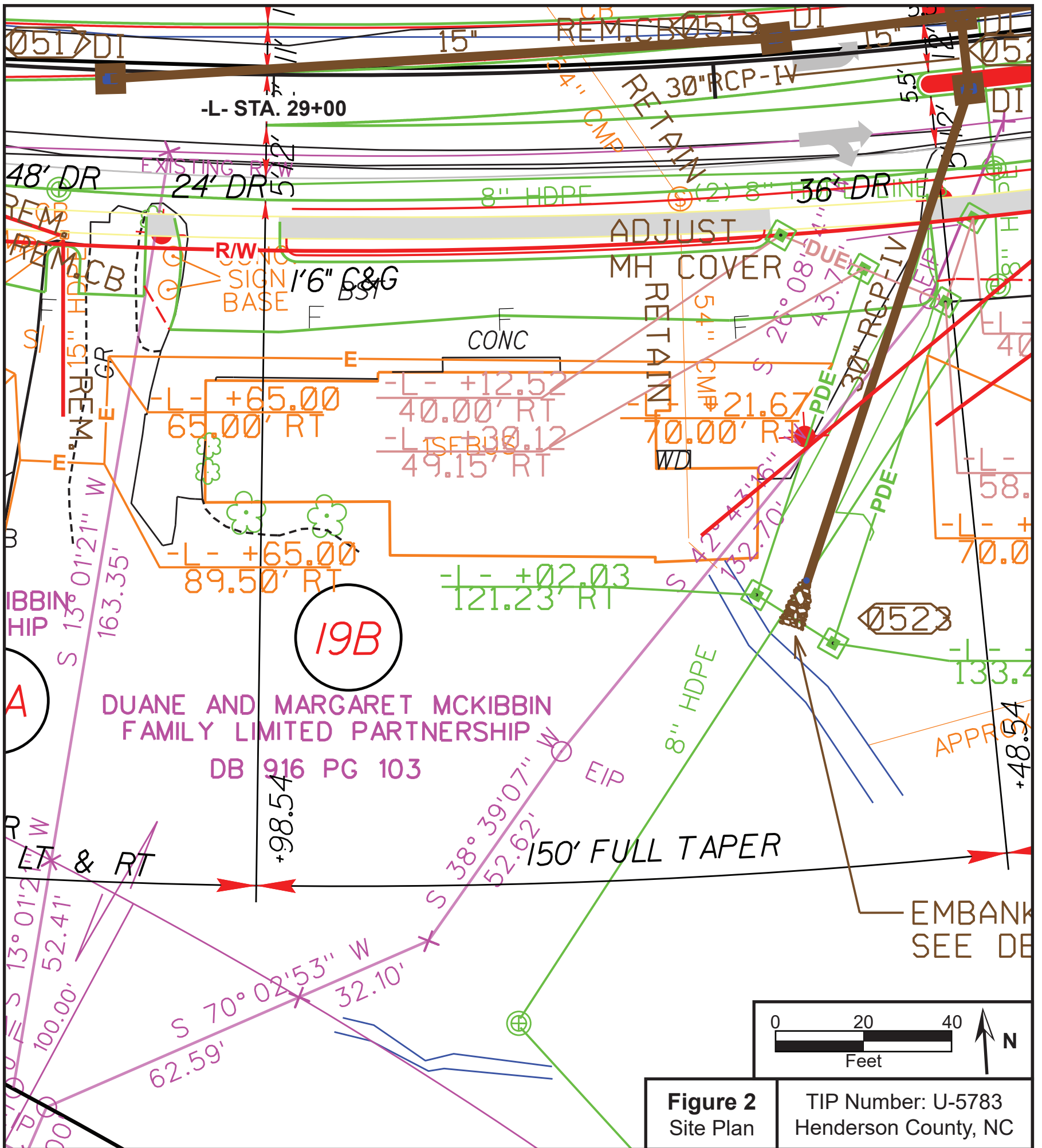


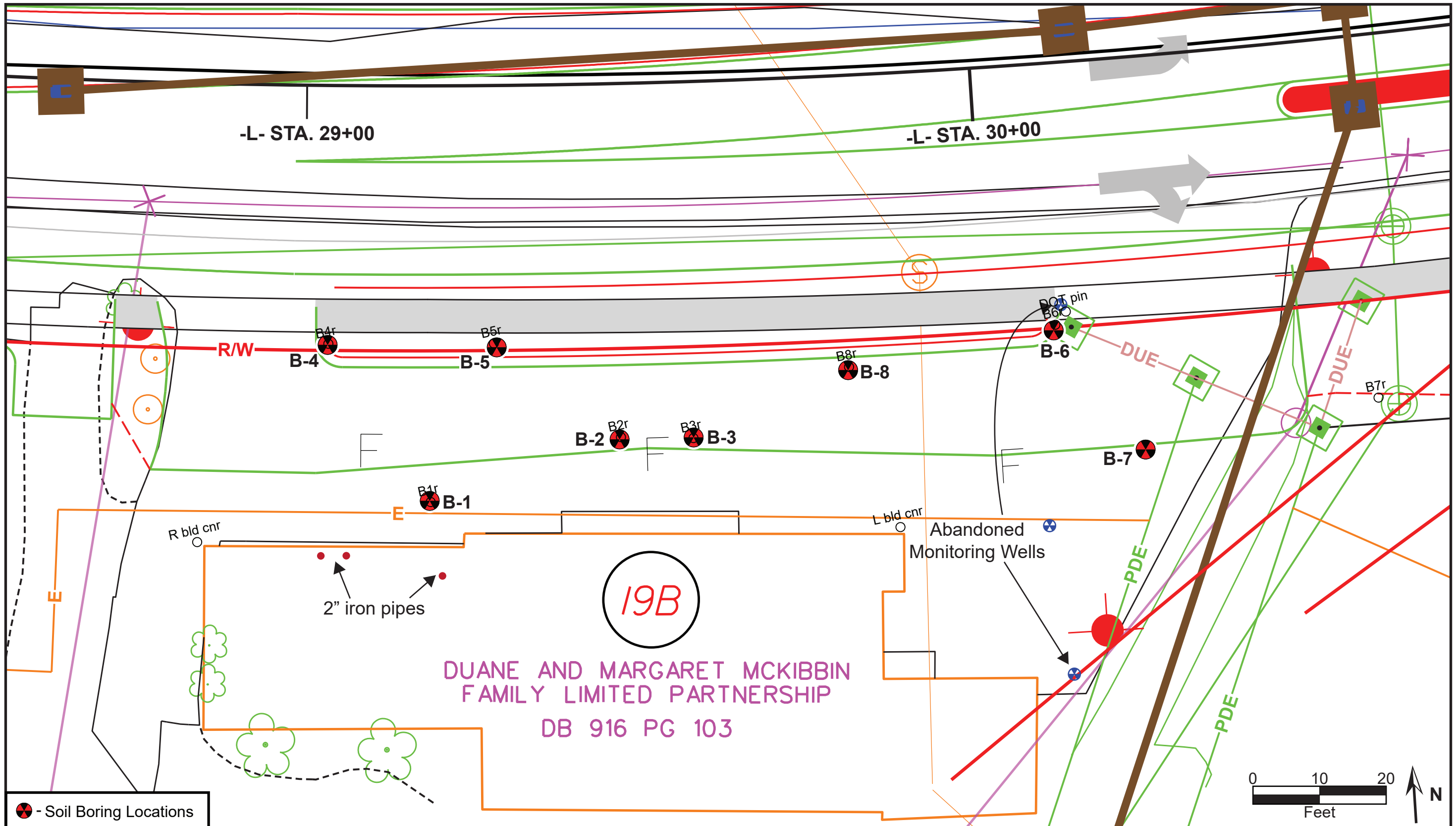
Figure 2
Site Plan

TIP Number: U-5783
Henderson County, NC

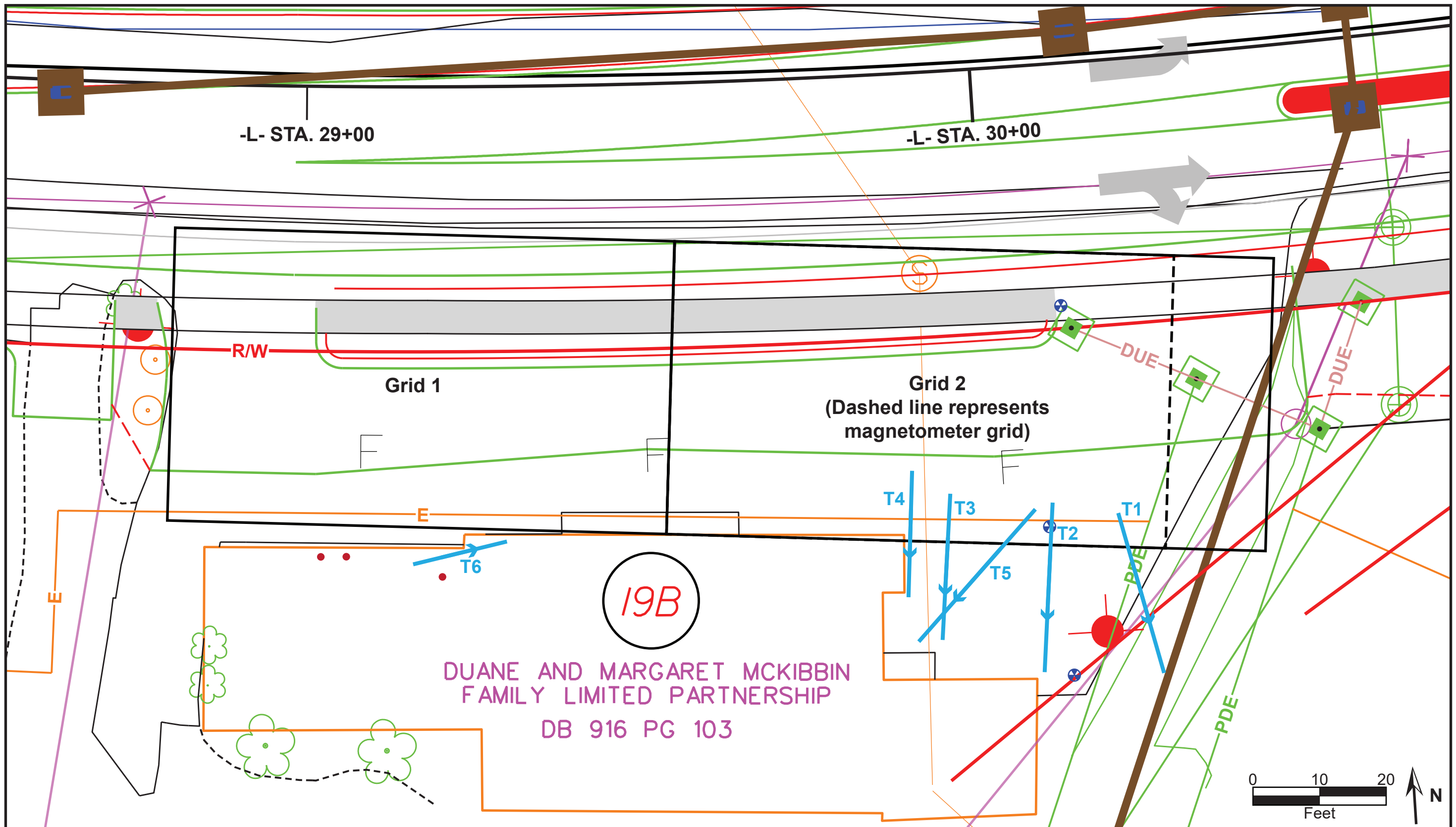
Duane and Margaret McKibbin Family
Limited Partnership Property
1724 Brevard Road
Hendersonville, NC

Parcel I.D. #: 019B
Facility I.D. #: N/A

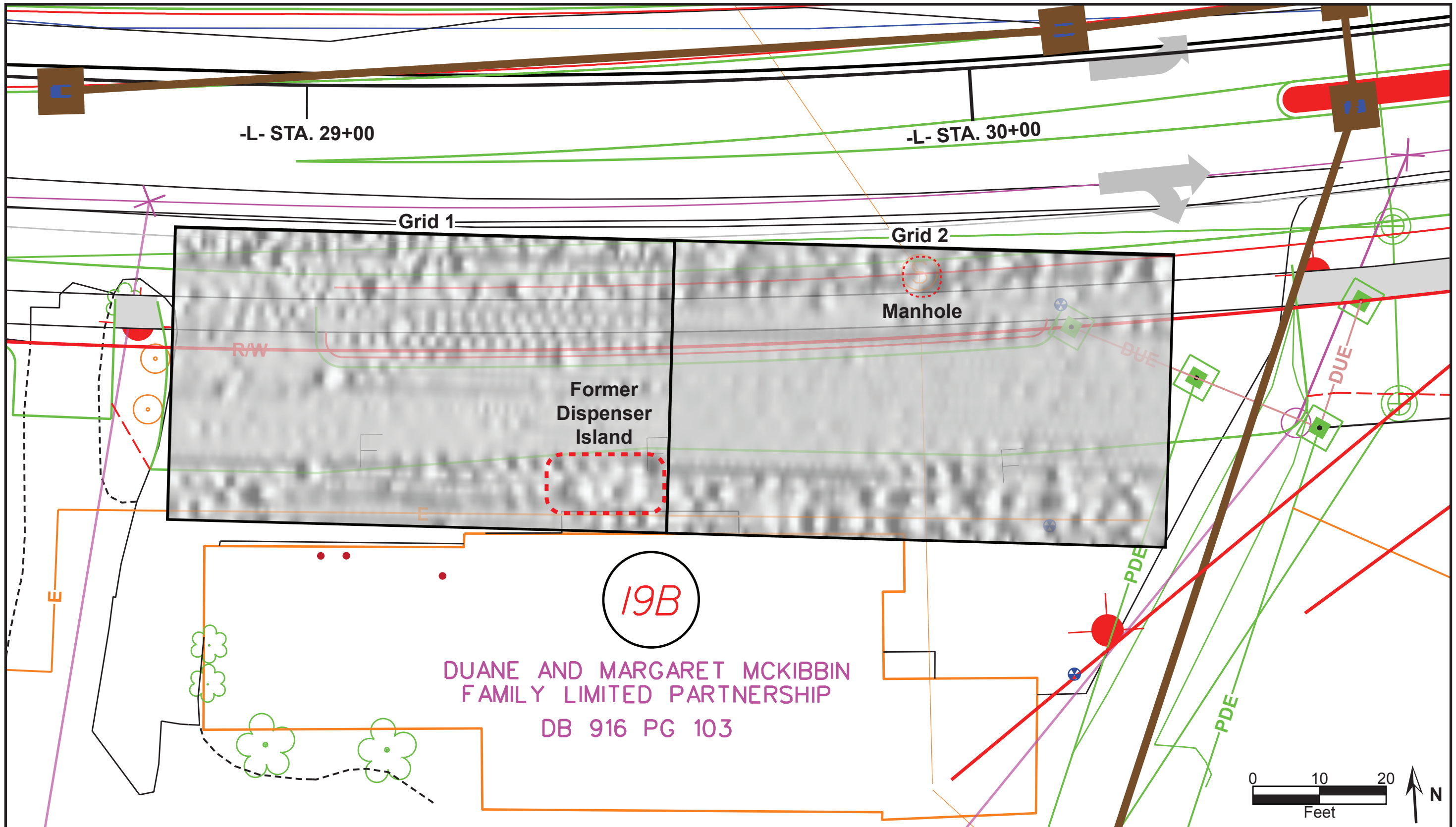
Seramur & Associates, PC
Boone, NC



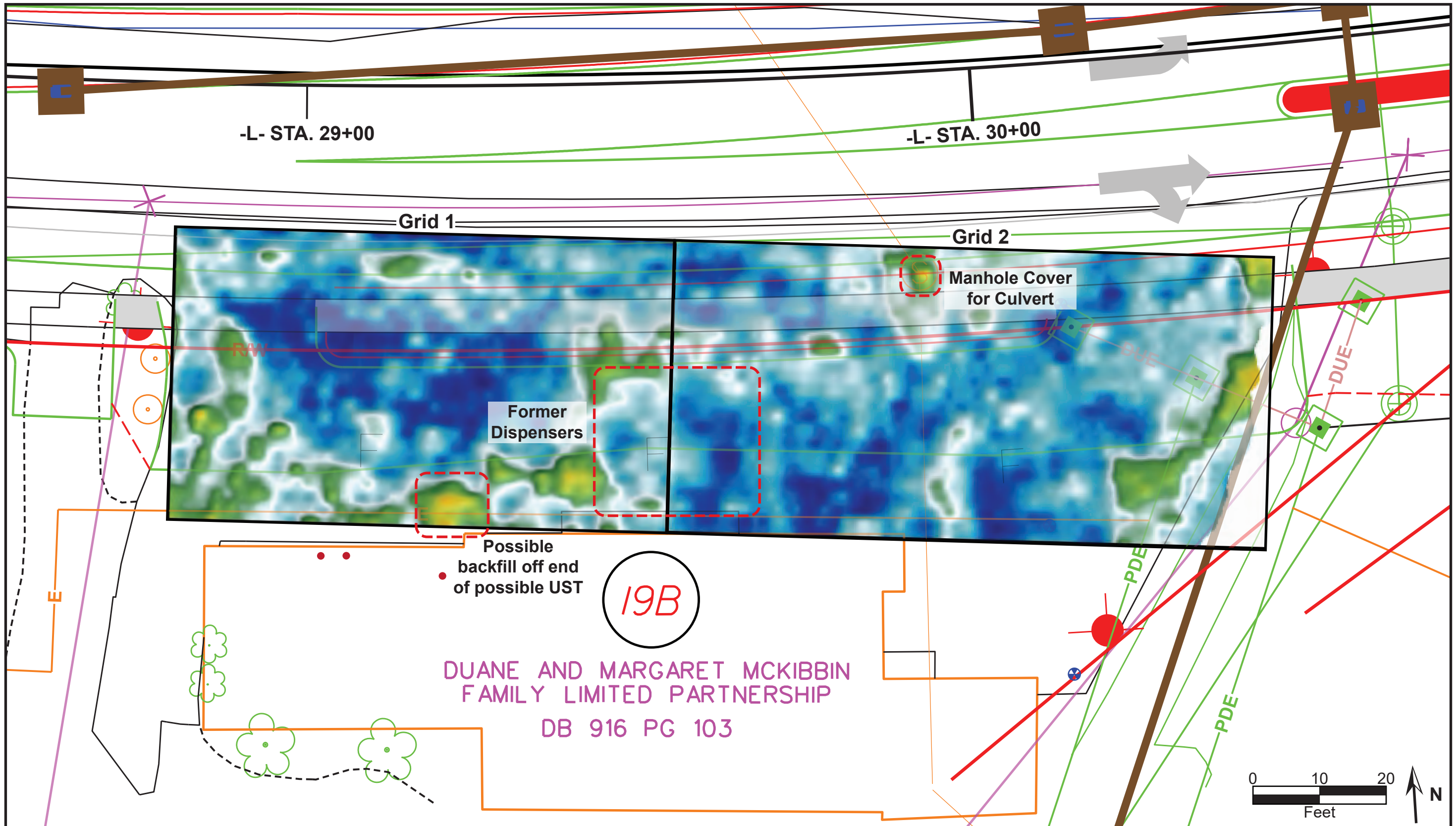
<p>Figure 3 Site Plan with Features and Soil Boring Locations</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
--	--	---	---	---



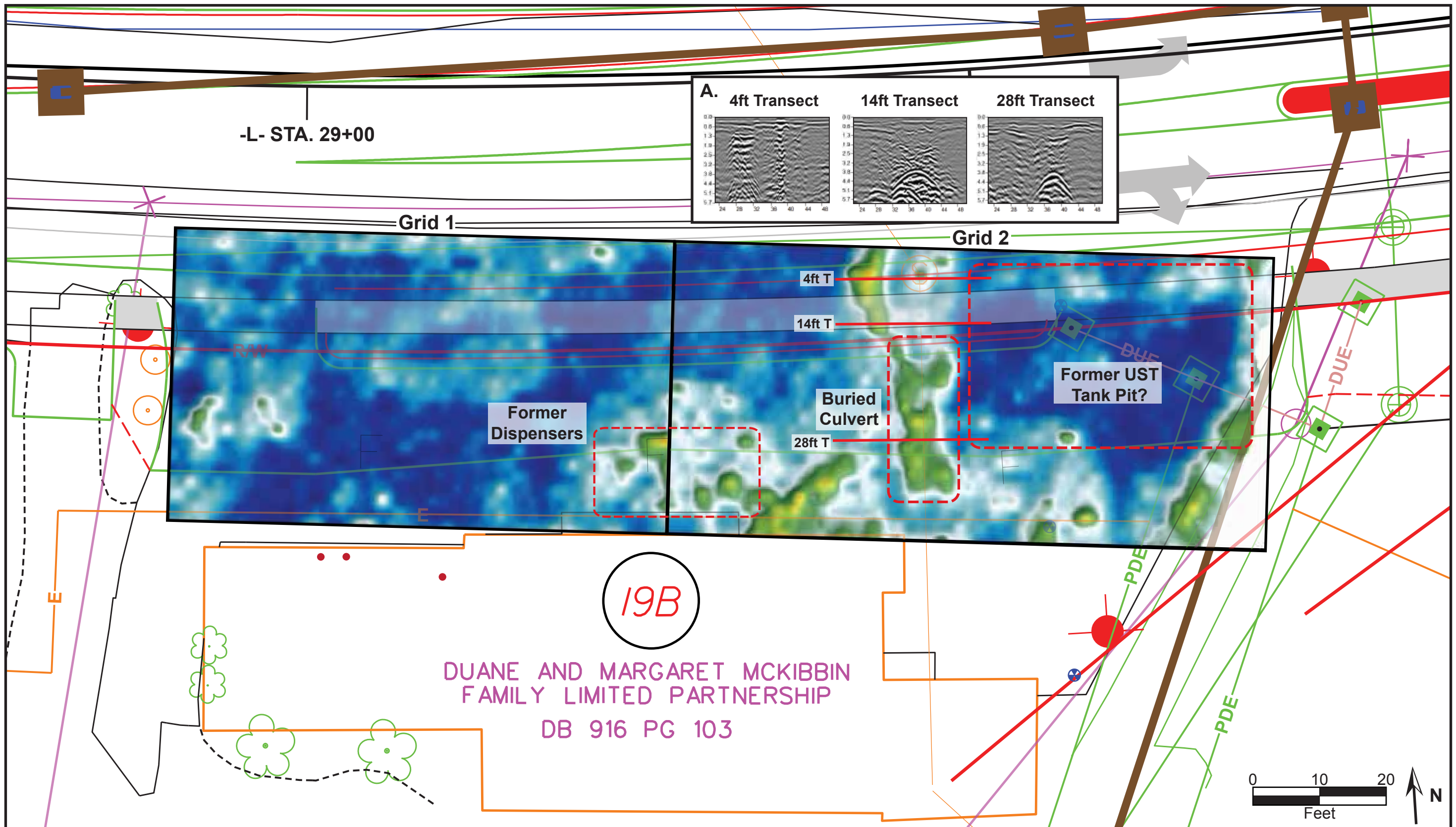
<p>Figure 4 Site Plan with Geophysical Grid and Transect Locations</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
---	--	---	---	---



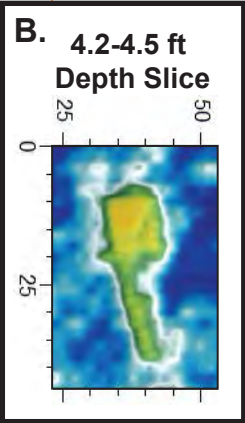
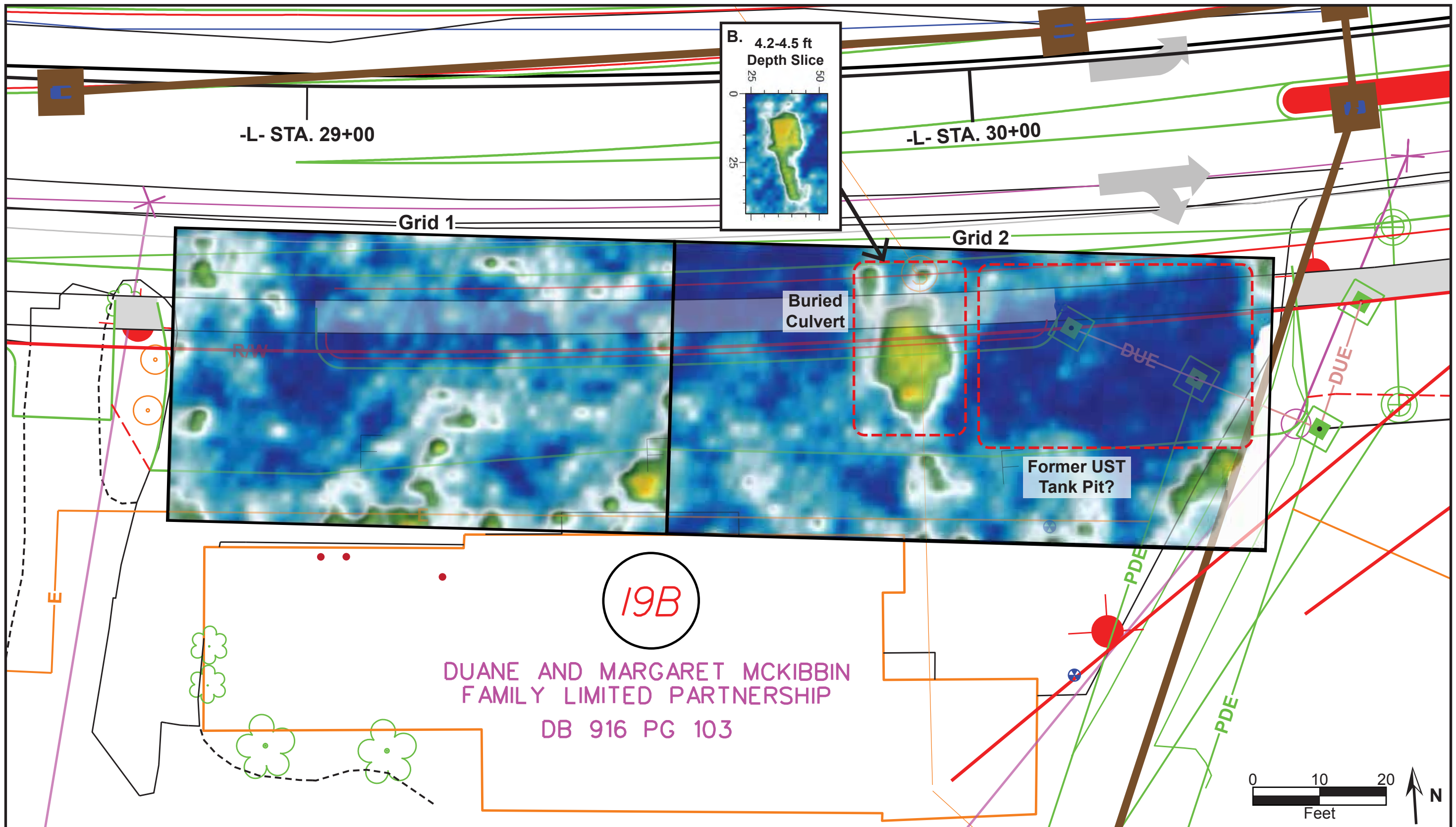
<p>Figure 5 Magnetometer Survey Hillshade Map</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
--	--	---	---	---



<p>Figure 6 Shallow GPR Depth Slices (0.2 - 0.5 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
--	--	---	---	---



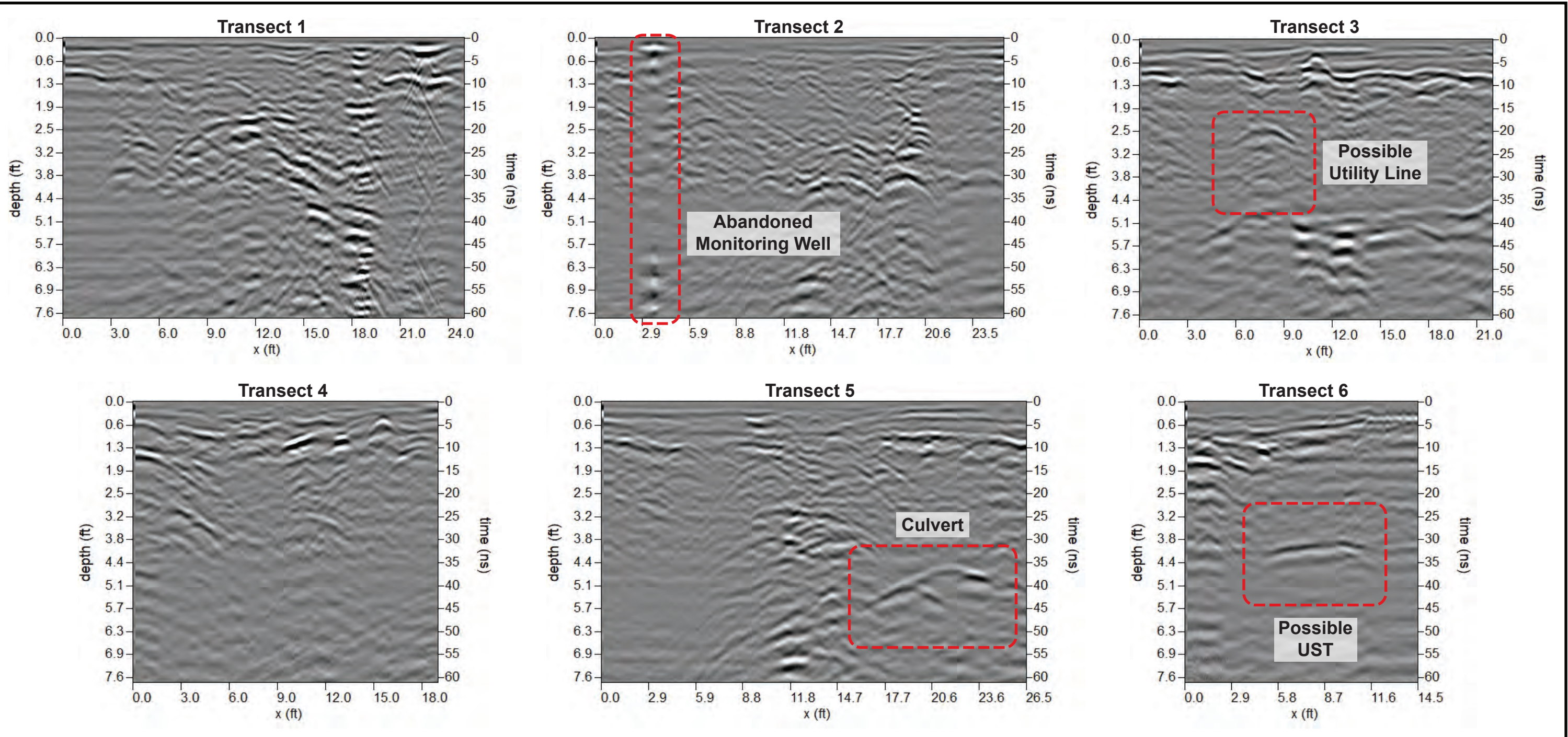
<p>Figure 7 Intermediate GPR Depth Slices (1.8 - 2.1 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
---	--	---	---	---



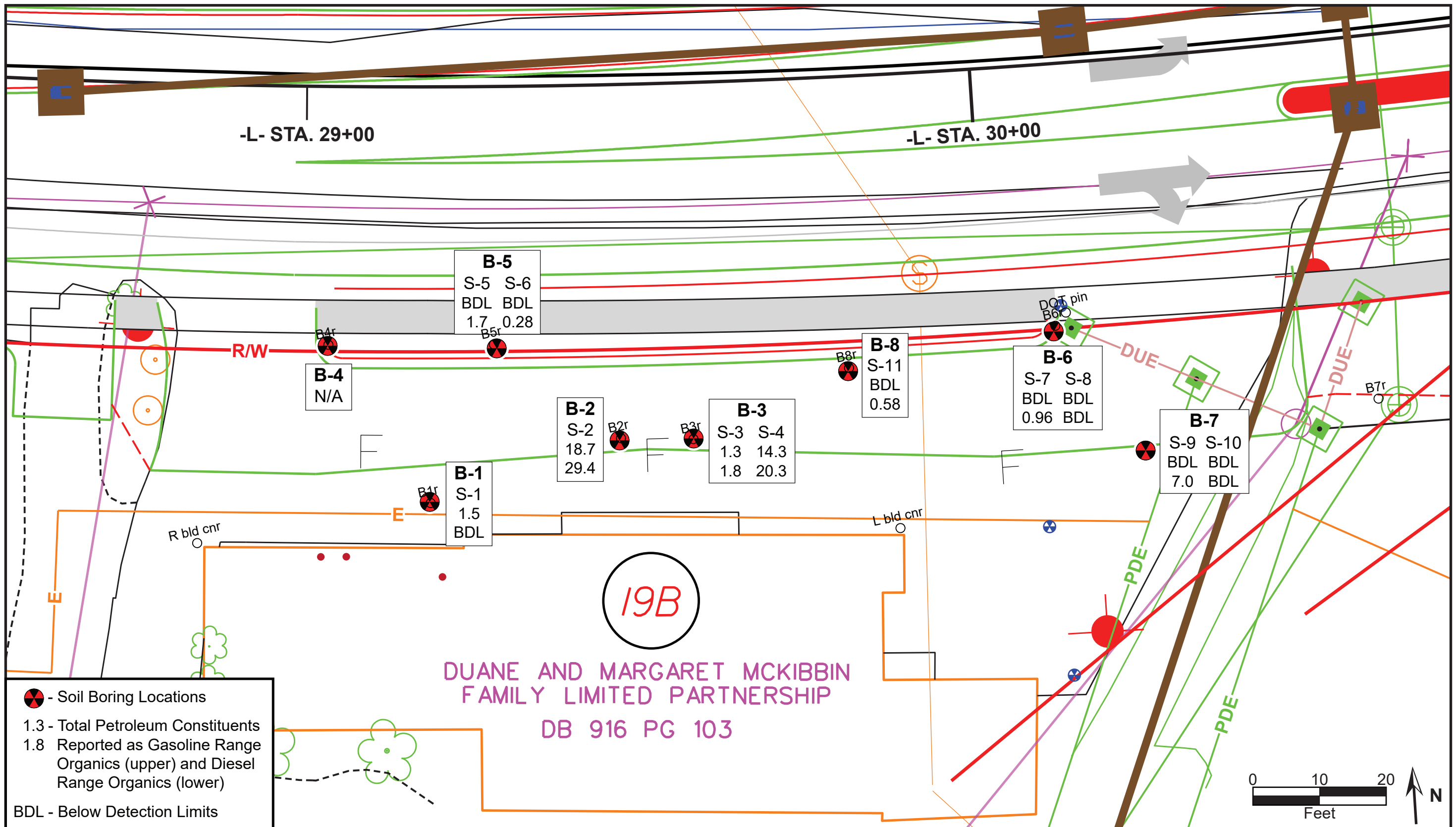
19B

DUANE AND MARGARET MCKIBBIN
FAMILY LIMITED PARTNERSHIP
DB 916 PG 103

<p>Figure 8 Deep GPR Depth Slices (3.3 - 3.6 feet)</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
---	--	---	---	---



<p>Figure 9 GPR Transects 1 through 6</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
--	--	---	---	---



<p>Figure 10 Soil Analytical Results</p>	<p>TIP Number: U-5783 Henderson County, NC</p>	<p>Duane and Margaret McKibbin Family Limited Partnership Property 1724 Brevard Road Hendersonville, NC</p>	<p>Parcel I.D. #: 019B Facility I.D. #: N/A</p>	<p>Seramur & Associates, PC Boone, NC</p>
---	--	---	---	---

Appendix B
Laboratory Reports



Hydrocarbon Analysis Results

Client: SAPC
Address: 165 KNOLL DR
 BOONE, NC 28607

Samples taken Thursday, April 6, 2023
Samples extracted Thursday, April 6, 2023
Samples analysed Wednesday, April 12, 2023

Contact: KEITH SERAMUR

Operator TORI KELLY

Project: NCDOT U5783 PARCEL 019B

											F03640						
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match				
										% light	% mid	% heavy					
s	S-1 r	5.2	<0.13	1.5	<0.13	1.5	<0.03	<0.04	<0.005	99.8	0.2	0	Deg.Gas,(FCM)				
s	S-2 r	10.3	<0.26	18.7	29.4	48.1	6.8	0.26	<0.01	94.9	4.4	0.6	Deg.Diesel 70.7%,(FCM)				
s	S-3 r	10.0	<0.25	1.3	1.8	3.1	0.88	<0.08	<0.01	67.6	22.3	10.1	Deg.Fuel 69.6%,(FCM),(BO)				
s	S-4 r	9.7	<0.24	14.3	20.3	34.6	12.7	0.52	<0.01	82.2	15.6	2.2	V.Deg.Diesel 80%,(FCM)				
s	S-5 r	11.3	<0.28	<0.28	1.7	1.7	0.83	<0.09	<0.011	0	80.8	19.2	Road Tar 92.7%,(FCM)				
s	S-6 r	11.1	<0.28	<0.28	0.28	0.28	0.21	<0.09	<0.011	0	71	29	Deg Fuel 74.1%,(FCM)				
s	S-7 r	11.1	<0.28	<0.28	0.96	0.96	0.46	<0.09	<0.011	0	79.8	20.2	Road Tar 91.1%,(FCM)				
s	S-8 r	5.6	<0.14	<0.14	<0.14	<0.14	<0.03	<0.04	<0.006	0	100	0	(FCM)				
s	S-9 r	10.7	<0.27	<0.27	7	7	6	0.3	<0.011	0	88.9	11.1	Deg Fuel 76.8%,(FCM)				
s	S-10 r	10.2	<0.26	<0.26	<0.26	0.16	0.16	<0.08	<0.01	0	100	0	Residual HC				
Initial Calibrator QC check										OK			Final FCM QC Check			OK	112.1 %

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

