

Preliminary Site Assessment

US 221 South of US 74 Business (Charlotte Road) to North of
SR 1366 (Roper Loop Road)
Parcel 118 – S&D Investments
877 and 881 Railroad Avenue, Rutherfordton, North Carolina

State Project No. R-2233BB

WBS Element: 34400.1.S5

December 1, 2017

Terracon Project No. 71177323



Prepared for:

North Carolina Department of Transportation
Raleigh, North Carolina

Prepared by:

Terracon Consultants, Inc.
Charlotte, North Carolina

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

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December 1, 2017

North Carolina Department of Transportation
Attention: Mr. Craig Haden
GeoEnvironmental Engineering Unit
Century Center Complex
Building B
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)
US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road)
Parcel 118 – S&D Investments
877 and 881 Railroad Avenue, Rutherfordton, North Carolina
State Project No. R-2233BB
WBS Element: 34400.1.S5

Dear Mr. Haden:

Terracon Consultants, Inc. (Terracon) is pleased to submit a Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P71177323) dated June 2, 2017. This report includes the findings of the investigation, and provides our conclusions and recommendations.

Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation (NCDOT). If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

Terracon Consultants, Inc.

Prepared by:

DocuSigned by:
S. Alex Chinery
F3F142104F4941D...

S. Alex Chinery, E.I.
Senior Staff Environmental Engineer

Reviewed by:

DocuSigned by:
Christopher L. Corbitt
D334903BD0324DE...

Christopher L. Corbitt, P.G.
Senior Geologist

PRELIMINARY SITE ASSESSMENT

US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH SR 1366 (ROPER LOOP ROAD)

RUTHERFORDTON, RUTHERFORD COUNTY, NORTH CAROLINA

STATE PROJECT NO. R-2233BB

WBS ELEMENT: 34400.1.S5

PARCEL 118 – S&D INVESTMENTS

877 AND 881 RAILROAD AVENUE, RUTHERFORDTON, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road) in Rutherfordton
Site Location/Address	877 and 881 Railroad Avenue, Rutherfordton, NC 27834 (Rutherford County Tax PIN: 1631944)
General Site Description	The site is occupied by a drop-off dry cleaning facility and a thrift shop

1.2 Site History

The site is located at 877 and 881 Railroad Avenue in Rutherfordton, Rutherford County, North Carolina (site). At the time of the PSA, the site was improved with a one-story commercial building currently occupied by a drop-off dry cleaning facility and a thrift store. According to available regulatory information, the site does not appear in the UST registry and there are no known release incidents associated with the site.

1.3 Scope of Work

Terracon conducted the following Preliminary Site Assessment (PSA) scope of work in accordance with Terracon's Proposal No. P71177323 dated June 2, 2017. This PSA is being completed prior to planned roadway improvements along US Highway 221 in Rutherfordton, North Carolina. The scope of work included a geophysical investigation, collection of three soil samples and preparation of a report documenting the investigation activities. The PSA is not intended to delineate potential impacts. The PSA was performed within the proposed right-of-way (ROW) as indicated by North Carolina Department of Transportation (NCDOT) provided plan sheets.

Preliminary Site Assessment

Parcel 118 – S&D Investments ■ Rutherfordton, North Carolina
December 1, 2017 ■ Terracon Project No. 71177323



1.4 Standard of Care

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report. These services were performed in accordance with Terracon Proposal No. P71177323 dated June 2, 2017 and were not conducted in accordance with ASTM E1903-11.

1.5 Additional Scope Limitations

Findings, conclusions and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

1.6 Reliance

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

2.0 FIELD ACTIVITIES

The following PSA activities are presented in the order that they were conducted in the field.

Exhibit 1 presents the topography of the site on a portion of the USGS topographic quadrangle map of Rutherfordton North, NC 2002. **Exhibit 2** is a site layout plan that indicates the approximate locations of the site features and soil boring locations.

2.1 Geophysical Survey

On July 28 and August 2, 2017, Geophysical Survey Investigations, conducted a geophysical investigation at the site in an effort to evaluate and detect potentially unknown, metallic underground storage tanks and buried utilities beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna.

The geophysical investigation did not detect evidence of unknown metallic USTs across the survey area within the depth interval of zero to six feet below land surface (bls). The metal detection and GPR scans identified underground utility lines and miscellaneous buried metal debris (reinforced concrete and a buried concrete slab). A copy of the geophysical report is included in **Appendix A**.

2.2 Soil Sampling

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon provided oversight for the advancement of three soil borings (B-117-1 through B-117-3) within Parcel 118 along the NCDOT ROW. *The samples collected on Parcel 118 were inadvertently labeled as B-117 and the samples obtained on Parcel 117 were labeled as B-118.* The borings were completed by Innovative Environmental Technologies, a North Carolina Certified Well Contractor using a track-mounted AMS 9500-VTR® direct-push drill rig.

Soil samples were collected in 5-foot, disposable, Macro-Core® sampler tubes to document soil lithology, color, moisture content, and sensory evidence of impacts. Each soil sample was screened for organic vapors using an 11.7 eV photoionization detector (PID). The PID data were collected in order to corroborate laboratory data and assist in selection of sample intervals for laboratory analysis. PID readings from the borings ranged from 1.0 part per million (ppm) to 2.3 ppm.

Based on the proposed disturbance depths and discussions with the NCDOT, each of the soil borings was advanced to a depth of approximately 15 feet bls. Three soil samples, one from each boring, were collected from depths ranging between 5 to 15 feet bls, placed in laboratory provided sample containers and sent to RED Lab, LLC (RED) for UVF analysis of gasoline range organics (GRO) and diesel range organics (DRO). Soil samples were collected in the depth interval that was most likely to be impacted based on PID readings and field observations.

Preliminary Site Assessment

Parcel 118 – S&D Investments ■ Rutherfordton, North Carolina
December 1, 2017 ■ Terracon Project No. 71177323



Soils generally consisted of orange brown silty clay. Groundwater was not encountered in the on-site borings. The soil boring logs are included in **Appendix B**. Sample locations were measured relative to site features and the locations depicted on **Exhibit 2** are approximate.

The drilling equipment used at the site was decontaminated prior to use and between the advancement of each boring. Non-dedicated sampling equipment was decontaminated using a Liquinox®/water wash followed by a distilled water rinse. Each of the boreholes was backfilled with hydrated bentonite pellets and investigation derived waste (IDW).

3.0 DATA EVALUATION

3.1 Soil Analytical Results

Laboratory analyses reported the following constituent detections in soil borings B-117-1 and B-117-2.

Boring B-117-1 (drilled near the apparent buried concrete slab note in the geophysical survey):

- n DRO (0.93 mg/kg)
- n total aromatics (0.63 mg/kg)

Boring B-117-2:

- n DRO (0.51 mg/kg)
- n total aromatics (0.36 mg/kg)

The identified constituents were detected at concentrations below their respective NCDEQ regulatory action levels (50 mg/kg for GRO and 100 mg/kg for DRO). **Table 1** summarizes the results of the UVF analyses of the soil samples.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

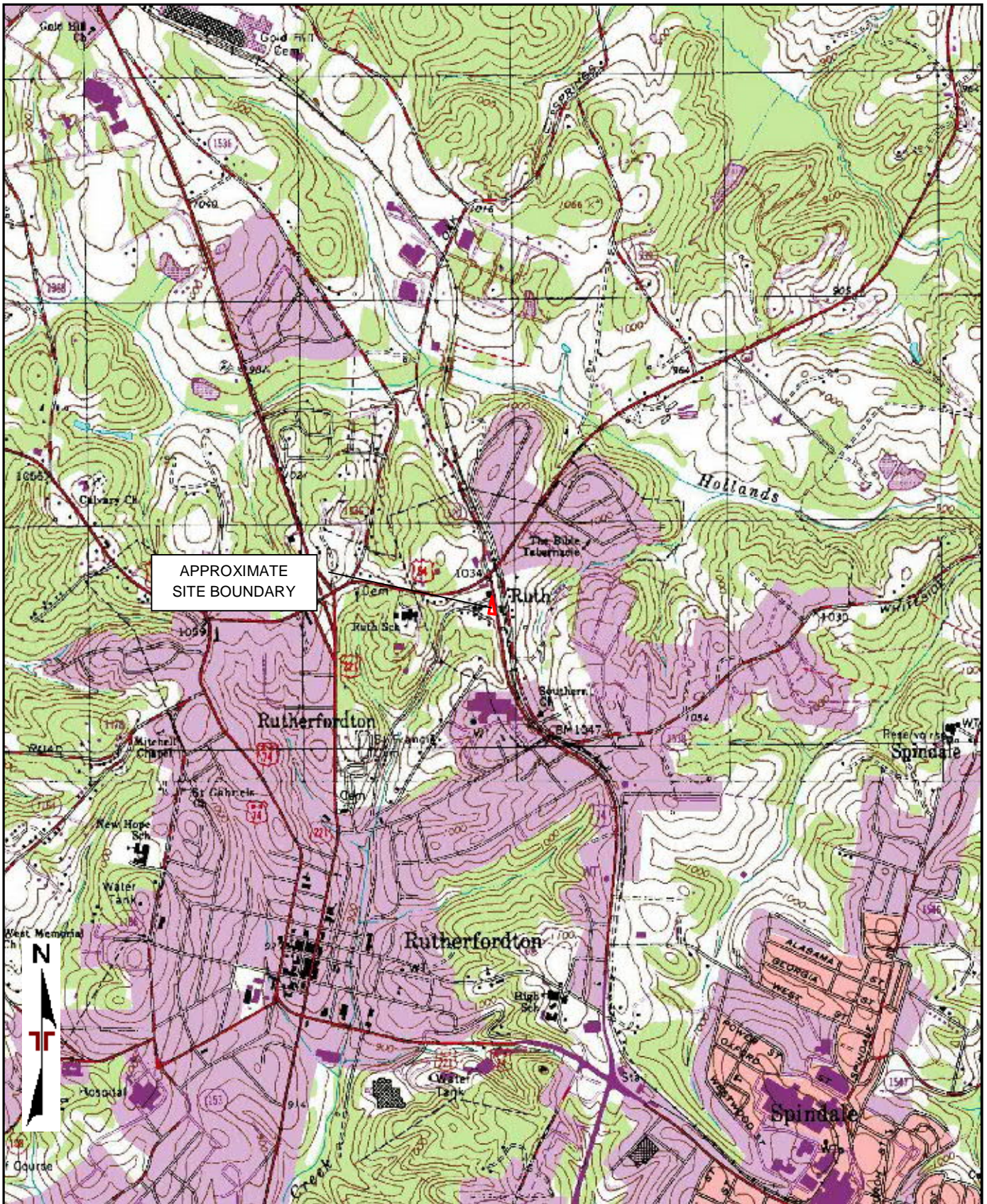
- n The geophysical investigation did not reveal evidence of unknown metallic USTs within the survey area at a depth interval of zero to six feet bls. Underground utility lines were detected in the survey area.
- n Based on laboratory analyses, petroleum compounds were not detected in the two borings on Parcel 2118 above their respective laboratory reporting limits.
- n Based on the analytical results, Terracon does not recommend additional assessment of the ROW at Parcel 118 at this time.

FIGURES

EXHIBIT 1 - TOPOGRAPHIC MAP

EXHIBIT 2A – SITE DIAGRAM WITH SOIL BORING LOCATIONS

**EXHIBIT 2B – SITE DIAGRAM WITH SOIL BORING LOCATIONS
AND ANALYTICAL DATA**



APPROXIMATE
SITE BOUNDARY

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: RUTHERFORDTON NORTH, NC (1/1/2002) and RUTHERFORDTON SOUTH, NC (1/1/1993).

Project Manager:	SAC
Drawn by:	SAC
Checked by:	CLC
Approved by:	CLC
Project No.:	71177323
Scale:	1"=2,000'
File Name:	PARCEL118
Date:	SEPT. 2017

Terracon
 2020 Starita Rd Ste E
 Charlotte, NC 28206-1298

TOPOGRAPHIC MAP
 Parcel 118 – S&D Investments
 877 and 881 Railroad Avenue
 Rutherfordton, NC

Exhibit	1
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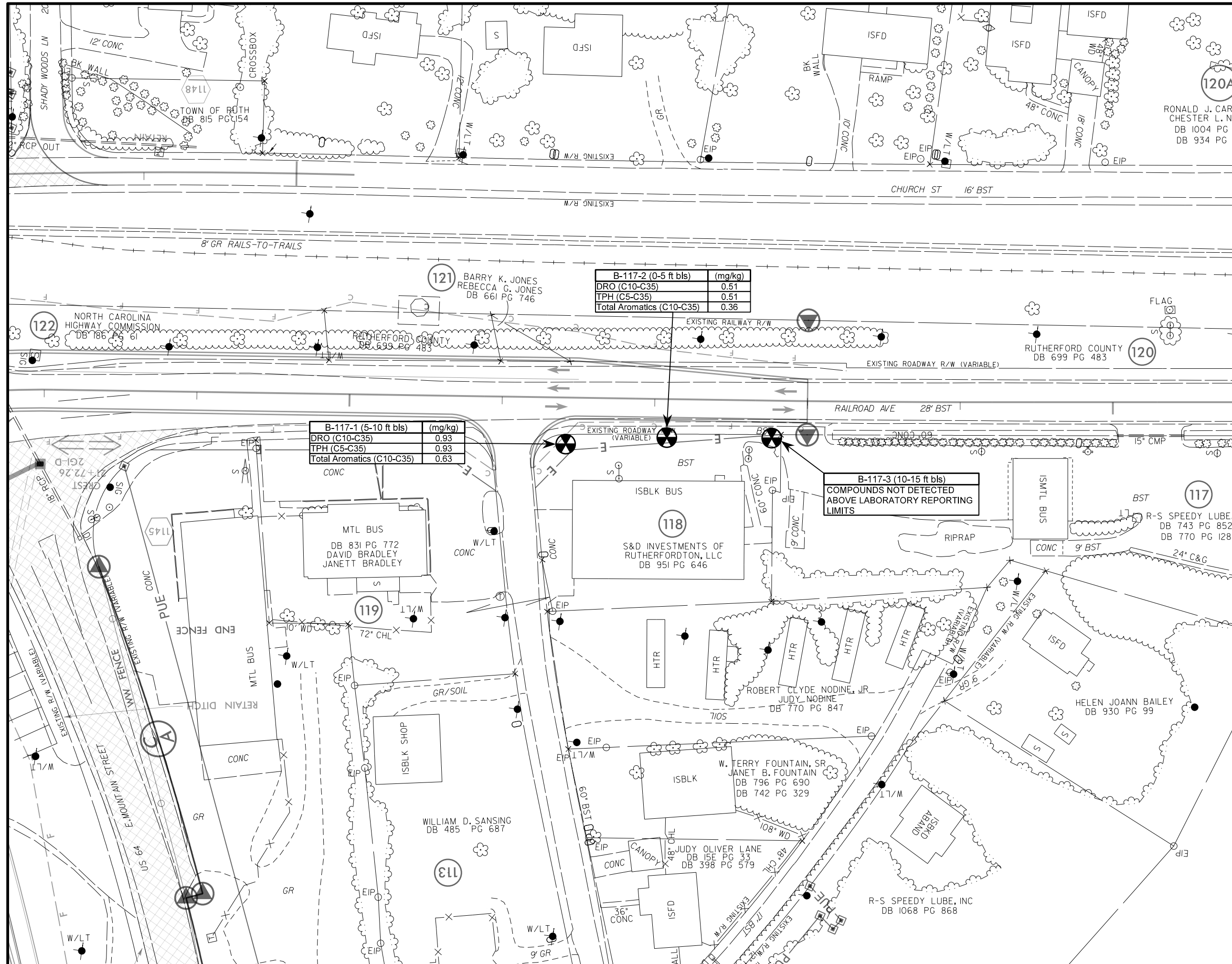
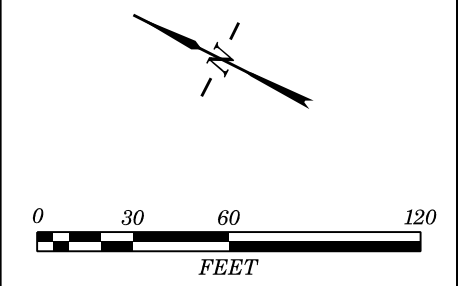
SITE DIAGRAM WITH BORING LOCATIONS

PARCEL 118 - S&D INVESTMENTS OF RUTHERFORDTON, LLC. PROPERTY
 877 - 881 RAILROAD AVENUE
 RUTHERFORDTON, RUTHERFORD COUNTY

LEGEND

- PROPERTY LINE
- - - EXISTING RIGHT OF WAY LINE
- ⊕ PROPOSED RIGHT OF WAY WITH MARKER
- ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
- - - EXISTING EDGE OF PAVEMENT
- - - PROPOSED EDGE OF TRAVEL
- - - PROPOSED CUT / FILL LINE
- - - PUE PROPOSED PERMANENT UTILITY EASEMENT
- ⊗ BORING LOCATION

NOTES:
 SOIL SAMPLES WERE COLLECTED ON AUGUST 14, 2017
 DETECTED COMPOUNDS ARE SHOWN IN TABLE
 SOIL CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAMS (mg/kg)
 ft bls - FEET BELOW LAND SURFACE
 DRO (C10-C35) - DIESEL RANGE ORGANICS
 TPH (C5-C35) - TOTAL PETROLEUM HYDROCARBONS
 LABORATORY ANALYTICAL RESULTS DID NOT REPORT CONTAMINANTS OF CONCERN AT CONCENTRATIONS IN EXCESS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) ACTION LEVELS AND / OR CLEAN-UP STANDARDS.



TABLES

TABLE 1 - FIELD SCREENING RESULTS

SUMMARY

TABLE 2 – SOIL SAMPLING ANALYTICAL RESULTS

SUMMARY (UVF)

Table 1
 Summary of Field Screening Results
 Preliminary Site Assessment
 Parcel 118 - S&D Investments
 Rutherfordton, Rutherford County, North Carolina
 Terracon Project No. 71177323

Sample ID	Screened Interval	PID Value
B-117-1	0-5	1.8
	5-10	2.0*
	10-15	1.8
B-117-2	0-5	2.3*
	5-10	2.1
	10-15	2.0
B-117-3	0-5	1.3
	5-10	1.0
	10-15	1.7*

Notes:

Soil screening was conducted on August 14, 2017.

*indicates sampled interval.

Concentrations are reported in parts per million (ppm).

Samples collected on Parcel 118 were incorrectly identified as B-117.

Table 2
 Summary of Soil Analytical Results
 Preliminary Site Assessment
 Parcel 118 - S&D Investments
 Rutherfordton, Rutherford County, North Carolina
 Terracon Project No. 71177323

Sample ID:	B-117-1*	B-117-2*	B-117-3*	TPH Action Level
Sample Depth (ft bls):	5-10	0-5	10-15	
UVF Analysis				
BTEX (C6-C9)	<0.47	<0.51	<0.51	NE
GRO (C5-C10)	<0.47	<0.51	<0.51	50
DRO (C10-C35)	0.93	0.51	<0.51	100
TPH (C5-C35)	0.93	0.51	<0.51	NE
Total Aromatics	0.63	0.36	<0.1	NE
16 EPA PAHs	<0.15	<0.16	<0.16	NE
BaP	<0.019	<0.02	<0.02	NE

Notes:

Soil samples were collected on August 14, 2017.

Detected compounds are shown in the table.

Concentrations are reported in milligrams per kilogram (mg/kg).

ft bls - feet below land surface.

* samples collected on Parcel 118 were incorrectly identified as B-117.

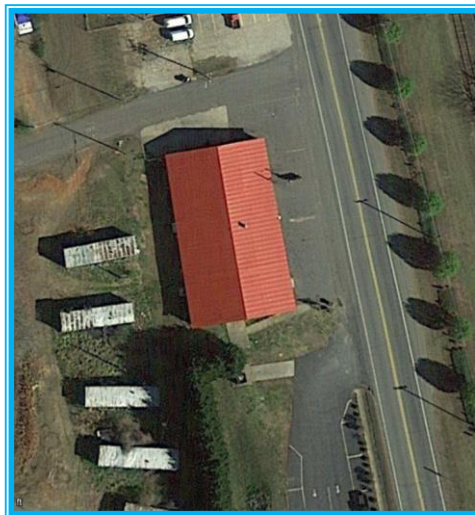
Bold: Constituent concentration reported above the method detection limit.

APPENDIX A
GEOPHYSICAL SURVEY REPORT

Terracon Consultants, Inc.

**GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS**

**S&D Investments of Rutherfordton LLC Property
(Parcel 118) 877 Railroad Avenue
Rutherford County, North Carolina**



November 27, 2017

Geophysical Survey Investigations, PLLC Project No. 2017-22



4 Willimantic Drive, Greensboro, NC 27455
Office Tel: (336) 286-9718
denilm@bellsouth.net

Terracon Consultants, Inc.
GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS
S&D Investments of Rutherfordton LLC Property
(Parcel 118) 877 Railroad Avenue
Rutherford County, North Carolina

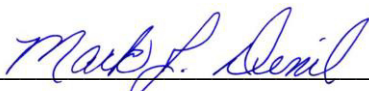
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3.0 DISCUSSION OF RESULTS	2
4.0 SUMMARY & CONCLUSIONS	4
5.0 LIMITATIONS	4

FIGURES

Figure 1	Geophysical Equipment & Site Photographs
Figure 2	EM61-MK2A Metal Detection – Early Time Gate Results
Figure 3	EM61-MK2A Metal Detection – Differential Results
Figure 4	NCDOT Map – EM61 Early Time Gate Results
Figure 5	NCDOT Map – EM61 Differential Results

Report prepared for: Christopher L. Corbitt, PG
Terracon Consultants, Inc.
2020 Starita Road, Suite E
Charlotte, North Carolina 28206

Prepared by: 
Mark J. Denil, P.G.
Geophysical Survey Investigations, PLLC

1.0 INTRODUCTION

Geophysical Survey Investigations, PLLC (GSI) conducted an electromagnetic (EM) metal detection survey, ground penetrating radar (GPR) scanning and utility line clearance search for Terracon Consultants, Inc. on July 28 and August 2, 2017 across the accessible portions of the S&D Investments of Rutherfordton LLC property (Parcel 118) located at 877 Railroad Avenue in Rutherford County, North Carolina. The geophysical investigation was performed as part of the North Carolina Department of Transportation (NCDOT) preliminary site assessment for State Project R-2233BB (WBS Element 34400.1.S1) US 221 south of US 74 Business (Charlotte Rd) to north of SR 1366.

The geophysical investigation was conducted to determine if buried, metallic, underground, storage tanks (USTs) are present beneath the proposed Right-of-Way (ROW) and PUE areas of the site. The perimeter of the geophysical survey area (approximate ROW & PUE areas) is shown as a red polygon in the aerial photograph presented in **Figure 1**. Presently, a building containing several commercial businesses operate on this property.

Terracon representative Mr. Christopher L. Corbitt, PG provided guidance and site maps to Geophysical Survey Investigations, PLLC personnel prior to conducting the geophysical field work. The geophysical survey area at Parcel 118 has a maximum length and width of approximately 180 feet and 140 feet, respectively. Please note that the ROW and PUE areas at this site were not marked in the field or the survey markers were not visible at the time the geophysical investigation was conducted.

2.0 FIELD METHODOLOGY

The EM investigation was performed across the geophysical survey area (proposed ROW and PUE areas) using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit. EM61 metal detection data and GPS coordinates were digitally collected in latitude and longitude geodetic format (NAD83) using a Juniper data recorder at approximately 1.0 foot intervals along survey lines spaced approximately five feet apart. The Trackmaker NAV61MK2 software program

was used with the data recorder to view the relative positions of the survey lines in real time during data acquisition.

According to the instrument specifications, the EM61-MK2A can detect a metal drum down to a maximum depth of approximately 8 to 10 feet. Objects less than one foot in size can be detected to a maximum depth of 4 or 5 feet. The EM61 and GPS data were downloaded to a computer and processed in the field using the Trackmaker61 and Surfer for Windows software programs. GPS coordinates were converted during data processing to Universal Transverse Mercator (UTM) coordinates (in feet) which are used as location control in this report.

GPR scans were performed along northerly-southerly and easterly-westerly directions spaced primarily 3 to 5 feet apart across selected EM61 differential anomalies and areas containing steel reinforced concrete using the Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna. GPR data were viewed in real time in a continuous mode using a vertical scan of 512 samples, at a sampling rate of 48 scans per second. A 70 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were viewed to a maximum investigating depth of approximately 6.0 feet based on an estimated two-way travel time of 8.0 nanoseconds per foot.

Following the UST investigation, areas around the proposed Terracon soil borings were scanned with the GPR unit and a DitchWitch 910 utility locator for buried utility line clearance and no further discussion regarding the utility clearance work will be made in this report. Photographs of the geophysical equipment used for the investigation and of the site are presented in Figure 1.

3.0 DISCUSSION OF RESULTS

Contour plots of the EM61 early time gate results and the EM61 differential results are presented in **Figures 2 and 3**, respectively. The early time gate results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The early time gate response can be used to delineate metallic conduits or utility lines, small, isolated, metal objects and areas containing insignificant metal debris. The differential results are obtained from the difference between the early

time gate channel and late time gate channel of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST-size objects and ignore the smaller, insignificant, metal objects or debris.

The linear, EM61 early time gate anomalies intersecting UTM coordinates 1357868-E 12847323-N and 1357898-E 12847338-N are probably in response to buried lines or conduits. The EM61 anomalies centered near UTM coordinates 1357969-E 12847302-N and 1357986-E 12847219-N are in response to two store signs. GPR scanning suggest the EM61 anomalies centered near UTM coordinates 1357887.874-E 12847320-N, 1357924-E 12847327-N, 1357949-E 12847322-N, and 1357956-E 12847274-N are in response to the building, objects along the building and/or the steel reinforced concrete that runs along the building.

The EM61 early time gate anomalies centered near coordinates 1357972-E 12847276-N, 1357982-E 12847246-N and 1357969-E 12847211-N are probably in response to buried, miscellaneous, metal debris or small objects.

GPR data suggest the EM61 differential anomaly centered near coordinates 1357967-E 12847322-N is in response to a flat-lying concrete slab that is approximately 5.5 feet long, 3.0 feet wide and 1.5 feet below present grade. The geophysical data could not determine if a possible metallic UST or other miscellaneous object lies below the probable concrete slab. Consequently, an intrusive investigation should be made to confirm the presence or absence of any tank or object below the probable concrete slab.

The EM61 and GPR investigation suggests the geophysical survey area (proposed ROW/PUE area) does not contain metallic USTs (excluding the area beneath the aforementioned buried, concrete slab). Please refer to Figures 2 and 3 for additional (detailed) information regarding the geophysical findings at this site. The EM61 results are also shown on NCDOT base maps in **Figures 4 and 5**.

4.0 SUMMARY & CONCLUSIONS

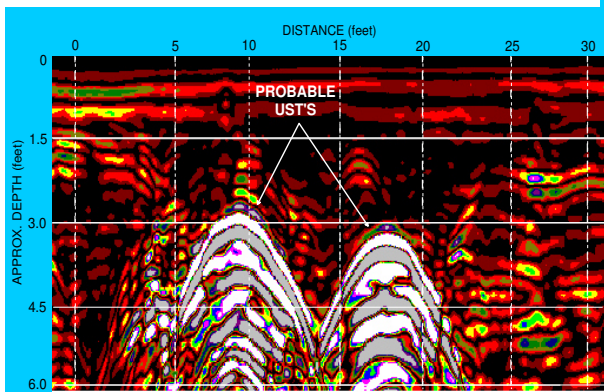
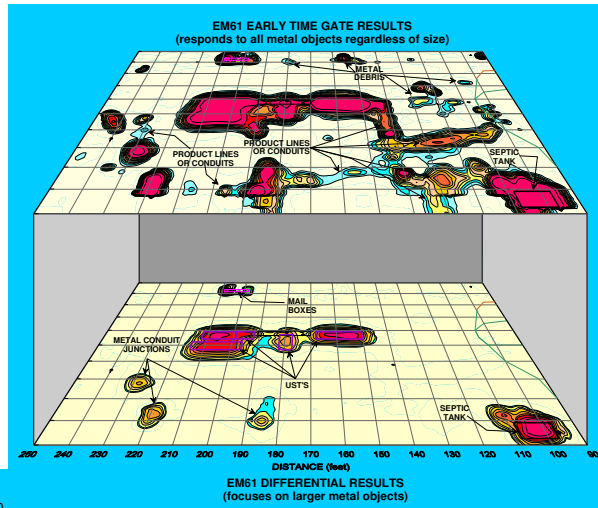
Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the S&D Investments of Rutherfordton LLC property (Parcel 118) located at 877 Railroad Avenue in Rutherford County, North Carolina provides the following summary and conclusions:

- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 6 feet.
- The linear, EM61 early time gate anomalies intersecting UTM coordinates 1357868-E 12847323-N and 1357898-E 12847338-N are probably in response to buried lines or conduits.
- GPR data suggest the EM61 differential anomaly centered near coordinates 1357967-E 12847322-N is in response to a flat-lying concrete slab that is approximately 5.5 feet long, 3.0 feet wide and 1.5 feet below present grade. The geophysical data could not determine if a possible metallic UST or other miscellaneous object lies below the probable concrete slab. Consequently, an intrusive investigation should be made to confirm the presence or absence of any tank or object below the probable concrete slab.
- Excluding the area beneath the aforementioned buried concrete slab, the EM61 and GPR investigation suggests the geophysical survey area (proposed ROW/PUE area) does not contain metallic USTs.

5.0 LIMITATIONS

EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. Some of the EM61 and GPR anomalies interpreted as possible/probable

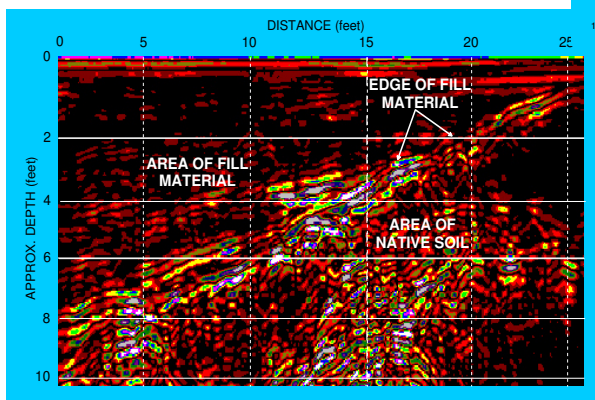
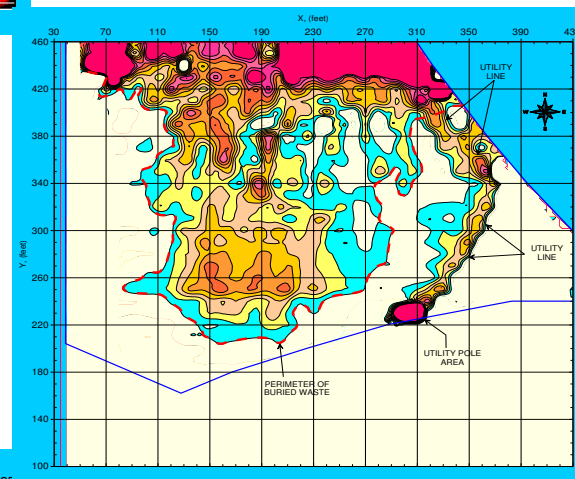
USTs, utility lines, conduits, steel reinforced concrete, or miscellaneous, metal debris may be attributed to other surface or subsurface features and/or interference from cultural features.

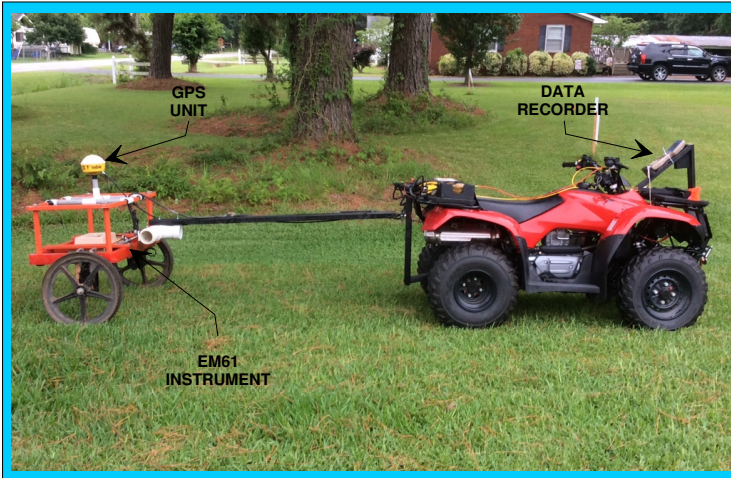


REPORT FIGURES

(on the following pages)

Figures shown on this page are for
esthetic purposes only and are not
related to the site discussed in this report





EM61 METAL DETECTOR

The photograph shows the Geonics EM61-MK2A metal detector, a Hemisphere A101 GPS unit, a Juniper data recorder, and a Honda Recon ATV which were used to conduct the metal detection survey across the S&D Investments of Rutherforddon LLC property.

GROUND PENETRATING RADAR UNIT

The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equipped with a 400 MHz antenna that were used to conduct the GPR scanning across selected portions of the site.

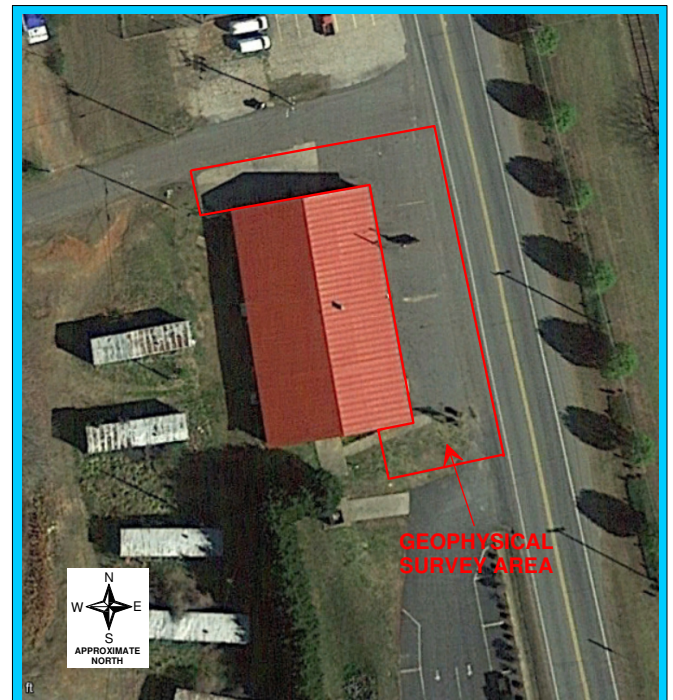


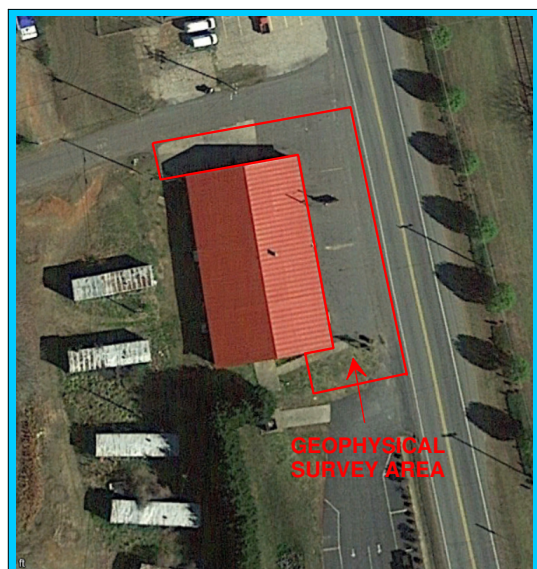
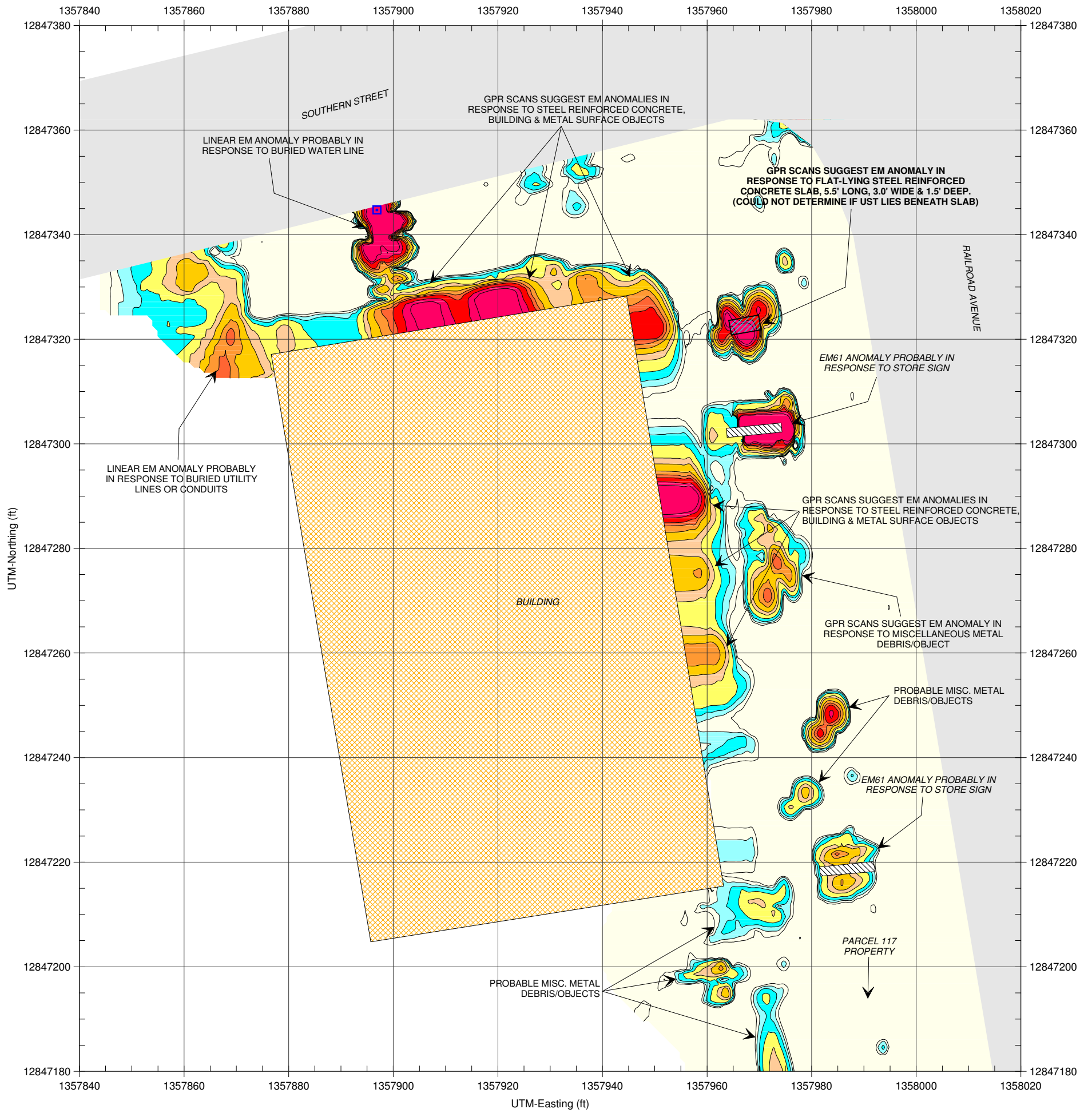
DITCHWITCH UTILITY LOCATOR

The photograph shows the Ditch Witch 910 utility locator which was used to detect buried lines across the proposed boring locations.

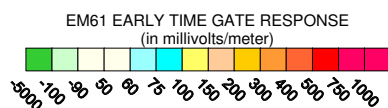
GEOPHYSICAL SURVEY AREA

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at the S&D Investments of Rutherforddon LLC property (Parcel 118). The geophysical investigation was conducted on July 28 and August 2, 2017.





The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 118.



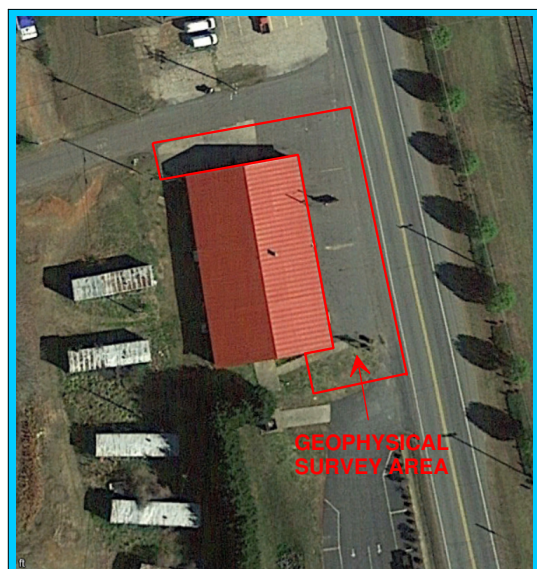
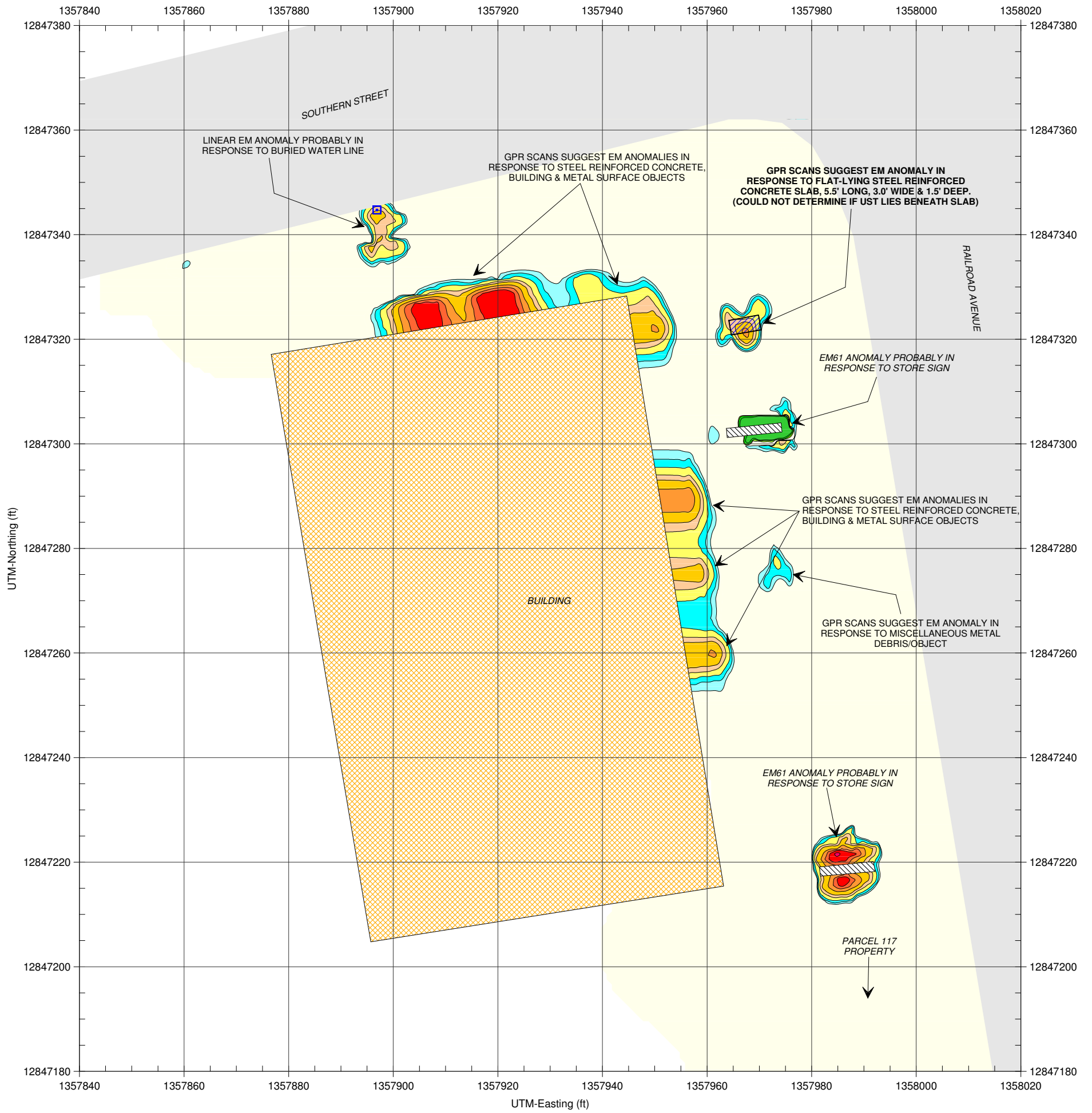
LEGEND	
	SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
	BUILDING
	STORE SIGN
	WATER METER COVER
	GPR SCANS SUGGEST BURIED CONCRETE SLAB

The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects, lines and conduits regardless of size. GPR scans were conducted across selected EM61 anomalies and steel reinforced concrete using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna. The geophysical investigation was conducted on July 28 and August 2, 2017.

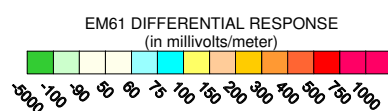
**EM61-MK2A METAL DETECTION
(EARLY TIME GATE RESULTS)**

TERRACON, INC.
S&D Investments of Rutherfordton LLC
(Parcel 118) 877 Railroad Avenue
Rutherford County, North Carolina





The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 118.



LEGEND	
	SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
	BUILDING
	STORE SIGN
	WATER METER COVER
	GPR SCANS SUGGEST BURIED CONCRETE SLAB

Note: The contour plot shows the differential response between the early time gate and the late time gate channels of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The differential response focuses on larger, buried, metallic objects such as drums and USTs and ignores smaller miscellaneous, metal debris. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies and areas containing reinforced concrete using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna. The geophysical investigation was conducted on July 28 and August 2, 2017.

EM61-MK2A METAL DETECTION
(DIFFERENTIAL RESULTS)

TERRACON, INC.
S&D Investments of Rutherfordton LLC
(Parcel 118) 877 Railroad Avenue
Rutherford County, North Carolina

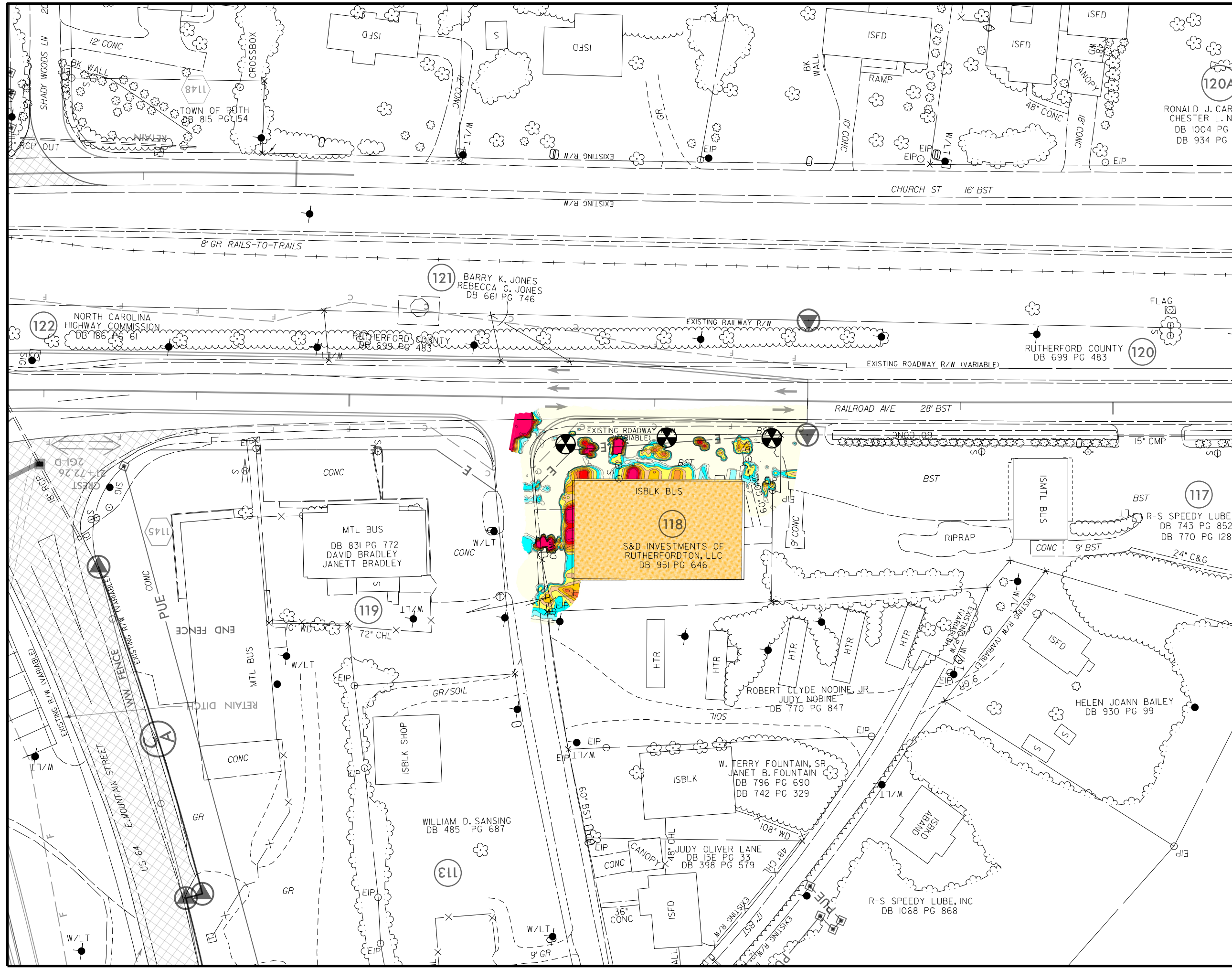
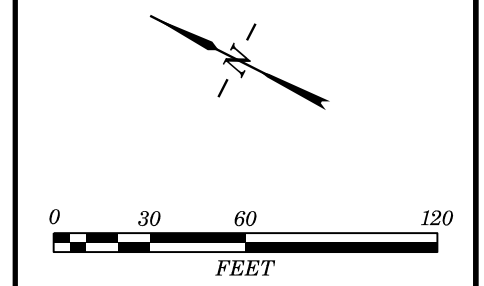
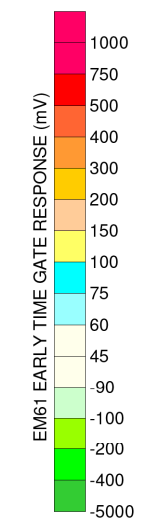


SITE DIAGRAM WITH EM61-MK2A METAL DETECTION (EARLY TIME GATE RESULTS)

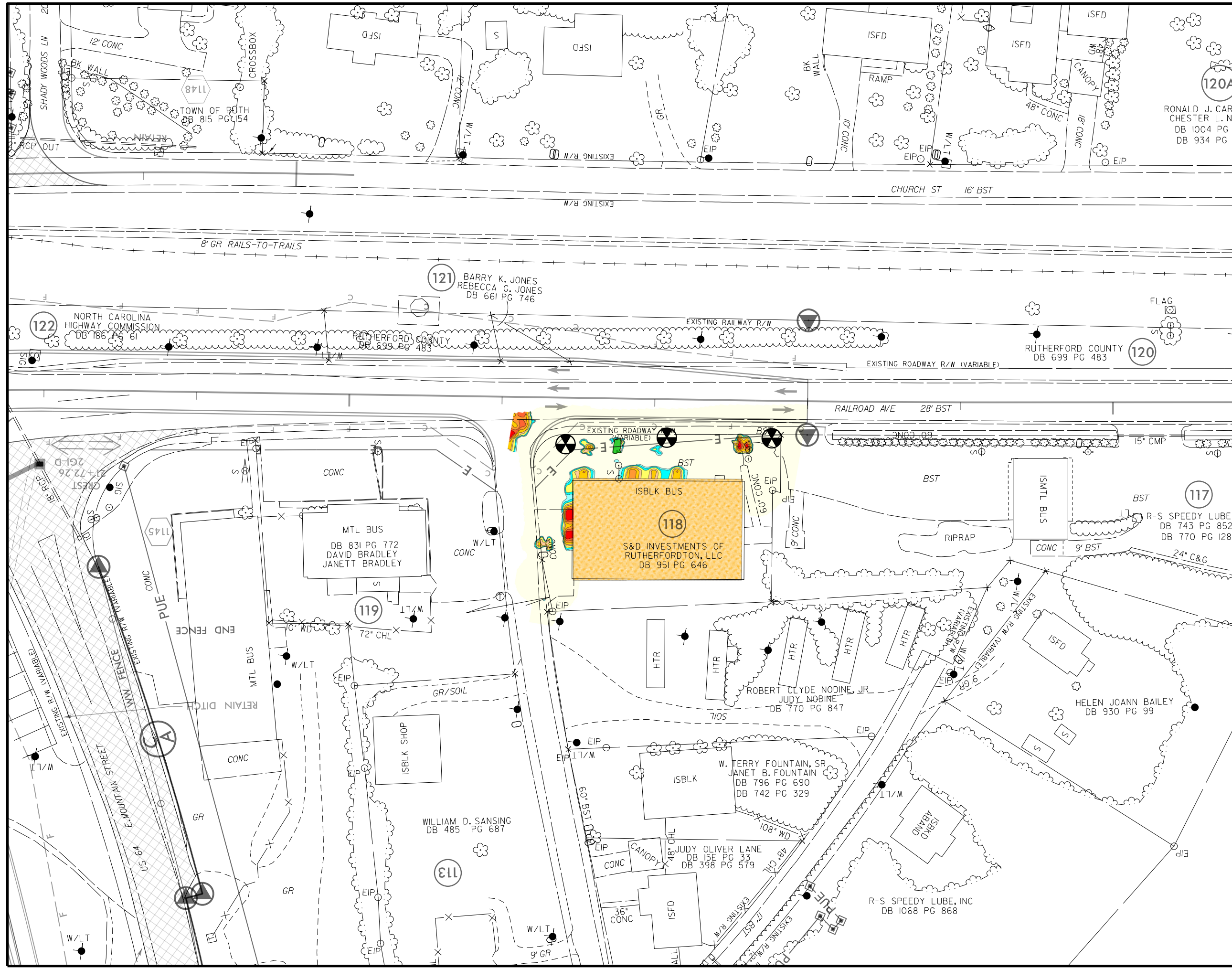
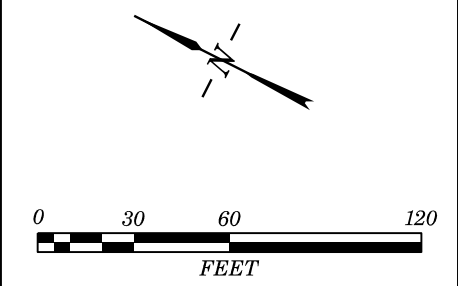
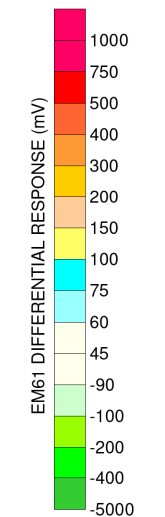
PARCEL 118 - S&D INVESTMENTS OF RUTHERFORDTON, LLC. PROPERTY
 877 - 881 RAILROAD AVENUE
 RUTHERFORDTON, RUTHERFORD COUNTY

LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- ⊕ PROPOSED RIGHT OF WAY WITH MARKER
- ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF TRAVEL
- E C PROPOSED CUT / FILL LINE
- PUE PROPOSED PERMANENT UTILITY EASEMENT
- ⊗ BORING LOCATION



- LEGEND**
- PROPERTY LINE
 - EXISTING RIGHT OF WAY LINE
 - ⊕ PROPOSED RIGHT OF WAY WITH MARKER
 - ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
 - EXISTING EDGE OF PAVEMENT
 - PROPOSED EDGE OF TRAVEL
 - PROPOSED CUT / FILL LINE
 - PUE PROPOSED PERMANENT UTILITY EASEMENT
 - ⊗ BORING LOCATION



**APPENDIX B
BORING LOGS**

APPENDIX C
LABORATORY ANALYTICAL REPORT AND CHAIN OF
CUSTODY



Hydrocarbon Analysis Results

Client: TERRACON CONSULTANTS
Address: 2020 E STARITA RD
 CHARLOTTE, NC 28206

Samples taken
Samples extracted
Samples analysed

Monday, August 14, 2017
 Monday, August 14, 2017
 Wednesday, August 16, 2017

Contact: ALEX CHINERY

Operator

PANTESCO

Project: # 71177323

H09382

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
s	B-115-1	25.0	<0.63	<0.63	<0.63	<0.63	<0.13	<0.2	<0.025	0	0	0	PHC not detected
s	B-115-2	21.0	<0.52	<0.52	0.52	0.52	0.27	<0.17	<0.021	0	78.8	21.2	Deg Fuel 74.3%,(FCM)
s	B-115-3	23.9	<0.6	<0.6	<0.6	<0.6	<0.12	<0.19	<0.024	0	93.3	6.7	Residual HC,(PFM),(OCR)
s	B-115-4	22.8	<0.57	<0.57	7.6	7.6	3.7	0.41	<0.023	0	81.6	18.4	Road Tar 77.3%,(FCM)
s	B-115-5	23.4	<0.59	<0.59	8.1	8.1	3.9	0.43	<0.023	0	84.8	15.2	Road Tar 94.7%,(FCM)
s	B-115-6	20.2	<0.5	<0.5	1	1	0.55	<0.16	<0.02	0	77.1	22.9	Deg.PHC 75.4%,(FCM),(BO)
s	B-115-7	24.1	<0.6	<0.6	<0.6	<0.6	<0.12	<0.19	<0.024	0	85.9	14.1	Residual HC
s	B-117-1	18.8	<0.47	<0.47	0.93	0.93	0.63	<0.15	<0.019	0	83.1	16.9	Deg Fuel 76.2%,(FCM),(BO)
s	B-117-2	20.3	<0.51	<0.51	0.51	0.51	0.36	<0.16	<0.02	0	72.4	27.6	V.Deg.PHC 65.8%,(FCM),(BO)
s	B-117-3	20.5	<0.51	<0.51	<0.51	<0.51	<0.1	<0.16	<0.02	0	0	0	PHC not detected,(BO),(P)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

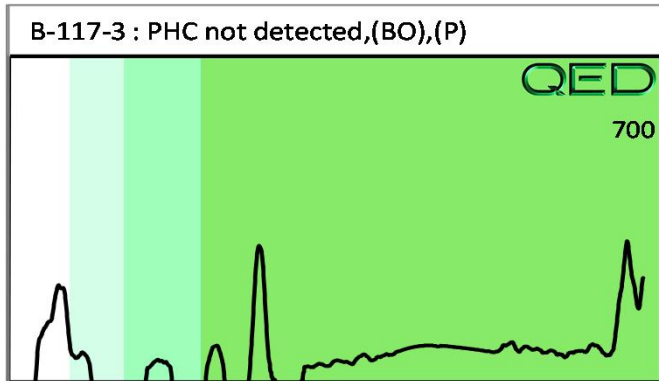
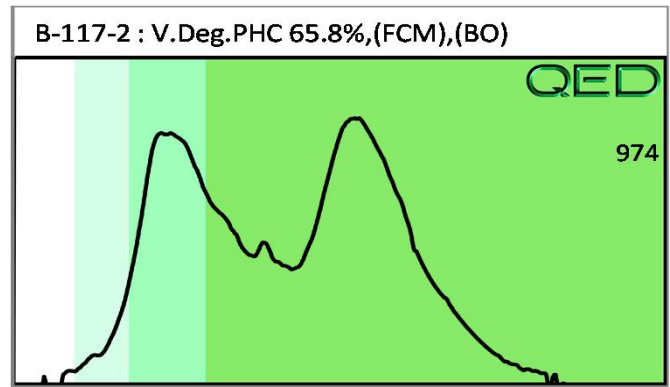
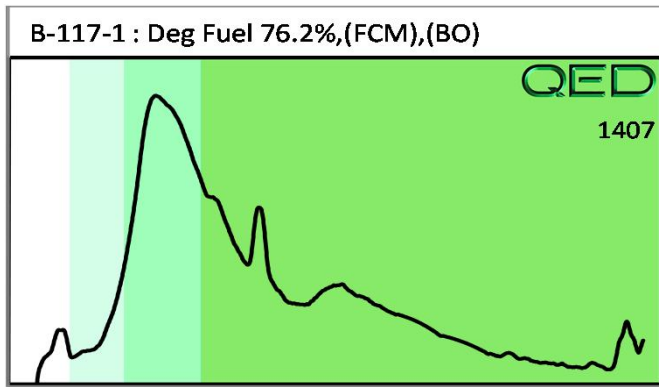
101.8 %

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

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

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

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**



Client Name: TERACON CONSULTANTS
 Address: 2020 E STRAITA ROAD
 CHARLOTTE, NC 28226
 Contact: ALEX CHINERY
 Project Ref.: ~~304~~ 71177323
 Email: alex.chinery@teracon.com
 Phone #: 704-535-6072
 Collected by: ALEX CHINERY

RED LAB

RAPID ENVIRONMENTAL DIAGNOSTICS
 CHAIN OF CUSTODY AND ANALYTICAL
 REQUEST FORM

3ateh 57
 RED Lab, LLC
 5598 Marvin K Moss Lane
 MARIIONC Bldg, Suite 2003
 Wilmington, NC 28409

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

Sample Collection Date/Time	TAT Requested		Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour							
8/14/17; 13:05		X	S	B-115-1	X		55.3	44.9	109.164
13:09		X		B-115-2	X		56.9	44.5	12.4
13:26		X		B-115-3	X		55.1	44.3	10.9
13:22		X		B-115-4	X		56.5	45.1	11.4
13:19		X		B-115-5	X		56.2	45.1	11.1
13:39		X		B-115-6	X		57.3	44.4	12.9
13:13		X		B-115-7	X		55.3	44.5	10.8
15:10		X		B-117-1	X		59.5	44.7	13.8
15:13		X		B-117-2	X		57.4	44.6	12.8
15:05		X		B-117-3	X		56.9	44.2	12.7
15:06		X		B-118-1	X		56.0	44.1	11.9
16:19		X		B-118-2	X		56.6	44.8	11.8
16:17		X		B-118-3	X		57.9	44.8	13.1
16:15		X		B-118-4	X		56.9	44.3	12.6
16:12		X		B-118-5	X		57.3	45.1	12.2
16:22		X		B-118-6	X		56.9	45.2	11.7

Comments: Relinquished by [Signature] Date/Time 8/14/17; Accepted by [Signature] Date/Time 8/16/17 130

RED Lab USE ONLY

(161)

Preliminary Site Assessment

US 221 South of US 74 Business (Charlotte Road) to North of
SR 1366 (Roper Loop Road)
Parcel 125 – Timothy and Lois Mace
137 and 145 US Highway 64, Rutherfordton, North Carolina

State Project No. R-2233BB

WBS Element: 34400.1.S5

December 1, 2017

Terracon Project No. 71177323



Prepared for:

North Carolina Department of Transportation
Raleigh, North Carolina

Prepared by:

Terracon Consultants, Inc.
Charlotte, North Carolina

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

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1.2 Site History	1
1.3 Scope of Work	1
1.4 Standard of Care.....	2
1.5 Additional Scope Limitations	2
1.6 Reliance.....	2
2.0 FIELD ACTIVITIES.....	2
2.1 Geophysical Survey	3
2.2 Soil Sampling.....	3
3.0 CONCLUSIONS AND RECOMMENDATIONS.....	3

EXHIBITS

Exhibit 1 – Topographic Vicinity Map

Exhibit 2 – Site Diagram

APPENDICES

Appendix A: Geophysical Survey Report

December 1, 2017

North Carolina Department of Transportation
Attention: Mr. Craig Haden
GeoEnvironmental Engineering Unit
Century Center Complex
Building B
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)
US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road)
Parcel 125 – Timothy and Lois Mace
137 and 145 US Highway 64, Rutherfordton, North Carolina
State Project No. R-2233BB
WBS Element: 34400.1.S5

Dear Mr. Haden:

Terracon Consultants, Inc. (Terracon) is pleased to submit a limited Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P71177323) dated June 2, 2017. This report includes the findings of the investigation, and provides our conclusions and recommendations.

Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation (NCDOT). If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

Terracon Consultants, Inc.

Prepared by:



S. Alex Chinery, E.I.
Senior Staff Environmental Engineer

DocuSigned by:

S. Alex Chinery

F3F142104F4941D...

Reviewed by:



Christopher L. Corbitt, P.G.
Senior Geologist

DocuSigned by:

Christopher L. Corbitt

D334903BD0324DE...

PRELIMINARY SITE ASSESSMENT

US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH SR 1366 (ROPER LOOP ROAD)

RUTHERFORDTON, RUTHERFORD COUNTY, NORTH CAROLINA

STATE PROJECT NO. R-2233BB

WBS ELEMENT: 34400.1.S5

PARCEL 125 – TIMOTHY AND LOIS MACE

137 AND 145 US HIGHWAY 64, RUTHERFORDTON, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road) in Rutherfordton
Site Location/Address	137 and 145 US Highway 64, Rutherfordton, NC 27834 (Rutherford County Tax PIN: 1206798)
General Site Description	The site currently operates as a gasoline station/convenience store and includes an apparent residence, a mobile home and a storage building.

1.2 Site History

The site is located at 137 and 145 US Highway 64 in Rutherfordton, Rutherford County, North Carolina (site). At the time of the PSA, the site was developed with several buildings including a one-story commercial building operating as a CITGO gasoline station and convenience store, an apparent residence, a mobile home and a storage building. According to the UST database of registered tanks, three USTs are currently maintained at the site. The database also indicates four other tanks were permanently closed at the property in 1993. A petroleum release incident (10873) is also associated with the site.

1.3 Scope of Work

Terracon conducted the following limited Preliminary Site Assessment (PSA) scope of work in accordance with Terracon's Proposal No. P71177323 dated June 2, 2017. This PSA is being completed prior to planned roadway improvements along US Highway 221 in Rutherfordton, North Carolina. The limited scope of work included only a geophysical investigation and preparation of a report documenting the geophysical investigation activities. *No soil sampling activities were conducted at the site at the request of the property owner.* The PSA is not intended to delineate

Preliminary Site Assessment

Parcel 125 – Timothy and Lois Mace ■ Rutherfordton, North Carolina
December 1, 2017 ■ Terracon Project No. 71177323



potential impacts. The PSA was performed within the proposed right-of-way (ROW) as indicated by North Carolina Department of Transportation (NCDOT) provided plan sheets.

1.4 Standard of Care

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report. These services were performed in accordance with Terracon Proposal No. P71177323 dated June 2, 2017 and were not conducted in accordance with ASTM E1903-11.

1.5 Additional Scope Limitations

Findings, conclusions and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

1.6 Reliance

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

2.0 FIELD ACTIVITIES

The following PSA activities are presented in the order that they were conducted in the field.

Exhibit 1 presents the topography of the site on a portion of the USGS topographic quadrangle map of Rutherfordton North, NC 2002. **Exhibit 2** is a site layout plan that indicates the

Preliminary Site Assessment

Parcel 125 – Timothy and Lois Mace ■ Rutherfordton, North Carolina
December 1, 2017 ■ Terracon Project No. 71177323



approximate locations of the site features. No soil borings or sample collection activities were conducted at the site at the request of the property owner.

2.1 Geophysical Survey

On July 28 and August 2-3, 2017, Geophysical Survey Investigations, conducted a geophysical investigation at the site in an effort to evaluate and detect potentially unknown, metallic underground storage tanks and buried utilities beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna.

The geophysical investigation detected the presence of three known USTs in the survey area that are associated with the operations of the on-site gasoline station. The geophysical investigation also identified a small metallic flat-lying structure near the apparent residence that could be a potential UST. The metal detection and GPR scans also identified underground utility lines within the depth interval of zero to eight feet below land surface (bls). A copy of the geophysical report is included in **Appendix A**.

2.2 Soil Sampling

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon mobilized to the site to provide oversight for the advancement of nine soil borings on Parcel 125; however, at the request of the property owner no borings were advanced at the site.

3.0 CONCLUSIONS AND RECOMMENDATIONS

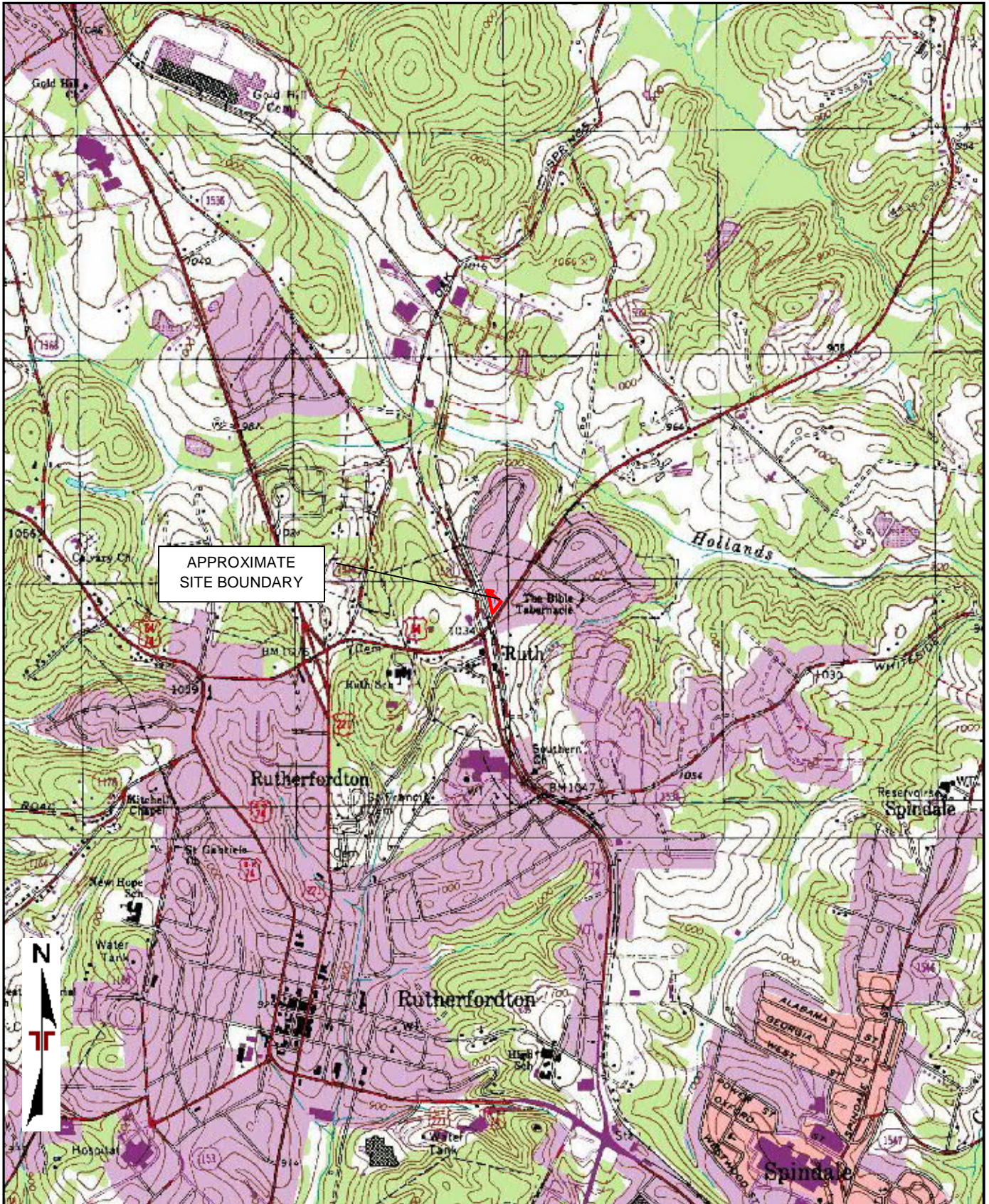
The findings of this investigation are discussed below.

- n The geophysical investigation confirmed the presence of three USTs associated with the operations of the gasoline station as well as a potential fourth UST located near the on-site residence. The metal detection and GPR scans also identified underground utility lines within the depth interval of zero to eight feet bls.
- n Terracon recommends the NCDOT obtain permission from the property owner prior to conducting the planned soil sampling activities at Parcel 125.

FIGURES

EXHIBIT 1 - TOPOGRAPHIC MAP

EXHIBIT 2 – SITE DIAGRAM WITH SOIL BORING LOCATIONS



APPROXIMATE
SITE BOUNDARY

TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: RUTHERFORDTON NORTH, NC (1/1/2002) and RUTHERFORDTON SOUTH, NC (1/1/1993).

Project Manager:	SAC
Drawn by:	SAC
Checked by:	CLC
Approved by:	CLC
Project No.:	71177323
Scale:	1"=2,000'
File Name:	PARCEL125
Date:	SEPT. 2017

Terracon
 2020 Starita Rd Ste E
 Charlotte, NC 28206-1298

TOPOGRAPHIC VICINITY MAP

Parcel 125 – Timothy and Lois Mace
 137 and 145 US Highway 64
 Rutherfordton, NC

Exhibit
 1

SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA

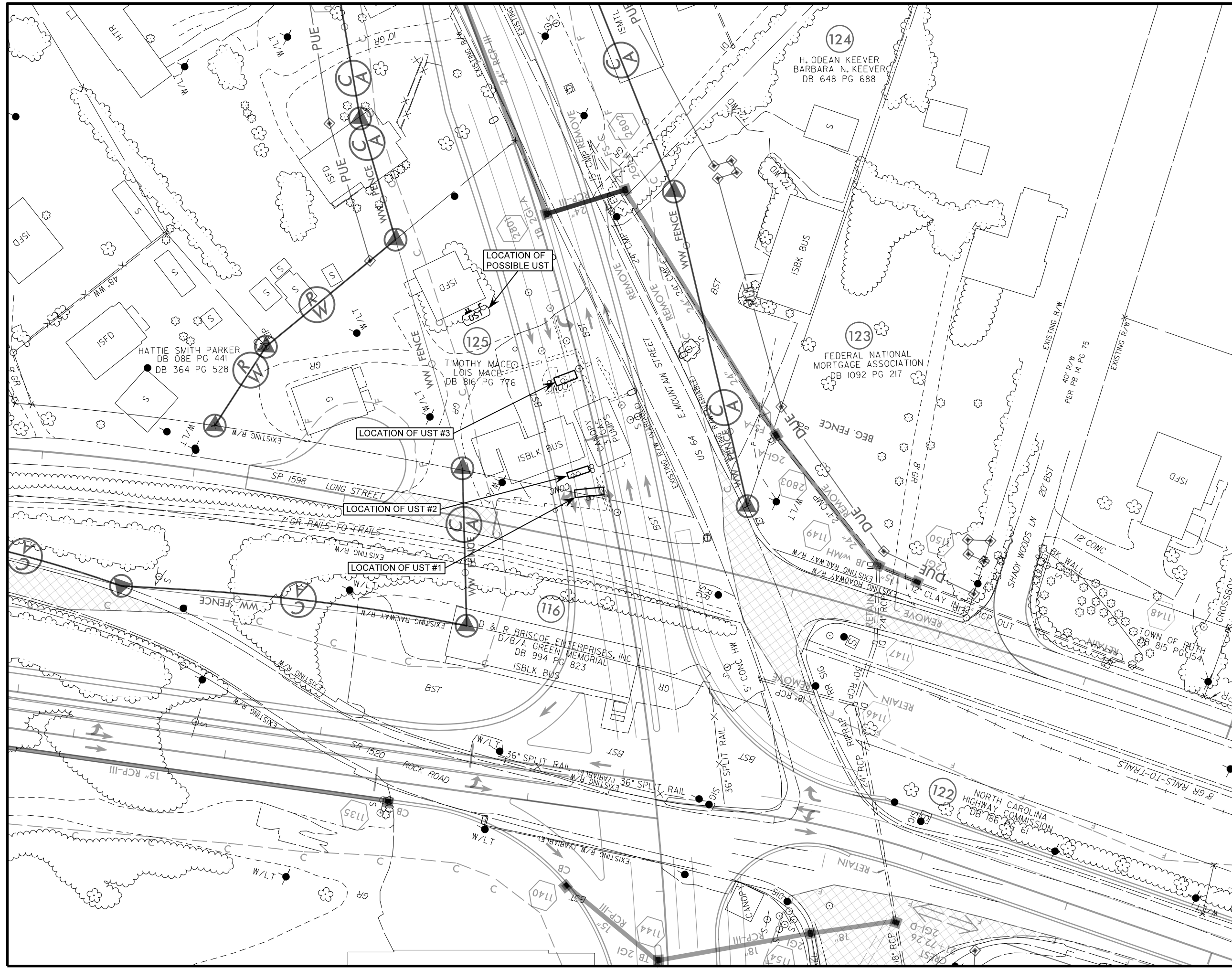
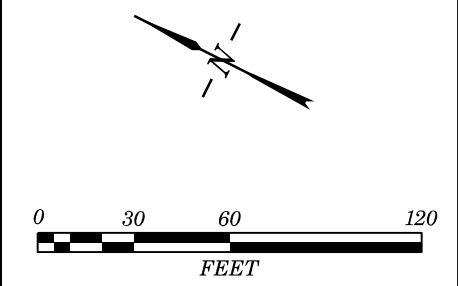
PARCEL 125 - TIMOTHY AND LOIS MACE PROPERTY
137 E MOUNTAIN STREET
RUTHERFORDTON, RUTHERFORD COUNTY

LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
- PROPOSED RIGHT OF WAY WITH MARKER
- - - EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF TRAVEL
- F C PROPOSED CUT / FILL LINE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- PUE PROPOSED PERMANENT UTILITY EASEMENT
- DUE PROPOSED PERMANENT DRAINAGE / UTILITY EASEMENT
- ⊗ BORING LOCATION
- OUTLINE OF KNOWN UST LOCATION
- U UST POSSIBLE UST LOCATION

NOTES:

ACCESS NOT GRANTED TO PERFORM SOIL BORINGS. TANK LOCATIONS BASED ON GPR SURVEY PERFORMED IN JULY AND AUGUST 2017.

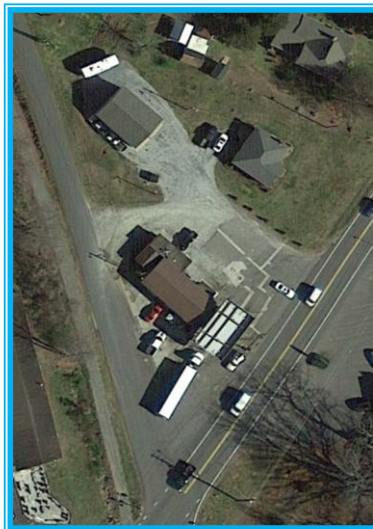


APPENDIX A
GEOPHYSICAL SURVEY REPORT

Terracon Consultants, Inc.

**GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS**

**Timothy & Lois Mace Property
(Parcel 125) 137 & 145 US Highway 64
Rutherford County, North Carolina**



November 27, 2017

Geophysical Survey Investigations, PLLC Project No. 2017-22



4 Willimantic Drive, Greensboro, NC 27455
Office Tel: (336) 286-9718
denilm@bellsouth.net

Terracon Consultants, Inc.
GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS
Timothy & Lois Mace Property
(Parcel 125) 137 & 145 US Highway 64
Rutherford County, North Carolina

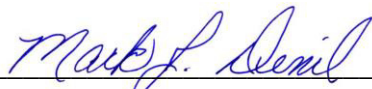
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2.0 FIELD METHODOLOGY	1
3.0 DISCUSSION OF RESULTS	2
4.0 SUMMARY & CONCLUSIONS	4
5.0 LIMITATIONS	5

FIGURES

Figure 1	Geophysical Equipment & Site Photographs
Figure 2	EM61-MK2A Metal Detection – Early Time Gate Results
Figure 3	EM61-MK2A Metal Detection – Differential Results
Figure 4	GPR Images & Photograph Across Known USTS-1 & 2
Figure 5	GPR Image & Photograph Across Known UST-3
Figure 6	GPR Image & Photograph Across Buried Metallic Object
Figure 7	NCDOT Map – EM61 Early Time Gate Results
Figure 8	NCDOT Map – EM61 Differential Results

Report prepared for: Christopher L. Corbitt, PG
Terracon Consultants, Inc.
2020 Starita Road, Suite E
Charlotte, North Carolina 28206

Prepared by: 
Mark J. Denil, P.G.
Geophysical Survey Investigations, PLLC

1.0 INTRODUCTION

Geophysical Survey Investigations, PLLC (GSI) conducted an electromagnetic (EM) metal detection survey, ground penetrating radar (GPR) scanning and utility line clearance search for Terracon Consultants, Inc. on July 28 and August 2-3, 2017 across the accessible portions of the Timothy & Lois Mace property (Parcel 125) located at 137 and 145 US Highway 64 in Rutherford County, North Carolina. The geophysical investigation was performed as part of the North Carolina Department of Transportation (NCDOT) preliminary site assessment for State Project R-2233BB (WBS Element 34400.1.S1) US 221 south of US 74 Business (Charlotte Rd) to north of SR 1366.

The geophysical investigation was conducted to determine if buried, metallic, underground, storage tanks (USTs) are present beneath the proposed Right-of-Way (ROW) and PUE areas of the site. The perimeter of the geophysical survey area (approximate ROW & PUE areas) is shown as a red polygon in the aerial photograph presented in **Figure 1**. The property consists of an active gas station/store as well as a large garage and an occupied residential home.

Terracon representative Mr. Christopher L. Corbitt, PG provided guidance and site maps to Geophysical Survey Investigations, PLLC personnel prior to conducting the geophysical field work. The geophysical survey area at Parcel 125 has a maximum length and width of 335 feet and 230 feet, respectively. Please note that the ROW and PUE areas at this site were not marked in the field or the survey markers were not visible at the time the geophysical investigation was conducted.

2.0 FIELD METHODOLOGY

The EM investigation was performed across the geophysical survey area (proposed ROW and PUE areas) using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit. EM61 metal detection data and GPS coordinates were digitally collected in latitude and longitude geodetic format (NAD83) using a Juniper data recorder at approximately 1.0 foot intervals along survey lines spaced approximately five feet apart. The Trackmaker NAV61MK2 software program was used with the data recorder to view the relative positions of the survey lines in real time during data acquisition.

According to the instrument specifications, the EM61-MK2A can detect a metal drum down to a maximum depth of approximately 8 to 10 feet. Objects less than one foot in size can be detected to a maximum depth of 4 or 5 feet. The EM61 and GPS data were downloaded to a computer and processed in the field using the Trackmaker61 and Surfer for Windows software programs. GPS coordinates were converted during data processing to Universal Transverse Mercator (UTM) coordinates (in feet) which are used as location control in this report.

GPR scans were performed along northerly-southerly and easterly-westerly directions spaced primarily 3 to 5 feet apart across selected EM61 differential anomalies and areas containing steel reinforced concrete using the Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna. GPR data were viewed in real time in a continuous mode using a vertical scan of 512 samples, at a sampling rate of 48 scans per second. A 70 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were viewed to a maximum investigating depth of approximately 6.0 feet based on an estimated two-way travel time of 8.0 nanoseconds per foot.

Following the UST investigation, areas around the proposed Terracon soil borings were scanned with the GPR unit and a DitchWitch 910 utility locator for buried utility line clearance and no further discussion regarding the utility clearance work will be made in this report. Photographs of the geophysical equipment used for the investigation and of the site are presented in Figure 1.

3.0 DISCUSSION OF RESULTS

Contour plots of the EM61 early time gate results and the EM61 differential results are presented in **Figures 2 and 3**, respectively. The early time gate results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The early time gate response can be used to delineate metallic conduits or utility lines, small, isolated, metal objects and areas containing insignificant metal debris. The differential results are obtained from the difference between the early time gate channel and late time gate channel of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST-size objects and ignore the smaller, insignificant, metal objects or debris.

The linear, EM61 early time gate anomalies intersecting UTM coordinates 1357987-E 12848127-N, 1358066-E 12848091-N, 1358091-E 12847950-N, and 1358155-E 12848024-N are probably in response to buried utility lines or conduits. The early time gate anomalies at 1358003-E 12848151-N, 1357996-E 12848210-N, 1358046-E 12848173-N, 1358087-E 12848153-N, and 1358100-E 12848142-N are probably in response to parked vehicles, buildings or mobile home. The early time gate anomalies centered near coordinates 1358011-E 12848105-N, 1357993-E 12848223-N and 1358068-E 12848192-N are probably in response to buried, miscellaneous debris or small objects.

GPR scanning suggests the EM61 differential anomalies located near UTM coordinates 1358091-E 12847998-N and 1358116-E 12847987-N are in response to buried lines, conduits, equipment, steel reinforced concrete and other known surface objects.

GPR scanning suggests that the large, high amplitude, EM61 differential anomaly centered near UTM coordinates 1358052-E 12847989-N is in response to an active (known) tank referred to in this report as “UST-1”. Based on the GPR data, UST-1 is approximately 19.0 feet long, 5.0 feet wide and lies 2.0 feet below present grade. GPR scanning suggests that the large, high amplitude, EM61 differential anomaly centered near UTM coordinates 1358060-E 12848001-N is in response to an active (known) tank referred to in this report as “UST-2”. Based on the GPR data, UST-2 is approximately 14.5 feet long, 4.0 feet wide and 2.3 feet below present grade. A portion of UST-2 lies beneath an active above ground storage tank (AST). Several valve covers are present at each of the two USTs which are oriented in a northwesterly-southeasterly direction. GPR images of the USTs and a photograph showing the locations of the USTs are presented in **Figure 4**.

GPR scanning suggests that the large, high amplitude, EM61 differential anomaly centered near UTM coordinates 1358111-E 12848035-N is in response to an active tank referred to in this report as “UST-3”. Based on the GPR data, UST-3 is approximately 14.5 feet long, 5.5 feet wide and 2.0 feet below present grade. Several valve covers are present at UST-3 which are oriented in a northwesterly-southeasterly direction. A GPR image of UST-3 and a photograph showing the location of the UST are presented in **Figure 5**. The foot prints of the three USTs were marked in the field using red marking paint.

GPR scanning suggests that the EM61 differential anomaly centered near UTM coordinates 1358117-E 12848105-N is probably in response to a flat-lying, miscellaneous, metallic object or to a possible (low confidence) small UST. Based on the GPR data, the probable buried object or possible UST is approximately 3.5 feet long, 2.5 feet wide and buried 0.75 feet below present grade. The foot print of the buried object was marked in the field using red marking paint and pin flags. A GPR image across the buried object and a photograph showing the location of the buried object are presented in **Figure 6**. An intrusive investigation is recommended to determine the identity of the buried object or possible UST.

Excluding the aforementioned active three USTs and the possible, small UST located adjacent to the home, the EM61 and GPR investigation suggests the remaining portion of the geophysical survey area (proposed ROW/PUE area) at Parcel 125 does not contain metallic USTs. Please refer to Figures 2 through 6 for additional (detailed) information regarding the geophysical findings at this site. The EM61 results are also shown on NCDOT base maps in **Figures 7 and 8**.

4.0 SUMMARY & CONCLUSIONS

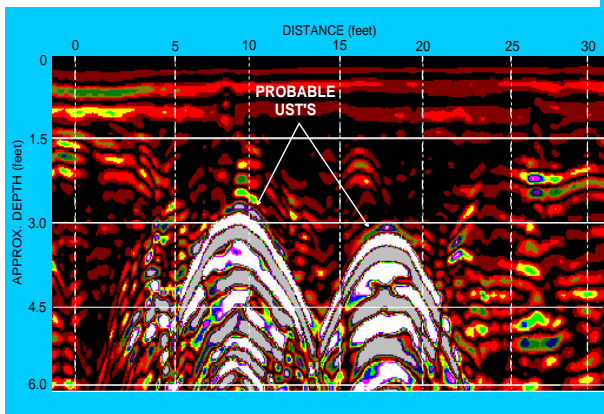
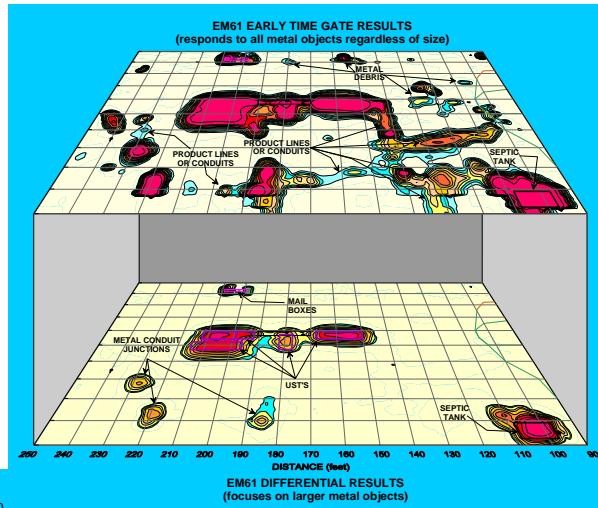
Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the Timothy & Lois Mace property (Parcel 125) located at 137 & 145 US Highway 64 in Rutherford County, North Carolina provides the following summary and conclusions:

- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 8 feet.
- The linear, EM61 early time gate anomalies intersecting UTM coordinates 1357987-E 12848127-N, 1358066-E 12848091-N, 1358091-E 12847950-N, and 1358155-E 12848024-N are probably in response to buried utility lines and conduits.
- Three active (known) USTs (USTs-1, 2 and 3) were detected by the geophysical investigation and are located near UTM coordinates 1358052-E 12847989-N, 1358060-E 12848001-N and 1358111-E 12848035-N, respectively.

- GPR scanning suggests that the EM61 differential anomaly centered near UTM coordinates 1358117-E 12848105-N is probably in response to a flat-lying, miscellaneous, metallic object or to a possible (low confidence) small UST. An intrusive investigation is recommended to determine the identity of the buried object or possible UST.
- Excluding the aforementioned active three USTs and the possible, small UST located adjacent to the home, the EM61 and GPR investigation suggests the remaining portion of the geophysical survey area (proposed ROW/PUE area) at Parcel 125 does not contain metallic USTs.

5.0 LIMITATIONS

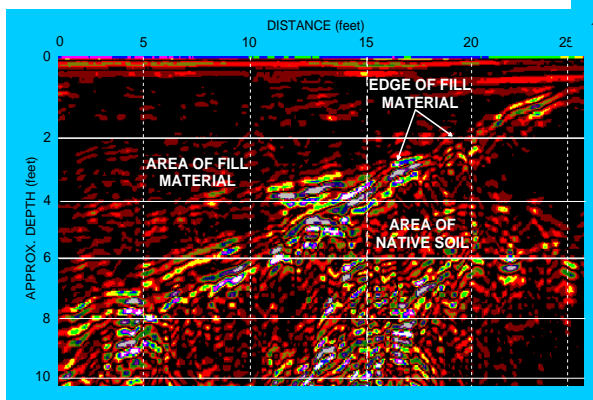
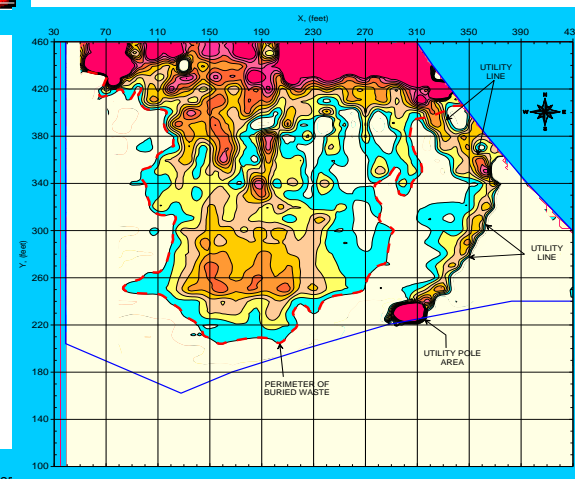
EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. Some of the EM61 and GPR anomalies interpreted as possible/probable USTs, utility lines, conduits, steel reinforced concrete, or miscellaneous, metal debris may be attributed to other surface or subsurface features and/or interference from cultural features.

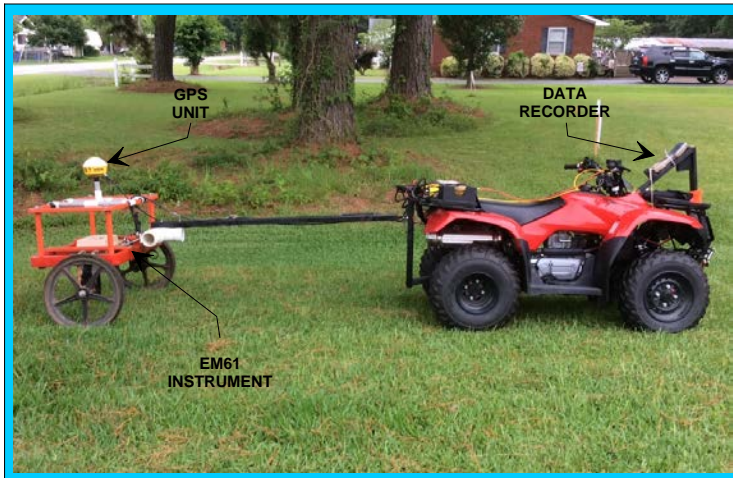


REPORT FIGURES

(on the following pages)

Figures shown on this page are for
esthetic purposes only and are not
related to the site discussed in this report





EM61 METAL DETECTOR

The photograph shows the Geonics EM61-MK2A metal detector, a Hemisphere A101 GPS unit, a Juniper data recorder, and a Honda Recon ATV which were used to conduct the metal detection survey across the Timothy & Lois Mace property.

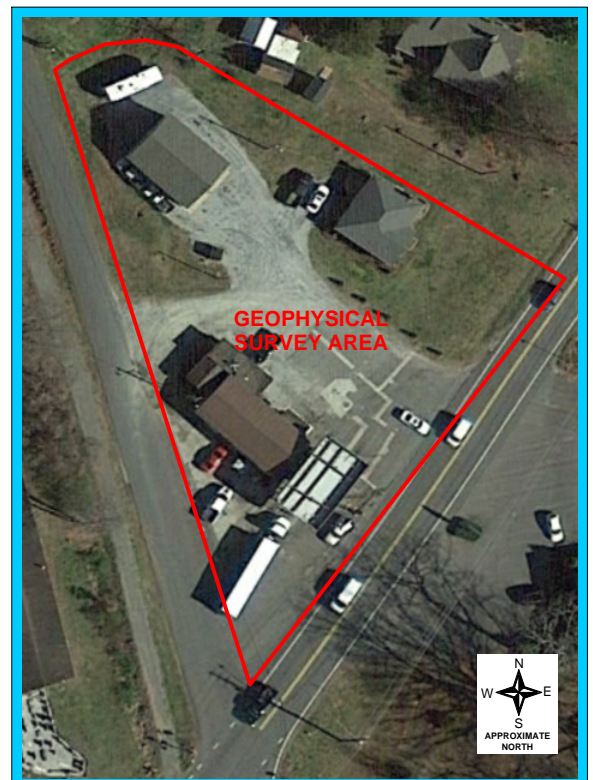
GROUND PENETRATING RADAR UNIT

The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equipped with a 400 MHz antenna that were used to conduct the GPR scanning across selected portions of the site.



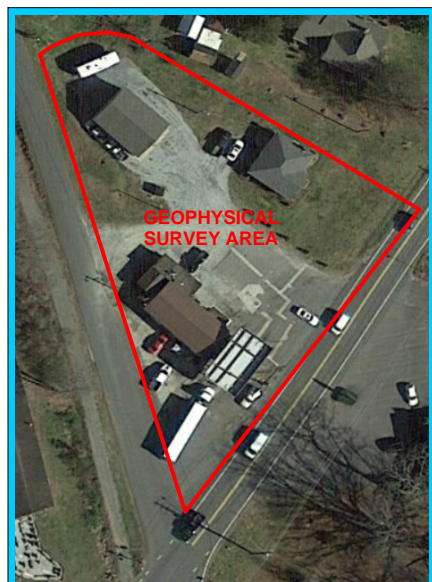
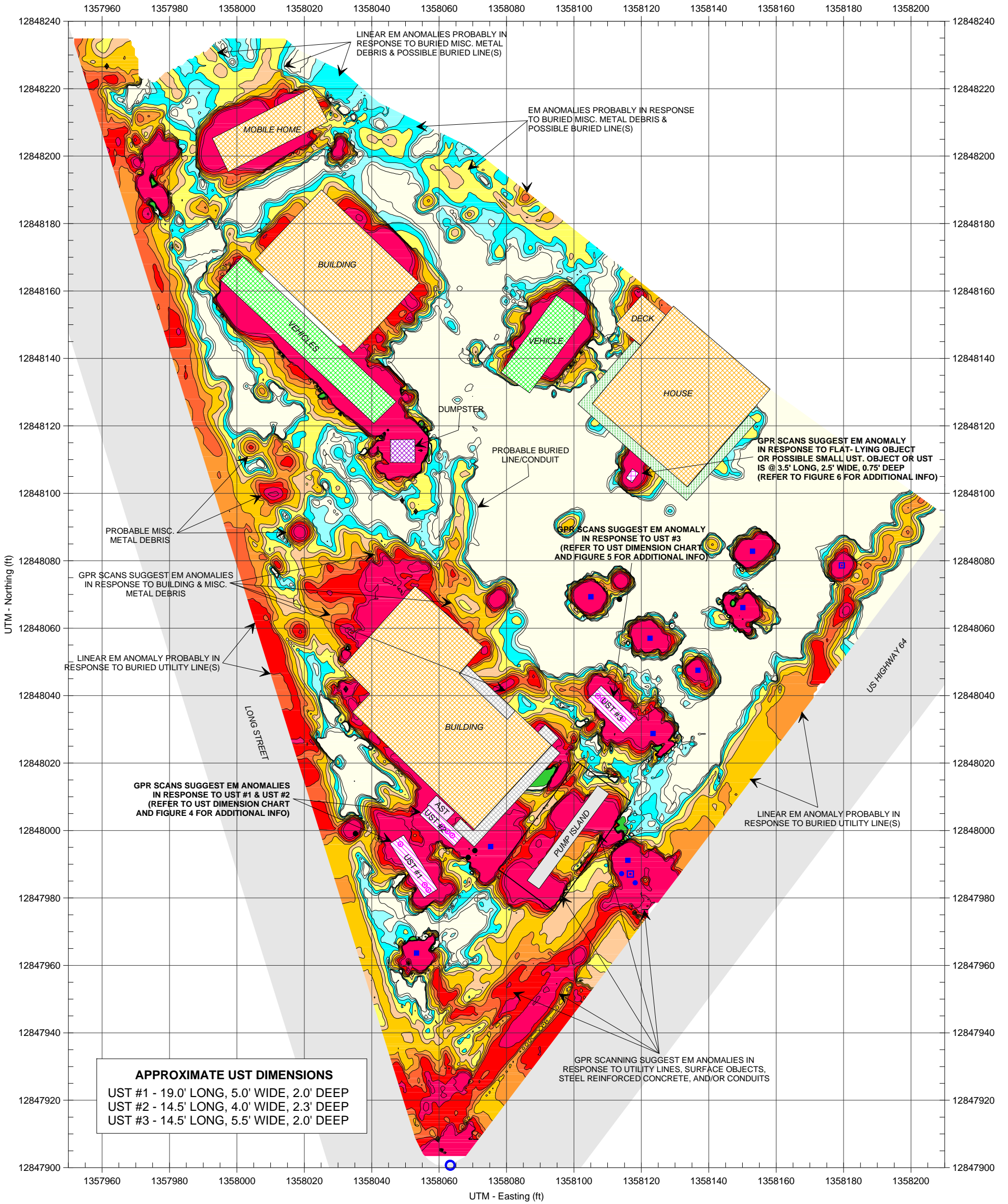
DITCHWITCH UTILITY LOCATOR

The photograph shows the DitchWitch 910 utility locator which was used to detect buried lines across the proposed boring locations.



GEOPHYSICAL SURVEY AREA

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at the Timothy & Lois Mace property (Parcel 125). The geophysical investigation was conducted on July 28 and August 2-3, 2017.



The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 125

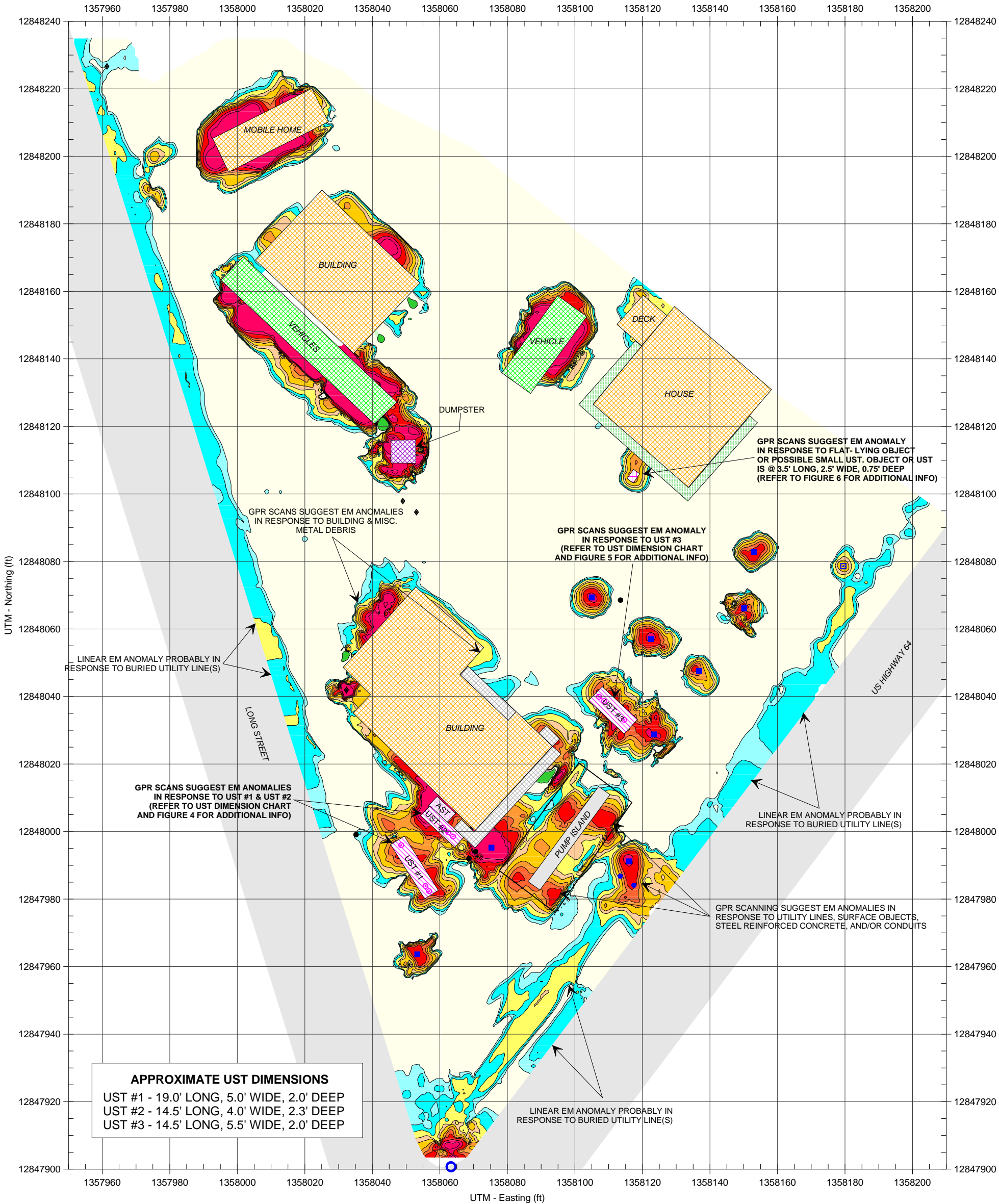
The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects, lines and conduits regardless of size. GPR scans were conducted across selected EM61 anomalies and steel reinforced concrete using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna. The geophysical investigation was conducted on July 28 and August 2 - 3, 2017.

EM61-MK2A METAL DETECTION (EARLY TIME GATE RESULTS)

TERRACON, INC.

Timothy & Lois Mace Property
 (Parcel 125) 137 & 145 US Highway 64
 Rutherford County, North Carolina





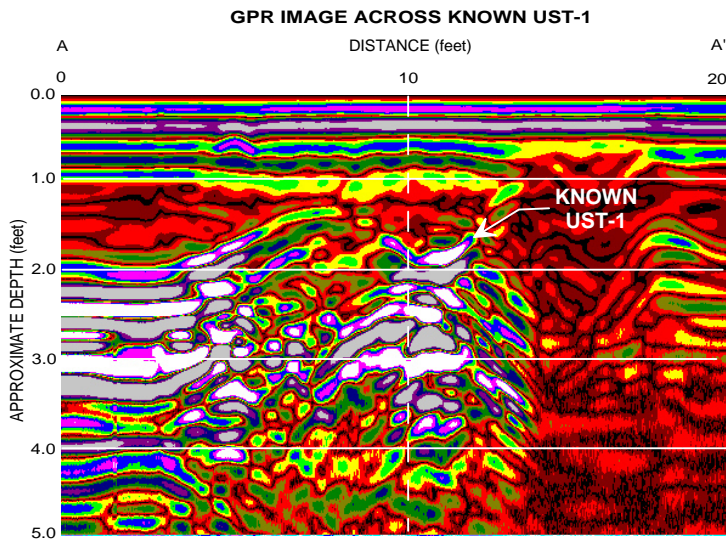
The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 125

EM61-MK2A METAL DETECTION
(DIFFERENTIAL RESULTS)

TERRACON, INC.
Timothy & Lois Mace Property
(Parcel 125) 137 & 145 US Highway 64
Rutherford County, North Carolina

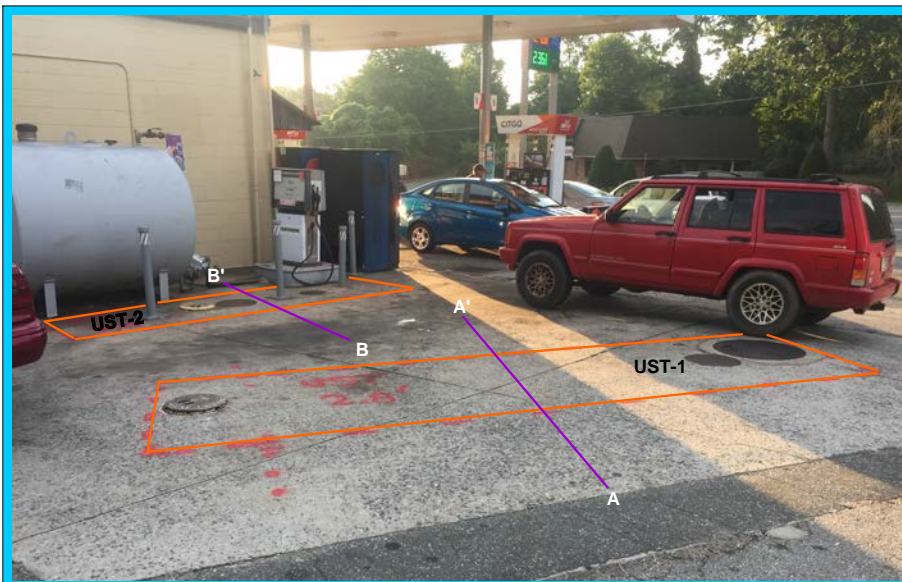
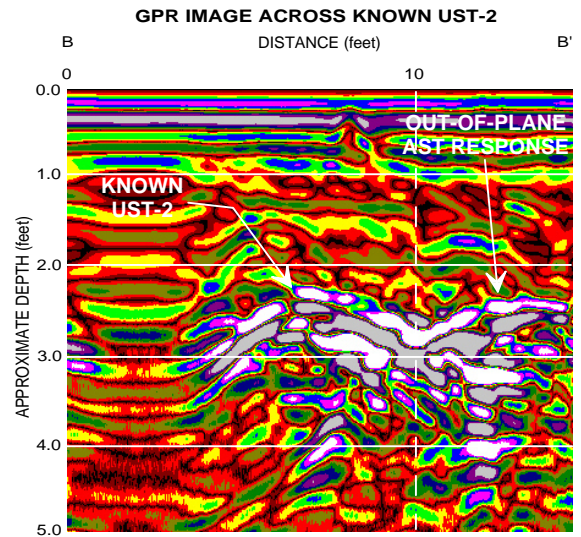
GEOPHYSICAL
SURVEY INVESTIGATIONS

11/27/17 336-286-9718 FIGURE 3



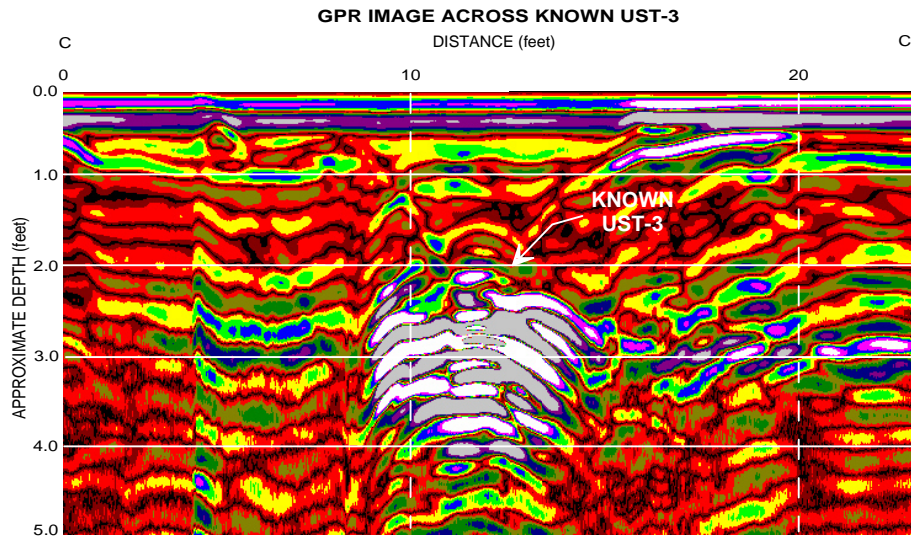
The high amplitude, hyperbolic reflections in the GPR image (left) are probably in response to known (active) UST-1 buried approximately 2.0 feet below present grade. The purple line labeled AA' in the photograph shown below represents the approximate location of the GPR image.

The high amplitude, hyperbolic reflections in the GPR image (right) are probably in response to known (active) UST-2 buried approximately 2.3 feet below present grade. The purple line labeled BB' in the photograph shown below represents the approximate location of the GPR image.

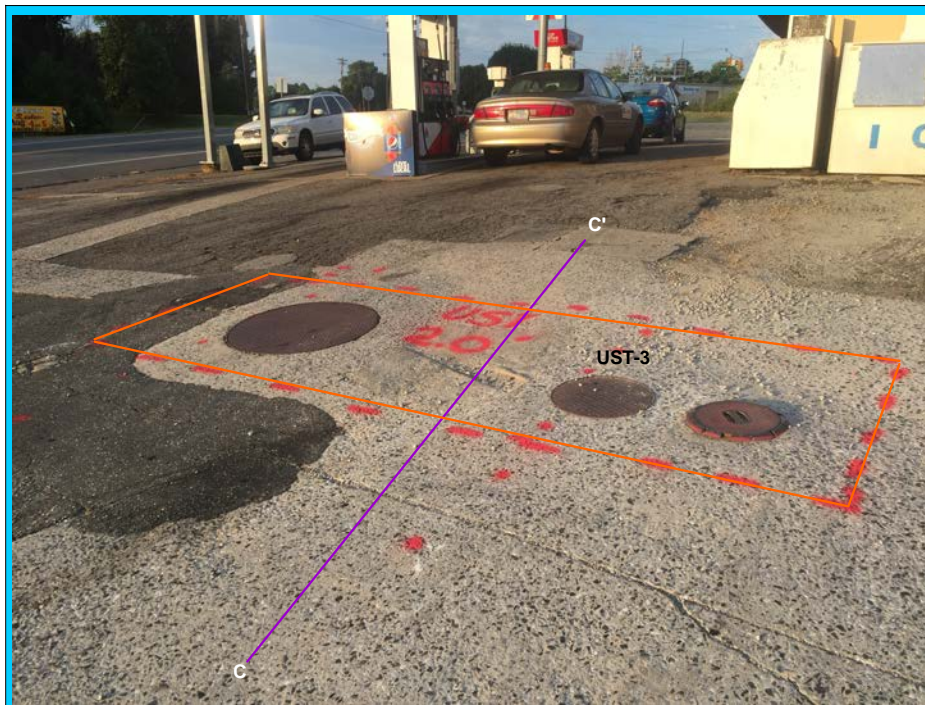


The orange rectangles in the photograph represent the approximate foot prints of known USTs-1 and 2 that were detected by the geophysical investigation. Based on the GPR data, active UST-1 is approximately 19.0 feet long, 5.0 feet wide and buried 2.0 feet below present grade. Active UST-2 is approximately 14.5 feet long, 4.0 feet wide and buried 2.3 feet below present grade.

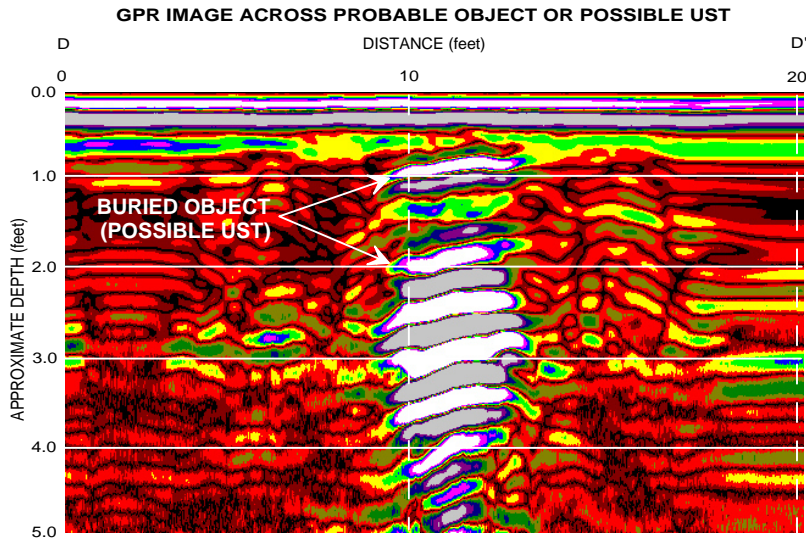
The solid purple lines labeled AA' and BB' in the photograph represent the approximate location of GPR images AA' and BB' shown above. The photograph is viewed in an easterly direction.



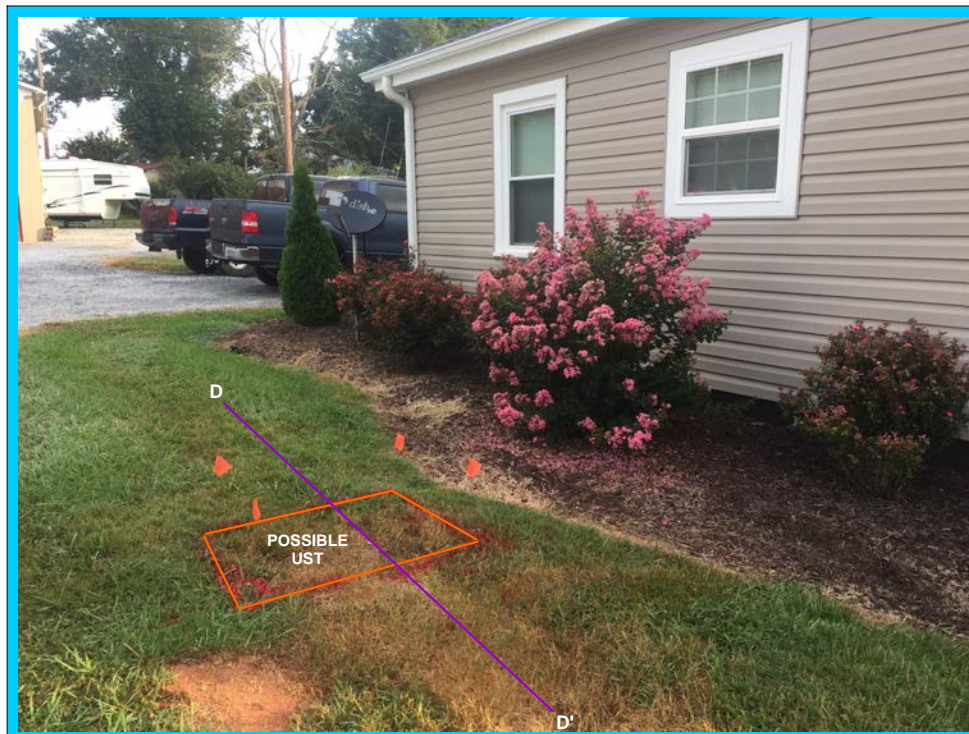
The high amplitude, hyperbolic reflections in the GPR image (above) are probably in response to known (active) UST-3 buried approximately 2.0 feet below present grade. The purple line labeled CC' in the photograph shown below represents the approximate location of the GPR image.



The orange rectangle in the photograph represents the approximate foot print of known UST-3 that was detected by the geophysical investigation. Based on the GPR data, the active UST is approximately 14.5 feet long, 5.5 feet wide and buried 2.0 feet below present grade. The solid purple line labeled CC' in the photograph represents the approximate location of GPR image CC' shown above. The photograph is viewed in a southwesterly direction.

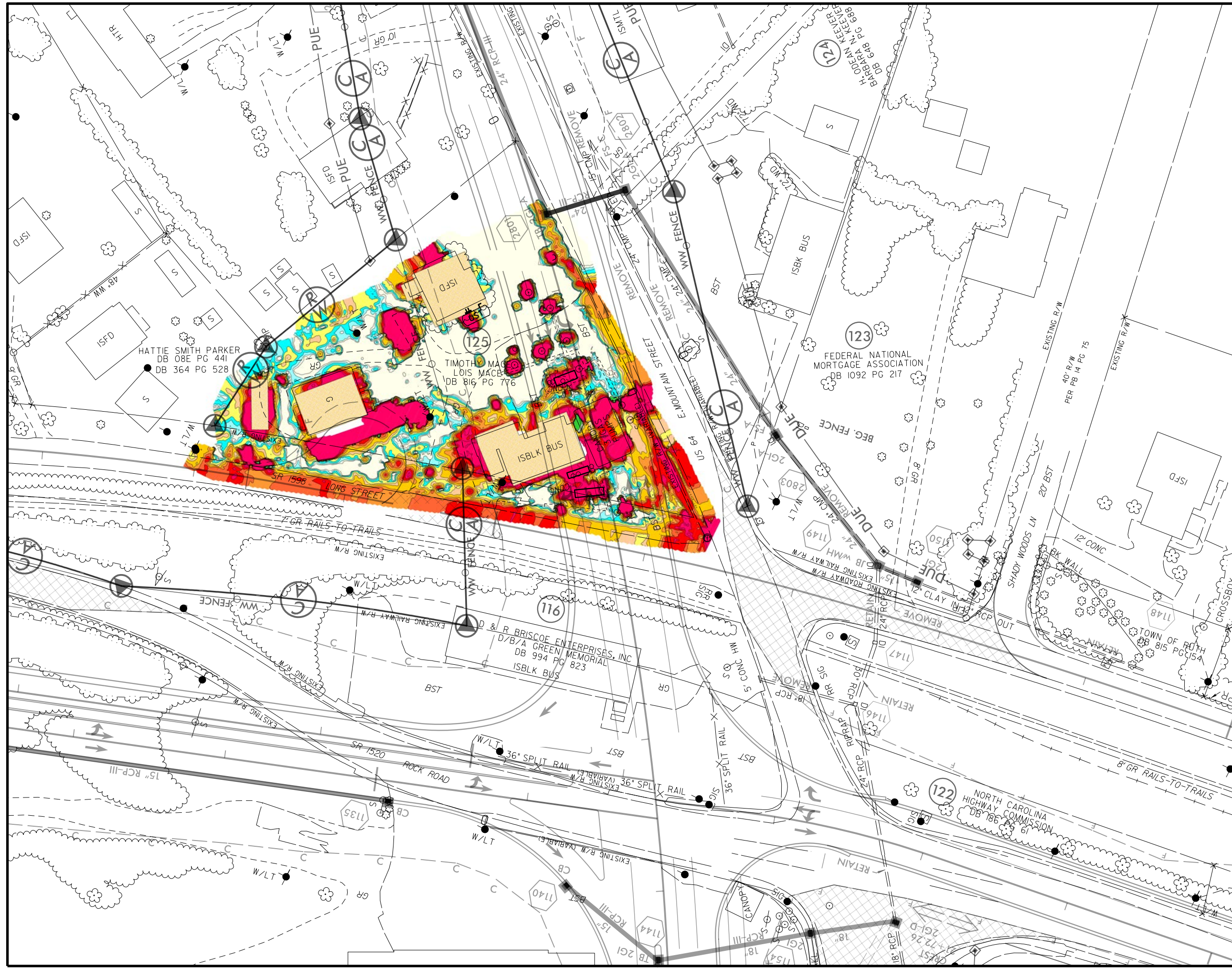
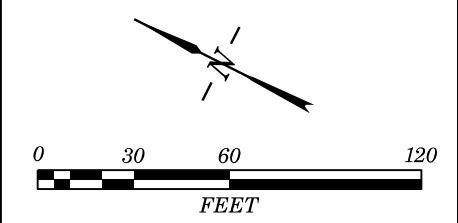
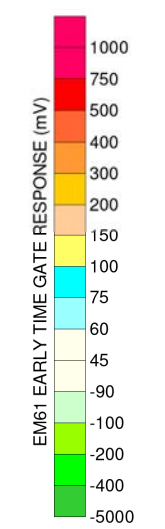


The high amplitude, flat-lying reflections in the GPR image (above) are probably in response to a miscellaneous, metal object or a possible (low confidence) UST buried approximately 0.75 feet below present grade. The purple line labeled DD' in the photograph shown below represents the approximate location of the GPR image.



The orange rectangle in the photograph represents the approximate foot print of a probable, miscellaneous, buried, metallic object or a possible (low confidence) UST that was detected by the geophysical investigation. Based on the GPR data, the probable object/possible UST is approximately 3.5 feet long, 2.5 feet wide and buried 0.75 feet below present grade. The solid purple line labeled DD' in the photograph represents the approximate location of GPR image DD' shown above. The photograph is viewed in a northerly direction.

- LEGEND**
- PROPERTY LINE
 - EXISTING RIGHT OF WAY LINE
 - ⊕ ⊖ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
 - ⊕ ⊖ PROPOSED RIGHT OF WAY WITH MARKER
 - EXISTING EDGE OF PAVEMENT
 - PROPOSED EDGE OF TRAVEL
 - F C PROPOSED CUT / FILL LINE
 - PROPOSED CATCH BASIN
 - PROPOSED DRAINAGE PIPING
 - PUE PROPOSED PERMANENT UTILITY EASEMENT
 - DUE PROPOSED PERMANENT DRAINAGE / UTILITY EASEMENT
 - ⊗ BORING LOCATION
 - OUTLINE OF KNOWN UST LOCATION
 - ▬ UST POSSIBLE UST LOCATION



- LEGEND**
- PROPERTY LINE
 - EXISTING RIGHT OF WAY LINE
 - ⊕ ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
 - ⊕ ⊕ PROPOSED RIGHT OF WAY WITH MARKER
 - EXISTING EDGE OF PAVEMENT
 - PROPOSED EDGE OF TRAVEL
 - F C PROPOSED CUT / FILL LINE
 - PROPOSED CATCH BASIN
 - PROPOSED DRAINAGE PIPING
 - PUE PROPOSED PERMANENT UTILITY EASEMENT
 - DUE PROPOSED PERMANENT DRAINAGE / UTILITY EASEMENT
 - ⊗ BORING LOCATION
 - OUTLINE OF KNOWN UST LOCATION
 - ▭ UST POSSIBLE UST LOCATION

