

**PRELIMINARY SITE ASSESSMENT
PARCEL N/A, STATE PROJECT B-4490
WBS ELEMENT 33727.1.1, CUMBERLAND COUNTY**

**REPLACE BRIDGE NO. 116 OVER CXS RAILROAD,
NORTH SOUTH RAILROAD, AND HILLSBORO STREET
ON NC 24-210, FAYETTEVILLE, NORTH CAROLINA**

Schnabel Project 11821014.33
April 8, 2014





April 8, 2014

Mr. Mohammed A. Mulla, P.E., CPM, MCE
NCDOT, Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

RE: State Project: B-4490
 WBS Element: 33727.1.1
 County: Cumberland
 Description: Replace Bridge No. 116 over CSX Railroad, North South Railroad, and
 Hillsboro Street on NC 24-210 in Fayetteville

Subject: **Preliminary Site Assessment for Parcel N/A, Fayetteville, NC**
 Schnabel Engineering Project 11821014.33

Dear Mr. Mulla:

SCHNABEL ENGINEERING SOUTH, P.C. (Schnabel) is pleased to submit our report for this project. This study was performed in accordance with our revised proposal dated January 23, 2014 as authorized by the Notice to Proceed on January 23, 2014 and was conducted under our June 2, 2011 Agreement with the NCDOT.

We appreciate the opportunity to be of service for this project. Please call us if you have any questions regarding this report.

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC

A handwritten signature in blue ink that reads "Benjamin L. Bradley".

Benjamin L. Bradley, GIT
Project Scientist

A handwritten signature in blue ink that reads "Gregory B. Kuntz".

Gregory B. Kuntz, LG
Senior Associate Scientist

BB/GK

**PRELIMINARY SITE ASSESSMENT FOR PARCEL N/A
STATE PROJECT B-4490, WBS ELEMENT 33727.1.1
REPLACE BRIDGE NO. 116 OVER CSX RAILROAD,
NORTH SOUTH RAILROAD, AND HILLSBORO STREET ON NC 24-210
FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA**

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is replacing a bridge over CSX Railroad, North South Railroad, and Hillsboro Street on Highway 24/210 (W. Rowan Street) in the town of Fayetteville, located in Cumberland County, North Carolina. Acquisition of properties within the right-of-way (ROW) is necessary prior to road and bridge construction. Schnabel Engineering conducted Preliminary Site Assessments (PSAs) on 10 sites (thirteen parcels) located within the proposed ROW that are of concern to the NCDOT.

This report summarizes the results of field activities conducted during the PSA for the proposed property acquisition area (Study Area) identified by NCDOT on Parcel N/A. The property is a City of Fayetteville traffic median located at the intersection of Washington Drive and Bragg Boulevard (Figure 1). The property line and topography are shown on Figure 2. The approximate NCDOT project limits that delineate the property acquisition area are shown on Figure 3.

The scope of work executed at the site was performed in general accordance with our cost proposal dated January 23, 2014 and was initiated based on a Notice to Proceed issued by the NCDOT Geotechnical Engineering Unit on January 24, 2014 under contract 7000012208, dated June 2, 2011.

2.0 BACKGROUND AND SITE DESCRIPTION

No structures are located on the ROW of Parcel N/A. The surface of the ROW is covered with grass. Several utilities cross the site including buried water, sewer pipes, and overhead electric lines. The information regarding prior site use provided to Schnabel Engineering by NCDOT was that the site operated as a filling station in the 1930's. This PSA is for the investigation of the entire parcel. Photographs of the Study Area are presented in Appendix A.

3.0 FIELD METHODOLOGY

Prior to mobilizing to the site to conduct the field investigation, Schnabel Engineering contacted North Carolina One Call to locate underground utilities in the proposed property Study Area of the site. Schnabel Engineering mobilized a geophysical crew to the site on January 27, 2014 and performed an electromagnetic survey of the subsurface in the proposed ROW area within the parcel. The electromagnetic survey equipment (EM61-MK2) identified various magnetic anomalies within the Study Area. The Schnabel geophysical crew returned to the Study Area on February 10, 2014 to perform ground penetrating radar (GPR) survey with a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna. Results of the survey suggested the presence of buried utility lines or conduits within the Study Area.

After reviewing the background information and geophysical data, Schnabel returned to Parcel N/A to conduct field screening of soils from within the Study Area. Two soil borings designated B-NA-01 and B-NA-02 were advanced by SAEDACCO of Fort Mill, SC along Bragg Boulevard on February 19, 2014. The locations of the two soil borings are shown on Figure 3. The borings were each advanced to a total depth of ten feet below ground surface (bgs). The borings drilled within the Study Area were advanced utilizing a track-mounted Geoprobe® (Model 7822-DT) with direct push probe technology. At the completion of the sampling activities, each boring was backfilled with soil removed from the boring during sampling and/or bentonite chips.

Soils for field screening were obtained from the borings using a MacroCore[®] sampler fitted with a new, single-use, five foot long disposable polyvinyl chloride (PVC) liner. A portion of each 2-foot interval was placed in a separate re-sealable plastic bag. These bags were sealed and placed at ambient temperature for field screening with a MiniRAE Plus photo ionization detector (PID). Volatiles were allowed to accumulate in the headspace of each bag for approximately 15 minutes, and then the headspace of each sealed bag was scanned with the PID. Headspace screening of the soil samples indicated concentrations that ranged from 0 to 907 parts per million (ppm) at the boring locations at intervals of two, four, six, eight, and ten feet bgs (Table 1, Field Volatile Measurements). The PID was calibrated on February 19, 2014 in general accordance with the manufacturer's recommended calibration procedures. The PID readings were recorded with the soil descriptions and indications of staining or odors, if present. Logs for each boring are presented in Appendix C.

Ultra Violet Fluorescence (UVF) was performed at this parcel because the PID indicated a reading of 907 ppm at B-NA-01 at a depth of ten feet bgs. Soil and groundwater samples were not collected at this parcel.

Soils collected from borings within the Study Area generally consisted of orangish brown Silty Sand with Clay (SM). GPS coordinates for each boring were obtained using a Trimble Pro-XRS DGPS system (Appendix D) with coordinates reported in US State Plane 1983 system, North Carolina 3200 zone, using the NAD 83 datum, with units in US survey feet.

4.0 GROUNDWATER MONITORING WELLS OR REMEDIATION WELLS

Groundwater monitoring wells and remediation wells were not observed within the proposed ROW or easement on this parcel.

5.0 DISCUSSION OF RESULTS

The geophysical survey conducted at the site did not indicate the presence of probable USTs on Parcel N/A. The geophysical survey did indicate the presence of buried utility lines and conduits.

The results from the UVF analyses indicated that degraded fuel was present at B-NA-01 at the 10 feet interval at a concentration less than 10 mg/Kg TPH. UVF results are included in Appendix E. The source of the degraded fuel is uncertain. A former service station may have existed on this parcel. The geophysical survey did not indicate the presence of a UST or pipeline associated with a dispenser island, although these systems may have been removed. The depth of impact suggests that the source may be located upgradient of B-NA-01 to the northwest.

6.0 CONCLUSIONS

We did not observe anomalies in the EM or the GPR geophysical data at the subject property that we interpret to be the results of metallic USTs within about 6 feet of the ground surface.

Two soil borings B-NA-01 and B-NA-02 were advanced to evaluate potential petroleum impact within the Study Area, and to document soil conditions.

Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) was detected in the soil at about 10 feet bgs at a concentration of 4.4 mg/Kg. This result is below the TPH Action Level of 10 mg/Kg for DRO (*UST Section Guidelines for the Investigation and Remediation of Contamination from Non-UST*

Petroleum Releases, Department of Environment and Natural Resource, Division of Waste Management, UST Section, July, 2012).

6.0 RECOMMENDATIONS

Based on the currently available information presented in this report, additional assessment is not recommended. Concentrations of the constituents selected for UVF analysis were below the TPH Action Levels, so excavation and treatment of soils for these constituents is not recommended. However, NCDOT may choose to properly transport and dispose excavated soil in the vicinity of this soil boring that shows evidence of petroleum impact. During roadway construction, the NCDOT transportation/disposal contractor may use different criteria for estimating impacted soil.

7.0 LIMITATIONS

This PSA was prepared for the use of the North Carolina Department of Transportation. The scope of work performed at the site is limited to the tasks described in our cost proposal dated January 23, 2014. This report is not intended to represent an exhaustive research of all potential hazards that may exist. Schnabel makes no other declarations, or any express or implied warranty, as to the professional services provided under the terms of the agreement.

TABLES

Table 1, Sampling Intervals and Field Volatile Measurements

**TABLE 1
FIELD VOLATILE MEASUREMENTS
PARCEL N/A
NCDOT B-4490, CUMBERLAND COUNTY**

Depth Below Ground Surface	Soil Borings	
	B-NA-01	B-NA-02
0 - 2 feet	0.1	0.2
2 - 4 feet	0.2	1.8
4 - 6 feet	0.1	0.2
6 - 8 feet	1.1	0.2
8 - 10 feet	907.0*	0.2

Notes:

Field volatile measurements obtained with a MiniRae Photo Ionization Detector

*: Ultra Violet Fluorescence (UVF) performed

Readings in parts per million (ppm)

FIGURES

Figure 1, Vicinity Map

Figure 2, Site Map

Figure 3 and 3A, Boring Locations and Legend



Source: 1. Cumberland County, NC, GIS Department
http://www.co.cumberland.nc.us/is_technology/gis.aspx
 Projection: NAD 1983 StatePlane North Carolina FIPS 3200 Feet

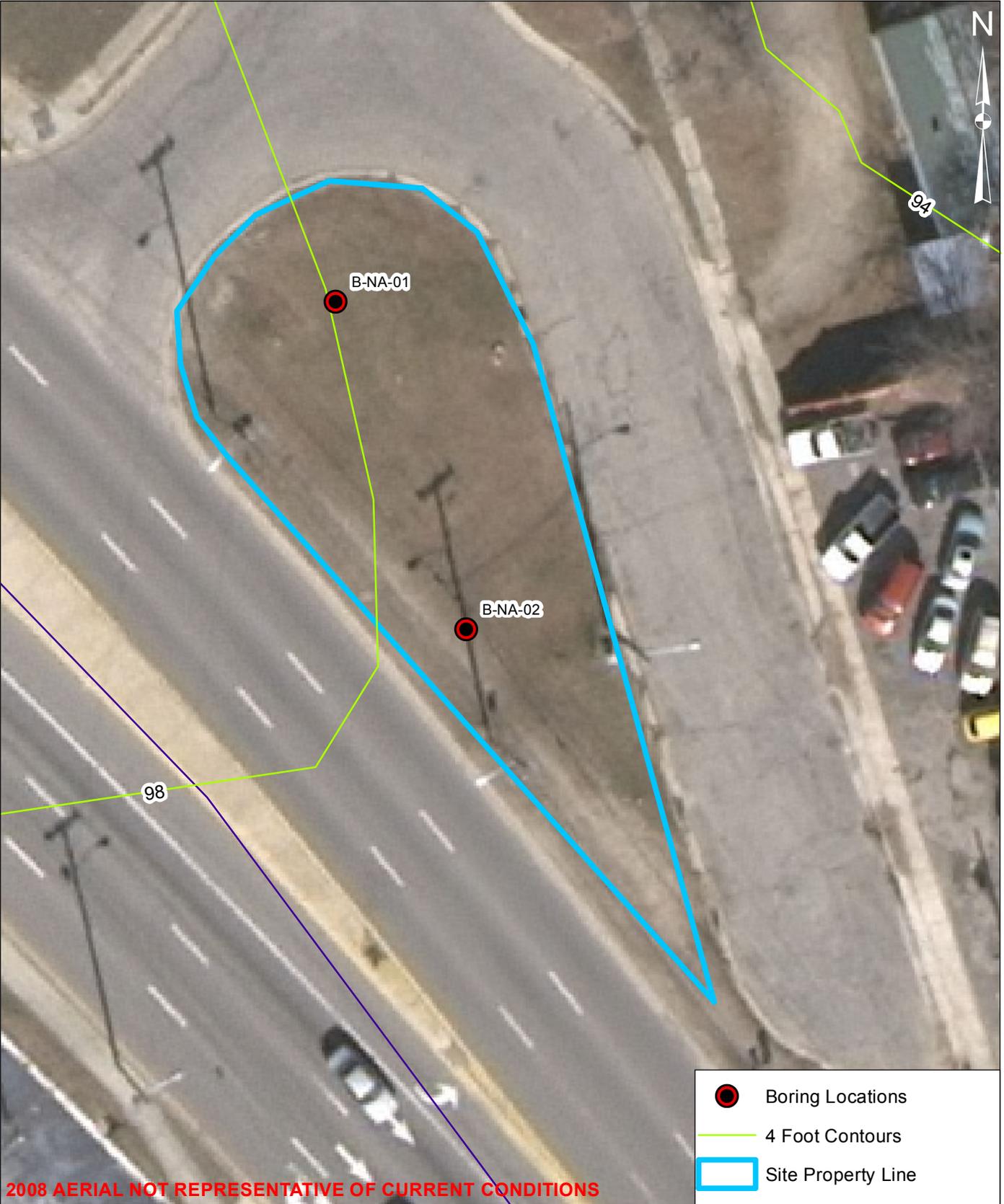
240 120 0 240 Feet
 Scale: 1:3,000



SITE PROJECT B-4490, PSA PARCELS
 CUMBERLAND COUNTY, NORTH CAROLINA
 NC DEPARTMENT OF TRANSPORTATION
 PROJECT NO. 11821014.33

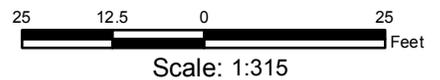
VICINITY MAP

FIGURE 1



2008 AERIAL NOT REPRESENTATIVE OF CURRENT CONDITIONS

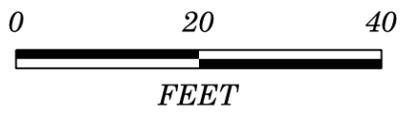
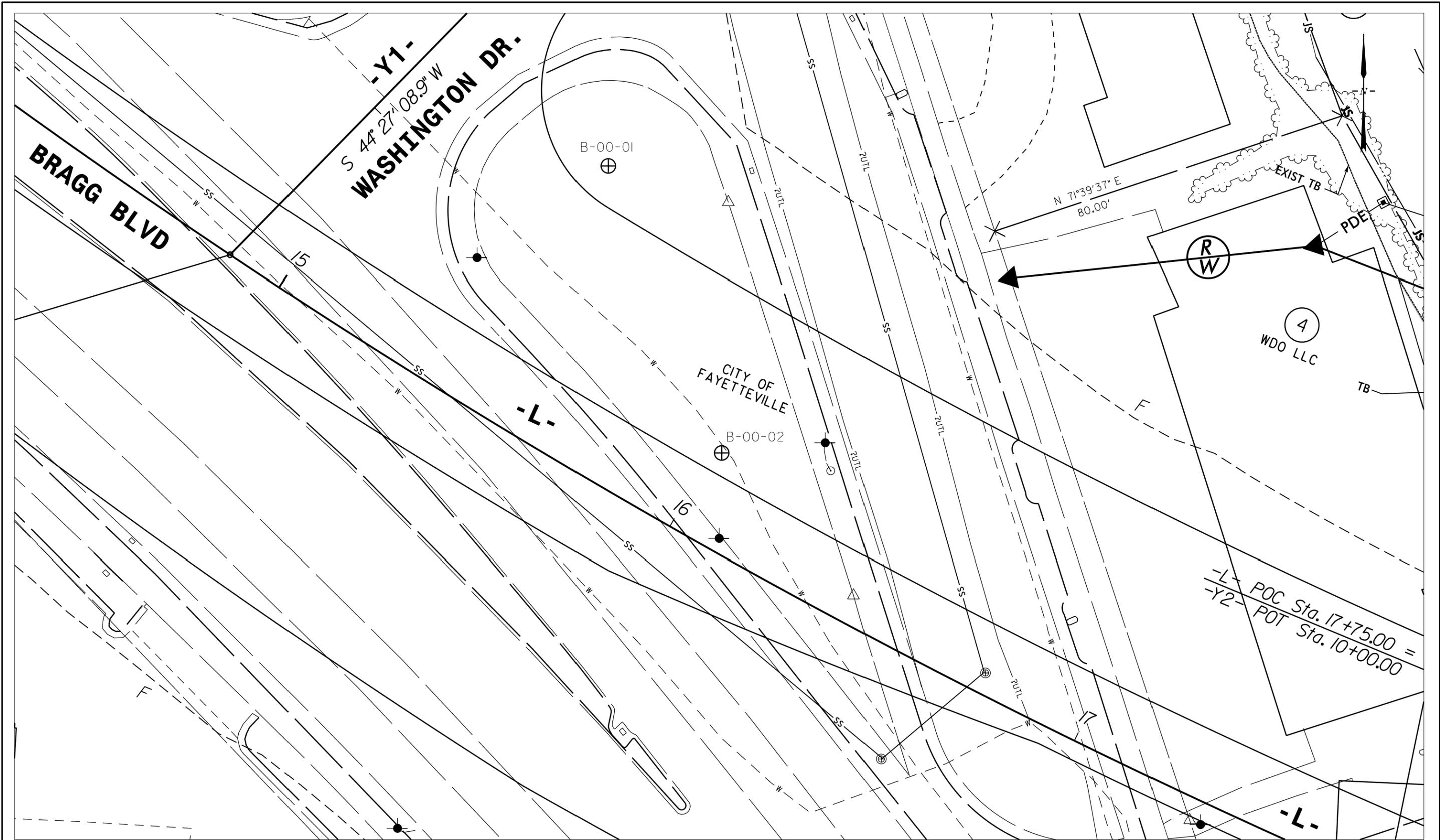
Source: 1. Cumberland County, NC, GIS Department
http://www.co.cumberland.nc.us/is_technology/gis.aspx
 Projection: NAD 1983 StatePlane North Carolina FIPS 3200 Feet



SITE PROJECT B-4490, PARCEL N/A
 CUMBERLAND COUNTY, NORTH CAROLINA
 NC DEPARTMENT OF TRANSPORTATION
 PROJECT NO. 11821014.33

SITE MAP
 PARCEL N/A

FIGURE 2



NC Department of Transportation
 Geotechnical Engineering Unit
 State Project No. B-4490
 Cumberland County, North Carolina

BORING LOCATIONS
 Parcel NA
 Figure 3

04/16/11

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	⑫③
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-----
Proposed Wetland Boundary	-----
Existing Endangered Animal Boundary	-----
Existing Endangered Plant Boundary	-----
Known Soil Contamination: Boundary or Site	☠
Potential Soil Contamination: Boundary or Site	?

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	♀
Small Mine	⊗
Foundation	□
Area Outline	□
Cemetery	⊕
Building	□
School	□
Church	⊕
Dam	▬

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	----- JS
Buffer Zone 1	----- BZ 1
Buffer Zone 2	----- BZ 2
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ CSX TRANSPORTATION MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite Marker	-----
Existing Control of Access	⊗
Proposed Control of Access	⊗
Existing Easement Line	----- E
Proposed Temporary Construction Easement	----- E
Proposed Temporary Drainage Easement	----- TDE
Proposed Permanent Drainage Easement	----- PDE
Proposed Permanent Drainage / Utility Easement	----- DUE
Proposed Permanent Utility Easement	----- PUE
Proposed Temporary Utility Easement	----- TUE
Proposed Aerial Utility Easement	----- AUE
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	----- C
Proposed Slope Stakes Fill	----- F
Proposed Curb Ramp	○ CR
Curb Cut Future Ramp	○ CCFR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	⊗

VEGETATION:

Single Tree	○
Single Shrub	○
Hedge	-----
Woods Line	-----

Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	----- CONC
Bridge Wing Wall, Head Wall and End Wall	----- CONC WW
MINOR:	
Head and End Wall	----- CONC HW
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	⊕
Storm Sewer	----- S

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	□
H-Frame Pole	●
Recorded U/G Power Line	----- P
Designated U/G Power Line (S.U.E.*)	----- P

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Booth	□
Telephone Pedestal	⊕
Telephone Cell Tower	⊗
U/G Telephone Cable Hand Hole	□
Recorded U/G Telephone Cable	----- T
Designated U/G Telephone Cable (S.U.E.*)	----- T
Recorded U/G Telephone Conduit	----- TC
Designated U/G Telephone Conduit (S.U.E.*)	----- TC
Recorded U/G Fiber Optics Cable	----- T FO
Designated U/G Fiber Optics Cable (S.U.E.*)	----- T FO

WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	----- A/G Water

TV:

TV Satellite Dish	⊕
TV Pedestal	⊕
TV Tower	⊗
U/G TV Cable Hand Hole	□
Recorded U/G TV Cable	----- TV
Designated U/G TV Cable (S.U.E.*)	----- TV
Recorded U/G Fiber Optic Cable	----- TV FO
Designated U/G Fiber Optic Cable (S.U.E.*)	----- TV FO

GAS:

Gas Valve	◇
Gas Meter	⊕
Recorded U/G Gas Line	----- G
Designated U/G Gas Line (S.U.E.*)	----- G
Above Ground Gas Line	----- A/G Gas

SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS
Designated SS Forced Main Line (S.U.E.*)	----- FSS

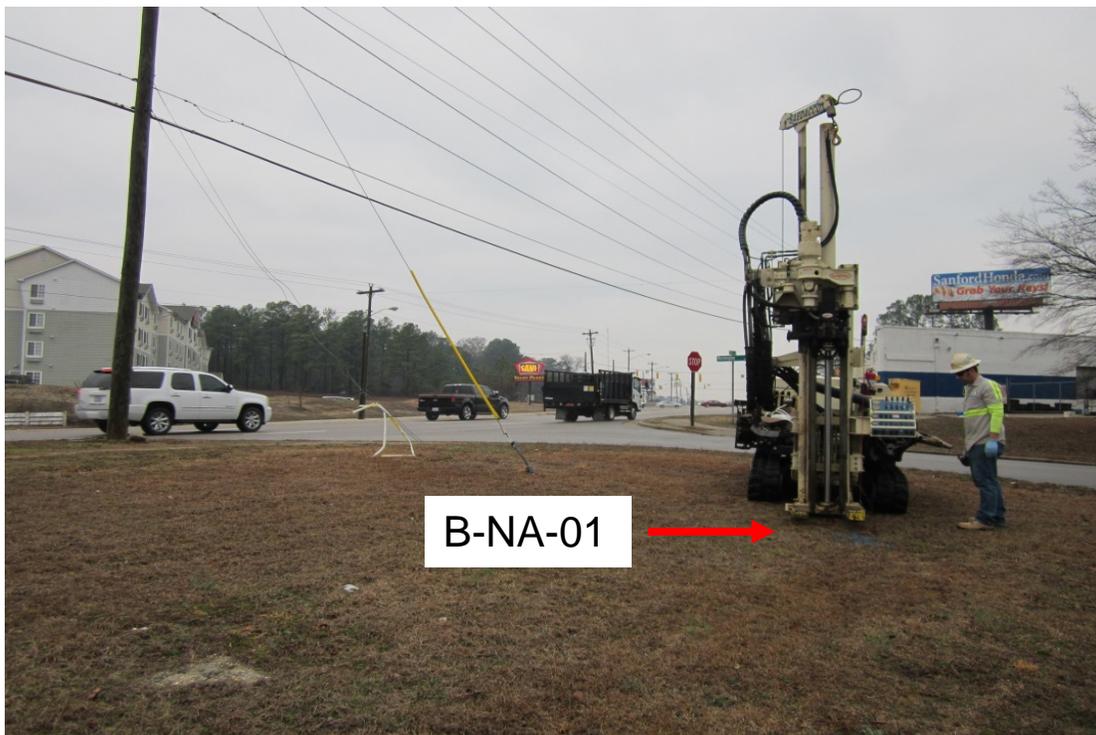
MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	----- TUL
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊕
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

APPENDIX A
PHOTOGRAPHS



Parcel N/A, facing south toward B-NA-02 and Bragg Blvd.



Parcel N/A, facing north toward B-NA-01 and Bragg Blvd.



STATE PROJECT B-4490
CUMBERLAND CO.
NORTH CAROLINA
NC DEPT. OF TRANSPORTATION
PROJECT NO. 11821014.33

SOIL BORINGS
PARCEL N/A

Figure A-1

APPENDIX B
GEOPHYSICS REPORT



March 27, 2014

Mr. Mohammed A. Mulla, P.E., CPM, MCE
NCDOT, Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

RE: State Project: B-4490
 WBS Element: 33727.1.1
 County: Cumberland
 Description: Replace Bridge No. 116 over CSX Railroad, North South Railroad, and
 Hillsboro Street on NC 24-210

Subject: Project 11821014.33, Report on Geophysical Surveys
Parcel NA, City of Fayetteville – Traffic Median Property, Fayetteville, North
Carolina

Dear Mr. Mulla:

SCHNABEL ENGINEERING SOUTH, PC (Schnabel) is pleased to present this report on the geophysical surveys we performed on the subject property. The report includes two 11x17 inch color figures and two 8.5x11 inch color figures. This study was performed in accordance with our proposal for Geophysical Surveys to Locate Possible USTs dated December 26, 2013, as approved by Terry Farr on January 24, 2014, and our agreement dated June 2, 2011. Gordon Box provided a verbal notice to proceed on January 23, 2014.

INTRODUCTION

The field work described in this report was performed on January 27, 2014, February 6, and February 10, 2014, by Schnabel. The purpose of the geophysical surveys was to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of Parcel NA (Traffic Median). Photographs of the property are included on Figure 1. The property is located in the northeast quadrant of the intersection of NC 24 (Bragg Boulevard) and Washington Drive in Fayetteville, NC.

The geophysical surveys consisted of an electromagnetic (EM) induction survey and a ground penetrating radar (GPR) survey. The EM survey was performed using a Geonics EM61-MK2 (EM61) instrument. The EM61 is a time domain metal detector that stores data digitally for later processing and review. Sensitivity to metallic objects is dependent on the size, depth, and orientation of the buried object and the amount of

noise (i.e. response from spurious metallic objects) in the area. The EM61 can generally observe a single buried 55 gallon drum at a depth of 10 feet or less. The EM61 makes measurements by creating an electromagnetic pulse and then measuring the response from metallic objects over time after the pulse is generated. We measured and recorded the response at several time increments after the pulse to help evaluate relative size and depth of metallic objects in the subsurface.

The GPR survey was performed over selected EM61 anomalies (see figures) using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna to further investigate and evaluate EM responses that could indicate a potential UST.

Photographs of the equipment used are shown on Figure 2.

FIELD METHODOLOGY

We obtained locations of geophysical data points using a sub-meter Trimble Pro-XRS differential global positioning system (DGPS). References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in US survey feet. We also recorded the locations of existing site features (signs, guy wires, etc.) with the DGPS for later correlation with the geophysical data and a site plan provided by the NCDOT. The microstation data provided by the NCDOT appears to be offset from the DGPS data we collected. The amount (approximately 5 feet) and direction (WNW – ESE) of offset appears to be consistent for all parcels where we collected data for this project.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced approximately one to two feet apart in orthogonal directions over anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

DISCUSSION OF RESULTS

The contoured EM61 data collected over Parcel NA (Median) and the GPR survey area locations are shown on Figure 3, EM61 Early Time Gate Response, and Figure 4, EM61 Differential Response. Areas outside the colored, contoured EM61 data were not surveyed. Early time data refer to the response measured at a short time after the initial EM pulse is generated. Early time data typically contain responses from all metal objects, small or large and shallow or deep, within the sensitivity range of the instrument. Differential data represent the difference in response between the top and bottom coils of the EM61 instrument at a later time after the initial pulse than early time data. Differential data naturally tend to filter out the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as USTs.

We were able to access nearly all of the planned survey area with the exception of avoiding small obstacles in various locations throughout the parcel. The EM data contain multiple anomalies that we investigated with GPR (as shown on Figures 3 and 4), all of which appear to be the result of buried utilities, reinforced concrete, or other metal objects at the ground surface or at shallow depths. The

geophysical data collected at the site do not indicate the presence of metallic USTs within the areas surveyed.

CONCLUSIONS

As shown in Figures 3 and 4, the EM data we collected over Parcel NA (Median) covered nearly all of the planned survey area. The EM data include responses from several visible metallic objects at grade (e.g. guy wires, signs, etc.). We did not observe anomalies in the EM or the GPR geophysical data at the subject property that we interpret to be the results of metallic USTs within about 6 feet of the ground surface.

LIMITATIONS

These services have been performed and this report prepared for the North Carolina Department of Transportation in accordance with generally accepted guidelines for conducting geophysical surveys. It is generally recognized that the results of geophysical surveys are non-unique and may not represent actual subsurface conditions.

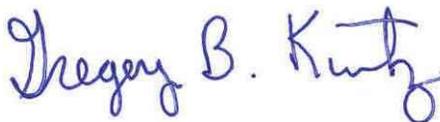
We appreciate the opportunity to have provided these services. Please call if you need additional information or have any questions.

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC



James W. Whitt, LG
Senior Staff Geophysicist



Gregory B. Kuntz, LG
Senior Associate

JWW:JCD:GBK

Attachments: Figures (4)

CC: NCDOT, Gordon Box

FILE: G:\2011-SDE-JOBS\11821014_00_NCDOT_2011_GEOTECHNICAL_UNIT_SERVICES\11821014_33_B-4490_CUMBERLAND_COUNTY\REPORT\GEOPHYSICS\PARCEL NA (MEDIAN)\SCHNABEL
GEOPHYSICAL REPORT ON PARCEL NA (MEDIAN) (B-4490).DOCX

Attachments:

- Figure 1 - Parcel NA (Median) Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - EM61 Early Time Gate Response
- Figure 4 - EM61 Differential Response



Parcel NA (City of Fayetteville – Traffic Median Property), looking east



Parcel NA (City of Fayetteville – Traffic Median Property), looking northwest



STATE PROJECT B-4490
NC DEPT. OF TRANSPORTATION
CUMBERLAND CO., NORTH CAROLINA
PROJECT NO. 11821014.33

PARCEL NA (MEDIAN)
SITE PHOTOS

FIGURE 1



Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit



GSSI SIR-3000 Ground-Penetrating Radar with 400 MHz Antenna

Note: Stock photographs – not taken on site.

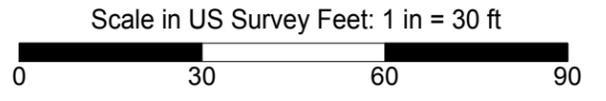
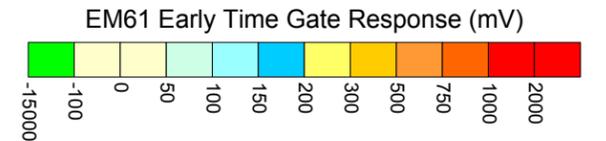
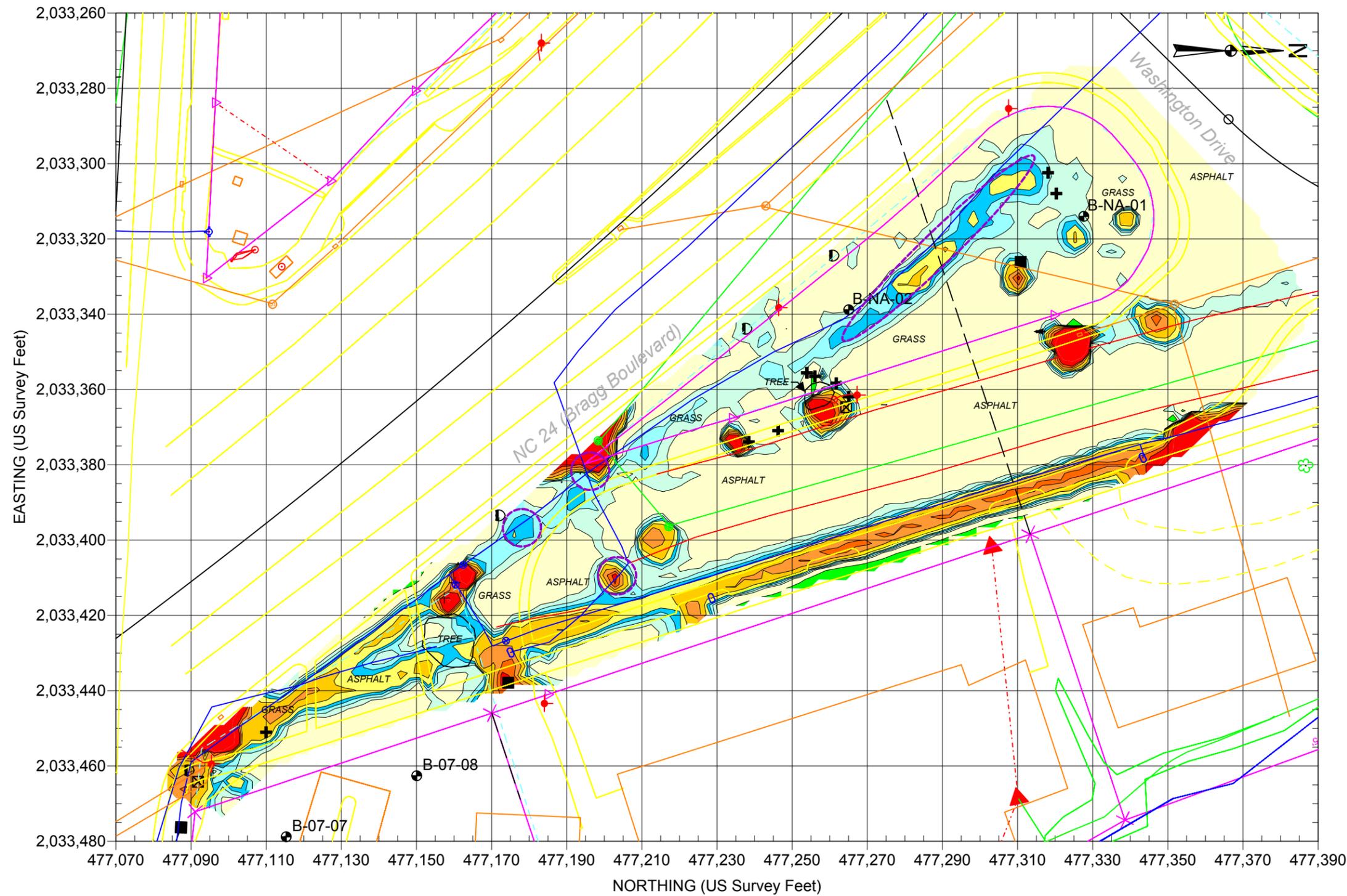


STATE PROJECT B-4490
NC DEPT. OF TRANSPORTATION
CUMBERLAND CO., NORTH CAROLINA
PROJECT NO. 11821014.33

PHOTOS OF
GEOPHYSICAL
EQUIPMENT USED

FIGURE 2

PARCEL NA (MEDIAN)



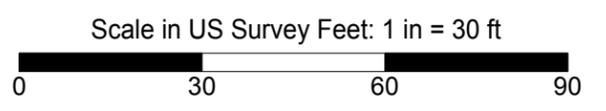
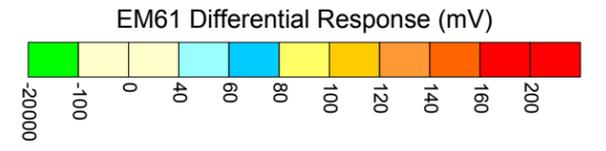
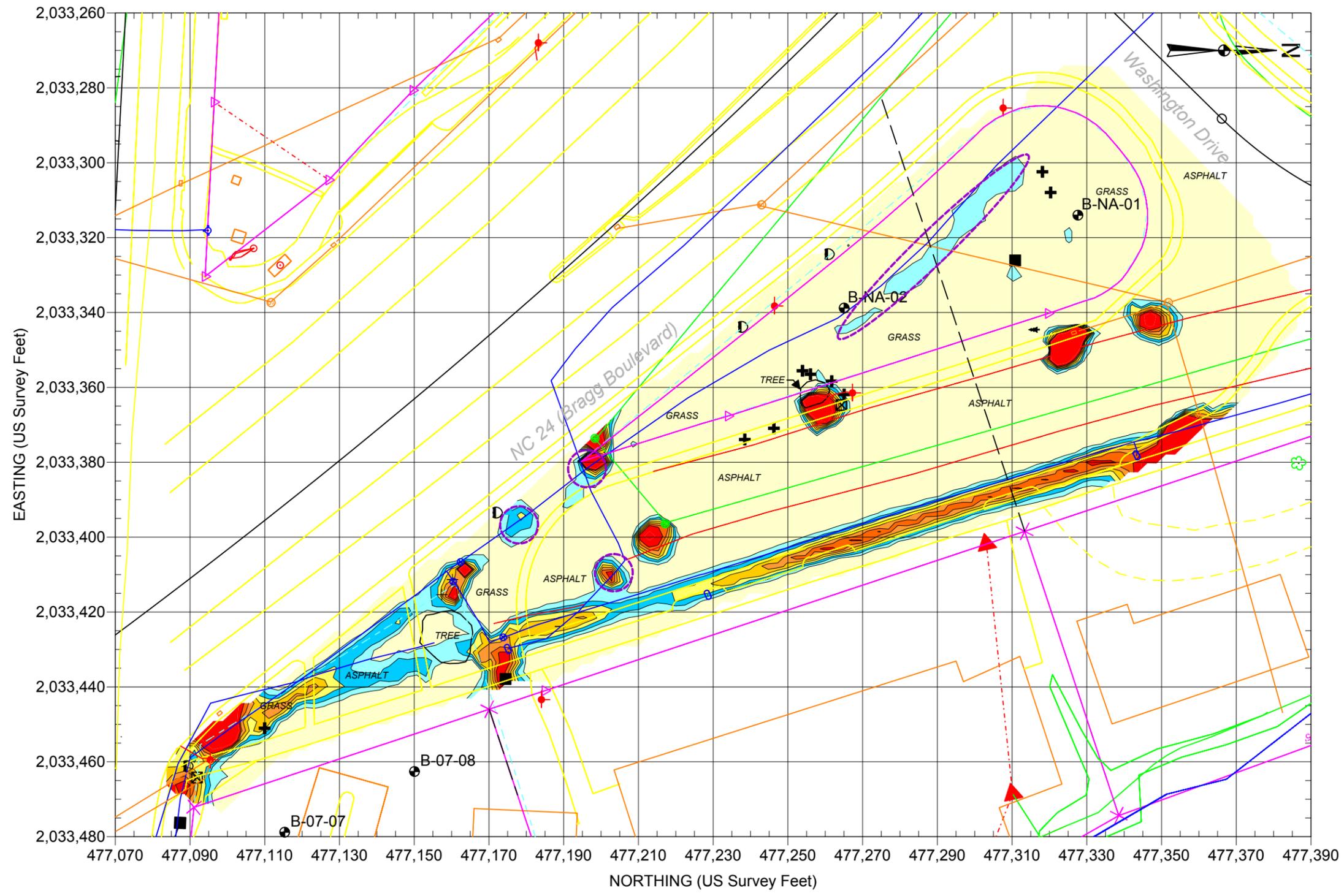
EXPLANATION	
	SIGN
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	GUY WIRE
	EDGE OF NCDOT PROPOSED RW
	PROPERTY LINE
	GPR SURVEY AREA
	BORING LOCATION

BASE PLAN FROM NCDOT FILE:
B-4490_rdy_psh05.dgn
(FOR SOME SITE FEATURES)

Note: The contour plot shows the earliest and more sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on January 27, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on February 6 and February 10, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT B-4490 NC DEPARTMENT OF TRANSPORTATION CUMBERLAND COUNTY, NC PROJECT NO. 11821014.33	EM61 EARLY TIME GATE RESPONSE FIGURE 3
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PARCEL NA (MEDIAN)



EXPLANATION	
	SIGN
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	GUY WIRE
	EDGE OF NCDOT PROPOSED RW
	PROPERTY LINE
	GPR SURVEY AREA
	BORING LOCATION

BASE PLAN FROM NCDOT FILE:
B-4490_rdy_psh05.dgn
(FOR SOME SITE FEATURES)

Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on January 27, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on February 6 and February 10, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT B-4490 NC DEPARTMENT OF TRANSPORTATION CUMBERLAND COUNTY, NC PROJECT NO. 11821014.33	EM61 DIFFERENTIAL RESPONSE FIGURE 4
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APPENDIX C
SOIL BORING LOGS



Project: Preliminary Site Assessments
Cumberland County
Fayetteville, North Carolina

Geo Probe Number: B-NA-01
Contract Number: B-4490
Sheet: 1 of 1

Contractor: Saedacco, Inc.
Fort Mill, South Carolina
Contractor Foreman: W. Hall
Schnabel Representative: B. Bradley
Equipment: Geoprobe 7822DT
Method: 3-1/4" Probe Rod,
Macrocore
Hammer Type:
Dates Started: 2/19/14 **Finished:** 2/19/14
X: 477327.625 m **Y:** 2033314 m
Ground Surface Elevation: **Total Depth:** 10.0 ft

Groundwater Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/19	8:38 AM	Moist	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DATA		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil							
	PROBABLE FILL, sampled as silty sand with clay; moist, orangeish brown						PID = 0.1 ppm	
							PID = 0.2 ppm	
		FILL			5		PID = 0.1 ppm	
							PID = 1.1 ppm	Staining and odor present
10.0					10		PID = 907 ppm	

Bottom of Geo Probe at 10.0 ft.
Boring terminated at selected depth.
Boring backfilled with bentonite and cuttings upon completion.

TEST BORING LOG PSA.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 3/27/14



Project: Preliminary Site Assessments
Cumberland County
Fayetteville, North Carolina

Geo Probe Number: B-NA-02
Contract Number: B-4490
Sheet: 1 of 1

Contractor: Saedacco, Inc.
Fort Mill, South Carolina
Contractor Foreman: W. Hall
Schnabel Representative: B. Bradley
Equipment: Geoprobe 7822DT
Method: 3-1/4" Probe Rod,
Macrocore
Hammer Type:
Dates Started: 2/19/14 **Finished:** 2/19/14
X: 477265.067 m **Y:** 2033338.812 m
Ground Surface Elevation: **Total Depth:** 10.0 ft

Groundwater Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/19	8:48 AM	Moist	---	---

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DATA		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil							
	PROBABLE FILL, sampled as silty sand with clay; moist, orangeish brown						PID = 0.2 ppm	
							PID = 1.8 ppm	
		FILL			5		PID = 0.2 ppm	
							PID = 0.2 ppm	
10.0					10		PID = 0.2 ppm	

Bottom of Geo Probe at 10.0 ft.
Boring terminated at selected depth.
Boring backfilled with bentonite and cuttings upon completion.

TEST BORING LOG PSA.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 3/27/14

APPENDIX D
SOIL BORING GPS COORDINATES

**SOIL BORING GPS COORDINATES
NCDOT B-4490, CUMBERLAND COUNTY**

Soil Boring GPS Coordinates		
Boring Identification	Easting	Northing
	X	Y
B-NA-01	2033314.000	477327.625
B-NA-02	2033338.812	477265.067

* NC State Plane 1983 System, NC 3200 Zone,
NAD 83 Datum, US Survey Feet

APPENDIX E
UVF ANALYSIS RESULTS

