



November 5, 2018

Mr. Cyrus Parker, L.G., P.E.
Geotechnical Engineering Unit
State of N.C. Department of Transportation – Division of Highways
P.O. Box 25201
Raleigh, NC 27611-5201

**RE: PRELIMINARY SITE ASSESSMENT OF PARCEL 331 – Revision 1
ESP Project No. CS34.366**

WBS: 34839.1.8
TIP: U-2579AB
County: Forsyth
Description: Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40
Business/US 421
Parcel No.: 331
Owner: NCDOT
Address: 4203 Kernersville Road, Winston-Salem, NC

Dear Mr. Parker:

ESP Associates, Inc. (ESP) is pleased to submit this report on our Preliminary Site Assessment of the subject parcel. This work was performed in accordance with your Request for Proposal dated April 17, 2018 and our Cost Proposal dated May 3, 2018.

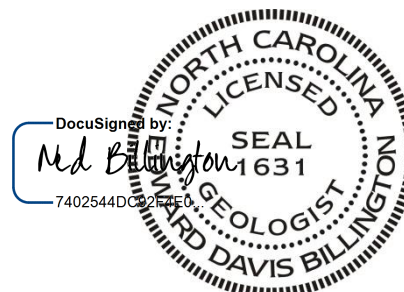
We appreciate the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

A handwritten signature in blue ink, appearing to read "Edward D. Billington".

Edward D. Billington, PG
Senior Geologist/Geophysicist
DMN/EDB/CJW



not considered Final unless all signatures are completed

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning to construct the Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40 Business/US 421 (Figure 1). The NCDOT requested that ESP Associates, Inc. (ESP) perform a Preliminary Site Assessment (PSA) of Parcel 331 to locate possible underground storage tanks (USTs), sample soil, and delineate potential contaminated soil.

2.0 HISTORY

This parcel has been acquired by the NCDOT and is currently occupied by a vacant lot. The facility is listed in the North Carolina Department of Environmental Quality's (NCDEQ's) UST Section Registry with Facility ID #: 0-016674. Two USTs were reportedly removed in 1975.

3.0 SITE OBSERVATIONS

During our May 2018 field work, the site was a vacant lot (Figure 2). The ground in the study area was covered by gravel and grass.

4.0 METHODS

ESP performed a geophysical study of the area designated by the NCDOT on May 21, 2018. We performed direct-push drilling and sampling of subsurface soils within the proposed easement on September 7, 2018. A photoionization detector (PID) was used to screen subsurface soils in the field and select soil samples to send for laboratory analysis.

4.1 Geophysics

ESP performed a metal detector study over the accessible areas of the site using a Geonics EM61 MK2 with a line spacing of about three feet (Figures 3 and 4). Location control was provided in real-time using a differential global positioning system (DGPS). We collected ground-penetrating radar (GPR) data over selected EM61 anomalies using our Sensors and Software Noggin 250 GPR system. The GPR data were collected using a line spacing of one to two feet.

4.2 Borings

ESP performed direct-push drilling activities within the easement of Parcel 331 using a subcontractor, SAEDACCO of Fort Mill, South Carolina. Five borings were drilled, designated B331-1 through B331-5 (Figure 3). The soil borings were advanced using a GeoProbe 7822DT drill rig. Continuous soil samples were obtained to a depth of approximately ten feet using five-foot long Macro Cores®. Soil cores had a recovery of four to five feet. The sampling equipment was decontaminated prior to drilling and between borings by the driller using a Liquinox® detergent solution.

4.3 Soil Sample Protocol

Representative soil samples were taken from the Macro-Core tubes at approximate one-foot intervals by the ESP field geologist while wearing nitrile disposable gloves. Each sample was placed in a sealed plastic bag and then kept in a sunny area for at least 5 minutes prior to measuring volatile organic compound (VOC) levels in the head space with the PID. All of the soil samples obtained had a PID reading of less than 10 parts per million (ppm) (Table 1).

Soil samples selected for laboratory analysis were Sample S-9 (corresponding depth of 9.0-9.5 feet) from all borings. For each selected sample, an approximate 10-gram soil sample was collected from the Macro-Core tube using a Terra Core Sampler and placed into a laboratory-supplied 40-milliliter volatile organic analysis (VOA) vial containing methanol. Once sealed, the vial was labeled with the sample identification number and then shaken vigorously for about one minute. The samples were packed on ice and sent via overnight delivery to RED Lab, LLC (RED Lab), located in Wilmington, North Carolina, following proper chain-of-custody procedures (Appendix C).

RED Lab used a QED Hydrocarbon Analyzer to quantitatively analyze the soil samples using the ultraviolet fluorescence (UVF) method for benzene, toluene, ethylbenzene, and xylene (BTEX); gasoline range organics (GRO); diesel range organics (DRO); total petroleum hydrocarbons (TPH); total aromatics; polycyclic aromatic hydrocarbons (PAHs); and benzo(a)pyrene (BaP).

4.4 Groundwater

Groundwater was not encountered in the five borings drilled on the site.

5.0 RESULTS

5.1 Geophysics

The EM61 early time gate data show the response from both shallow and deeper metallic objects (Figure 3). The differential response reduces the effect of shallow anomalies and emphasizes anomalies from larger and more deeply buried metallic objects, such as USTs (Figure 4). The EM61 differential results indicated one anomaly (response above background) that did not correspond to known site features.

GPR data were collected over the EM61 anomaly. The GPR data collected did not indicate the presence of unknown USTs within the study area.

The EM61 early time gate response and differential response are shown on the plan sheet on Figures 5 and 6, respectively.

5.2 Sample Data

The soil sample UVF hydrocarbon analysis results for BTEX, GRO, DRO, and PAHs are presented in Table 2. The RED Lab laboratory report, which includes results for TPH, total aromatics, and BaP, is provided in Appendix B. Values are provided in milligrams per kilogram (mg/kg or ppm).

5.3 Sample Observations

The results of the laboratory testing indicated that BTEX, GRO, DRO, and PAHs were below the detection limits for all samples.

6.0 CONCLUSIONS

6.1 Interpretation of Results

The results of the PSA for Parcel 331 of NCDOT Project U-2579AB do not indicate the presence of abandoned USTs. No petroleum hydrocarbon soil contamination at or above NCDEQ action levels was detected on Parcel 331.

6.2 Geophysics

The geophysical data do not indicate the presence of abandoned USTs.

6.3 Soil

The results of the PID field screening readings and off-site UVF hydrocarbon analyses do not indicate the presence of contaminated soil at or above the NCDEQ action levels within the study area on Parcel 331 (Figure 7).

7.0 RECOMMENDATIONS

No limitations on construction activities or special handling of excavated soil are recommended for Parcel 331.

8.0 LIMITATIONS

ESP's professional services have been performed, findings obtained, and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. ESP is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report.

The passage of time may result in a change in the environmental characteristics at this site and surrounding properties. ESP does not warrant against future operations or conditions, or against operations or conditions present of a type or at a location not investigated. ESP does not assume responsibility for other environmental issues that may be associated with the subject site.

TABLES

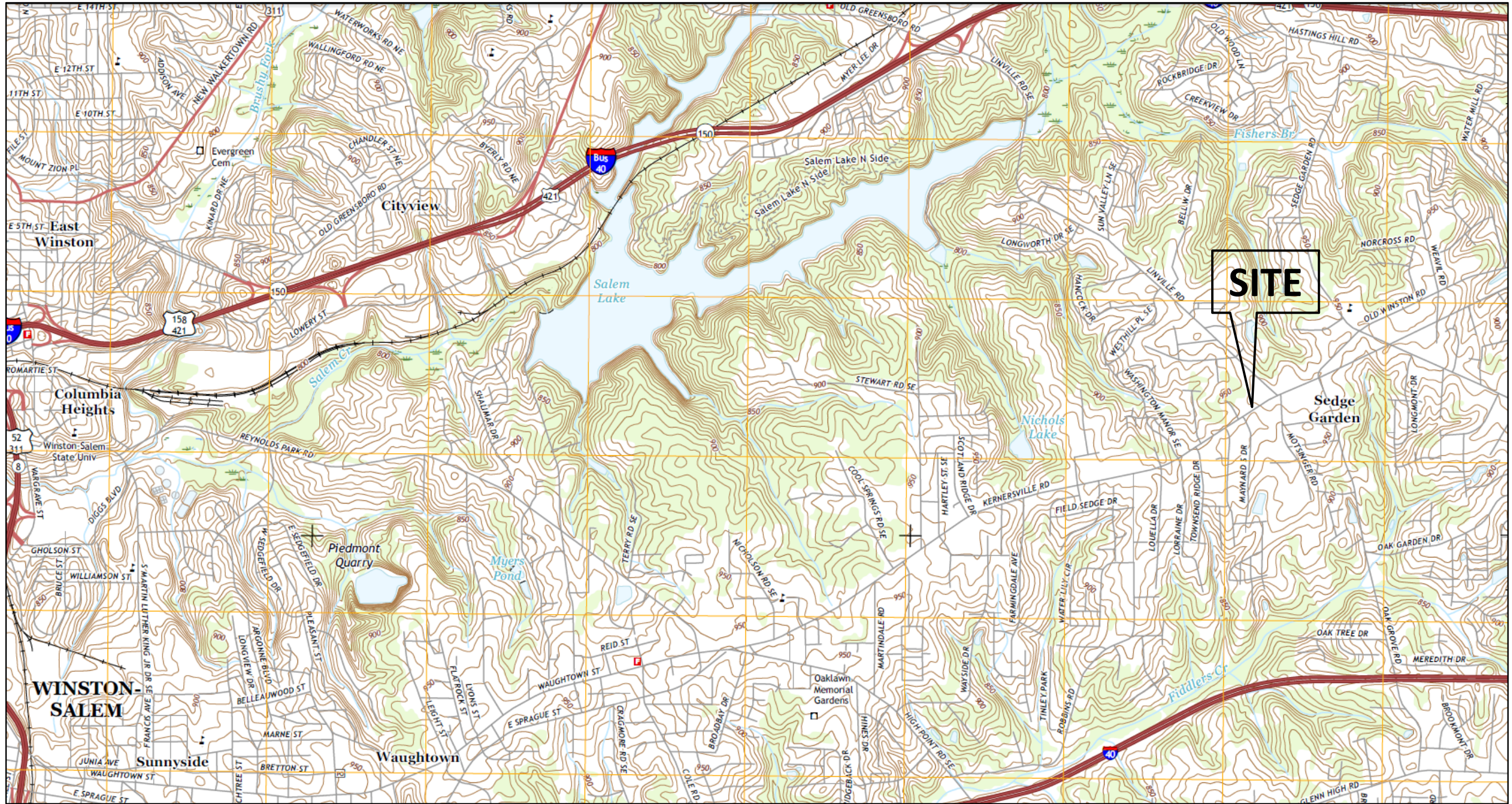
TABLE 1
SOIL SAMPLE PID READINGS

Boring	Sample Depth Range with PID > 10 ppm (feet bgs)	Maximum PID Reading (ppm) and Sample Depth (feet bgs)
B331-1	none	4.1 (5.0-5.5)
B331-2	none	4.6 (2.0-2.5)
B331-3	none	4.7 (7.0-7.5)
B331-4	none	4.8 (7.0-7.5)
B331-5	none	3.9 (2.0-2.5)

TABLE 2
SOIL SAMPLE UVF RESULTS SUMMARY

Boring	Sample ID (depth in feet bgs)	Date Collected	BTEX (C6-C9) (mg/kg)	GRO (C5-C10) (mg/kg)	DRO (C10-C35) (mg/kg)	PAHs (mg/kg)
B331-1	S-9 (9.0-9.5)	9/10/18	<0.53	<0.53	<0.53	<0.17
B331-2	S-9 (9.0-9.5)	9/10/18	<0.49	<0.49	<0.49	<0.16
B331-3	S-9 (9.0-9.5)	9/10/18	<0.47	<0.47	<0.47	<0.15
B331-4	S-9 (9.0-9.5)	9/10/18	<0.31	<0.31	<0.31	<0.1
B331-5	S-9 (9.0-9.5)	9/10/18	<0.38	<0.38	<0.38	<0.12

FIGURES



From: USGS US Topo 7.5 - minute map for WINSTON-SALEM EAST, NC Date: 2016, Scale: 1:24,000

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

**FIGURE 1 – PARCEL 331, NCDOT
SITE VICINITY MAP**

**U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA**



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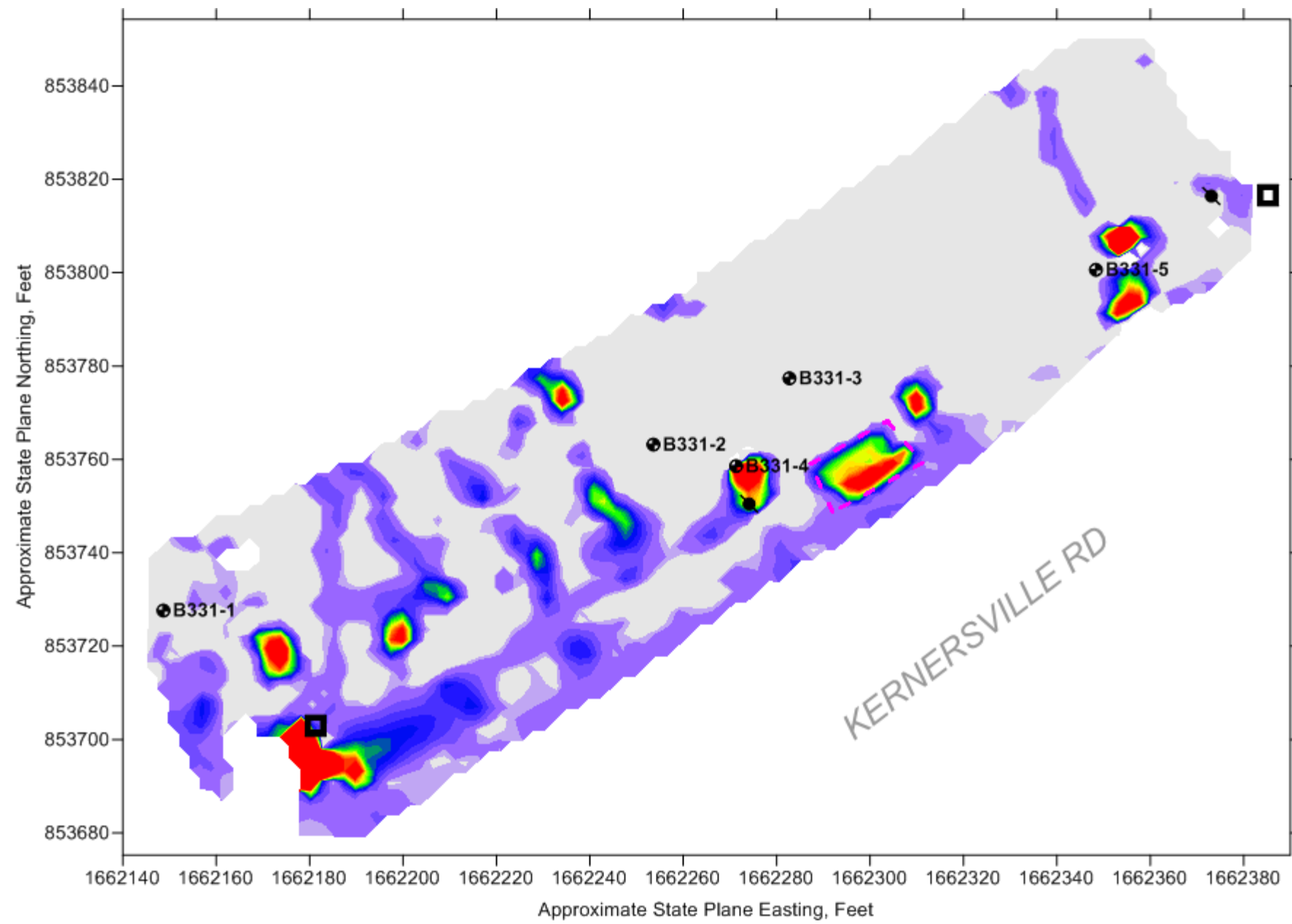


a. Photo from northeast side of site looking southwest.



b. Photo from southwest side of site looking northeast.

PROJECT NO. CS34.366	FIGURE 2 – PARCEL 331, NCDOT SITE PHOTOGRAPHS	U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421 FORSYTH COUNTY, NORTH CAROLINA	 ESP	7011 Albert Pick Rd., Suite E Greensboro, NC 27409
SCALE AS SHOWN				336.334.7724
DATE 11/6/18				www.espassociates.com
BY DMN				



EXPLANATION

- Miscellaneous metal object (pipe, debris, etc.)
- Power pole
- EM61 Data Collection Areas
- GPR Data Collection Areas
- Approximate soil boring location

Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

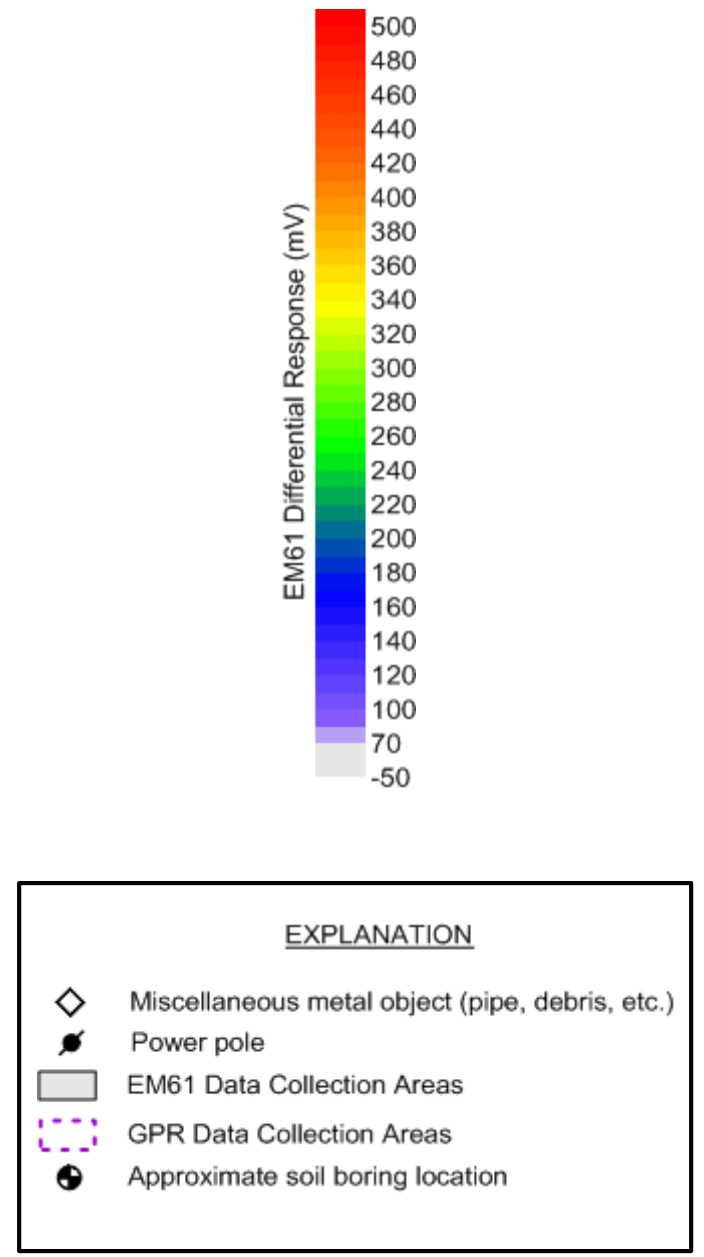
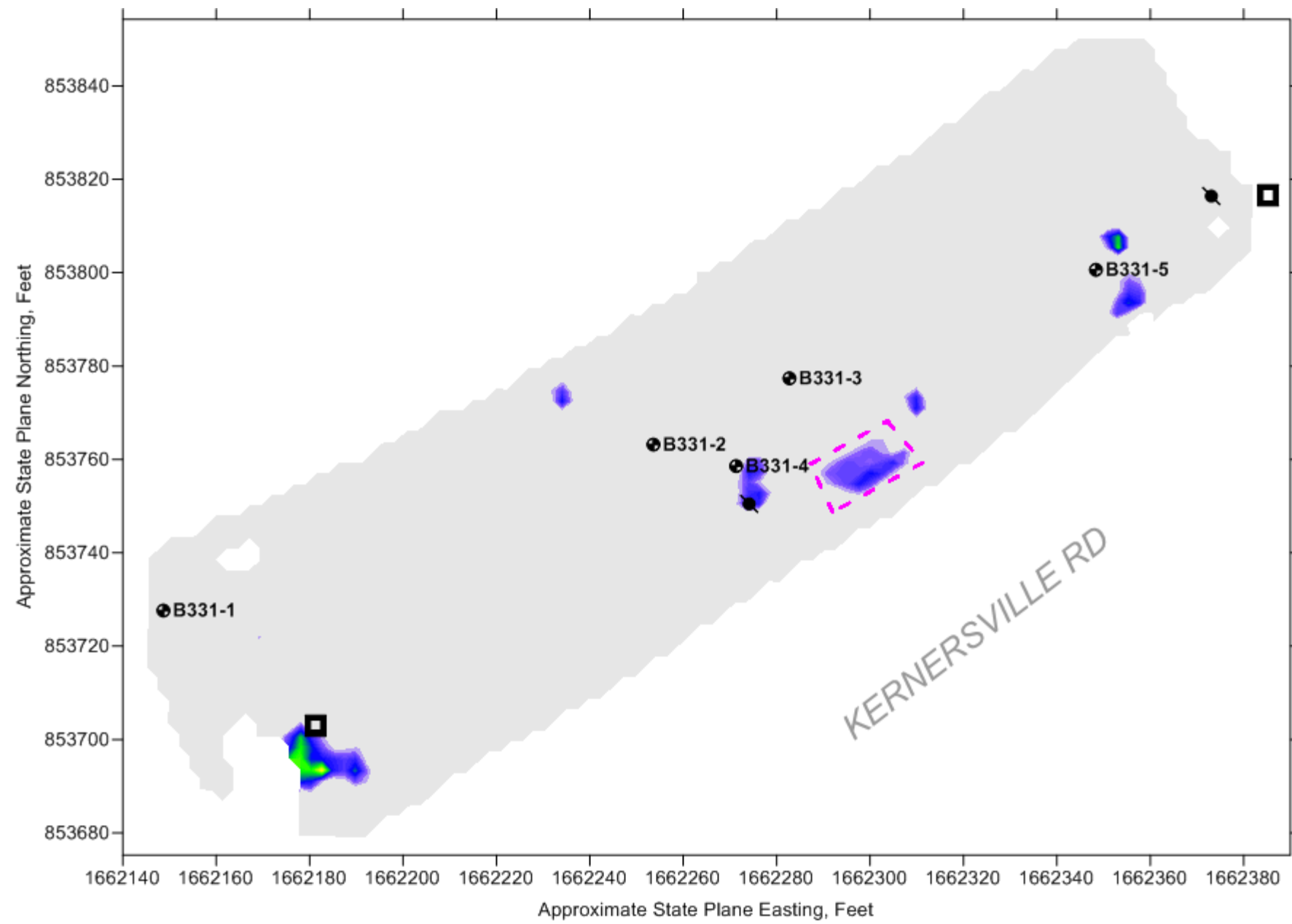
PROJECT NO.	CS34.366
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DATE	11/6/18
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FIGURE 3 – PARCEL 331, NCDOT
EM61 EARLY TIME GATE RESPONSE

*U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
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Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

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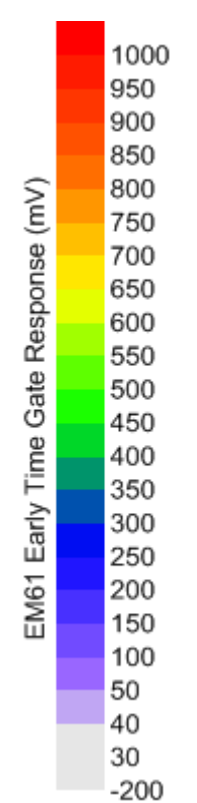
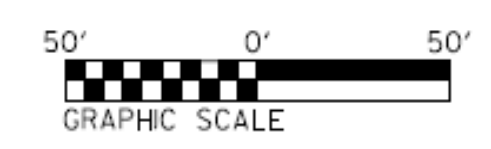
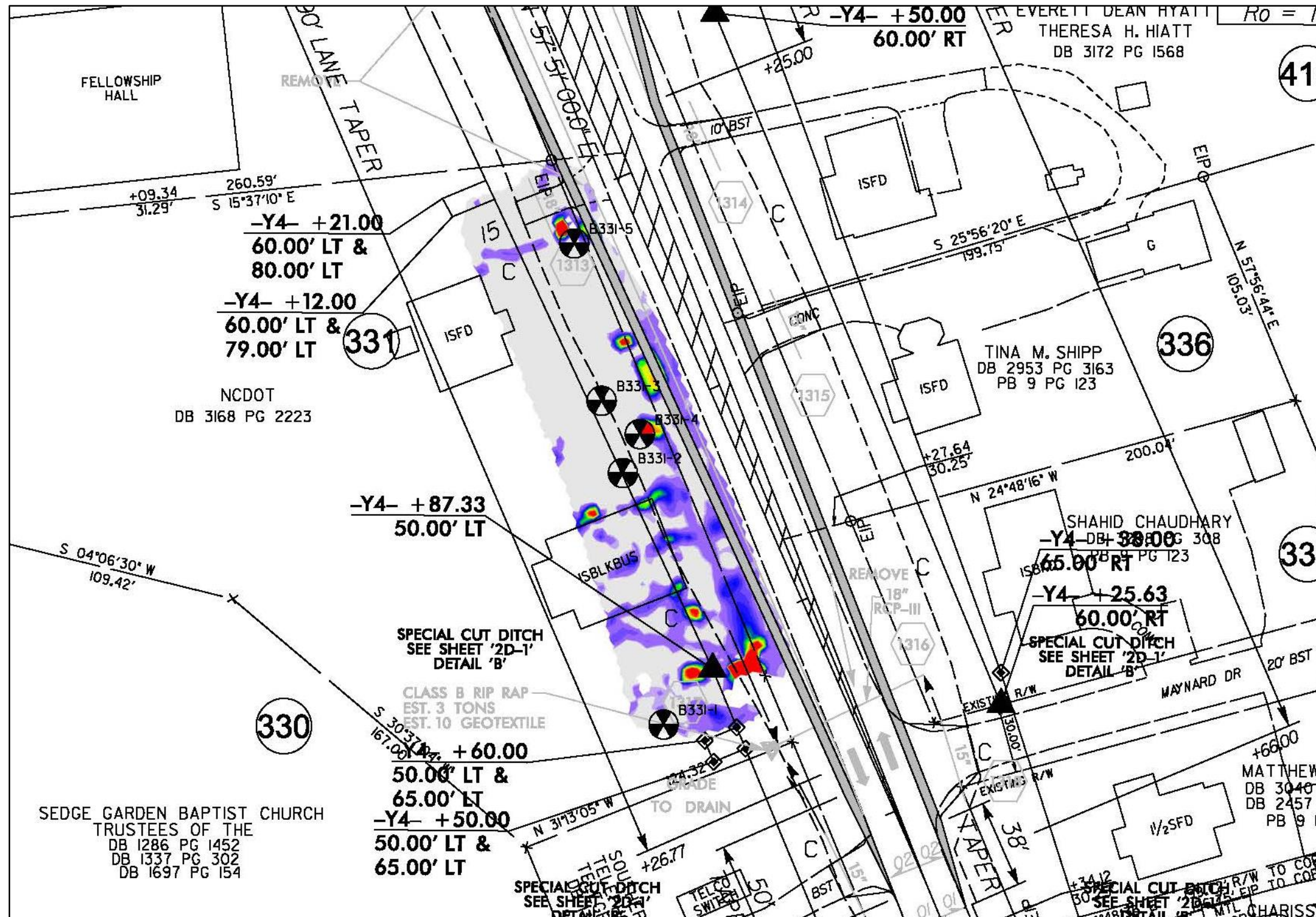
**FIGURE 4 – PARCEL 331, NCDOT
EM61 DIFFERENTIAL RESPONSE**

*U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
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List of NCDOT reference files

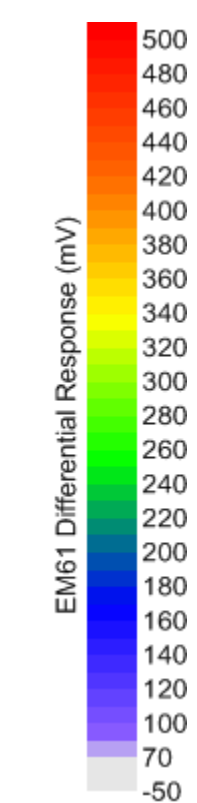
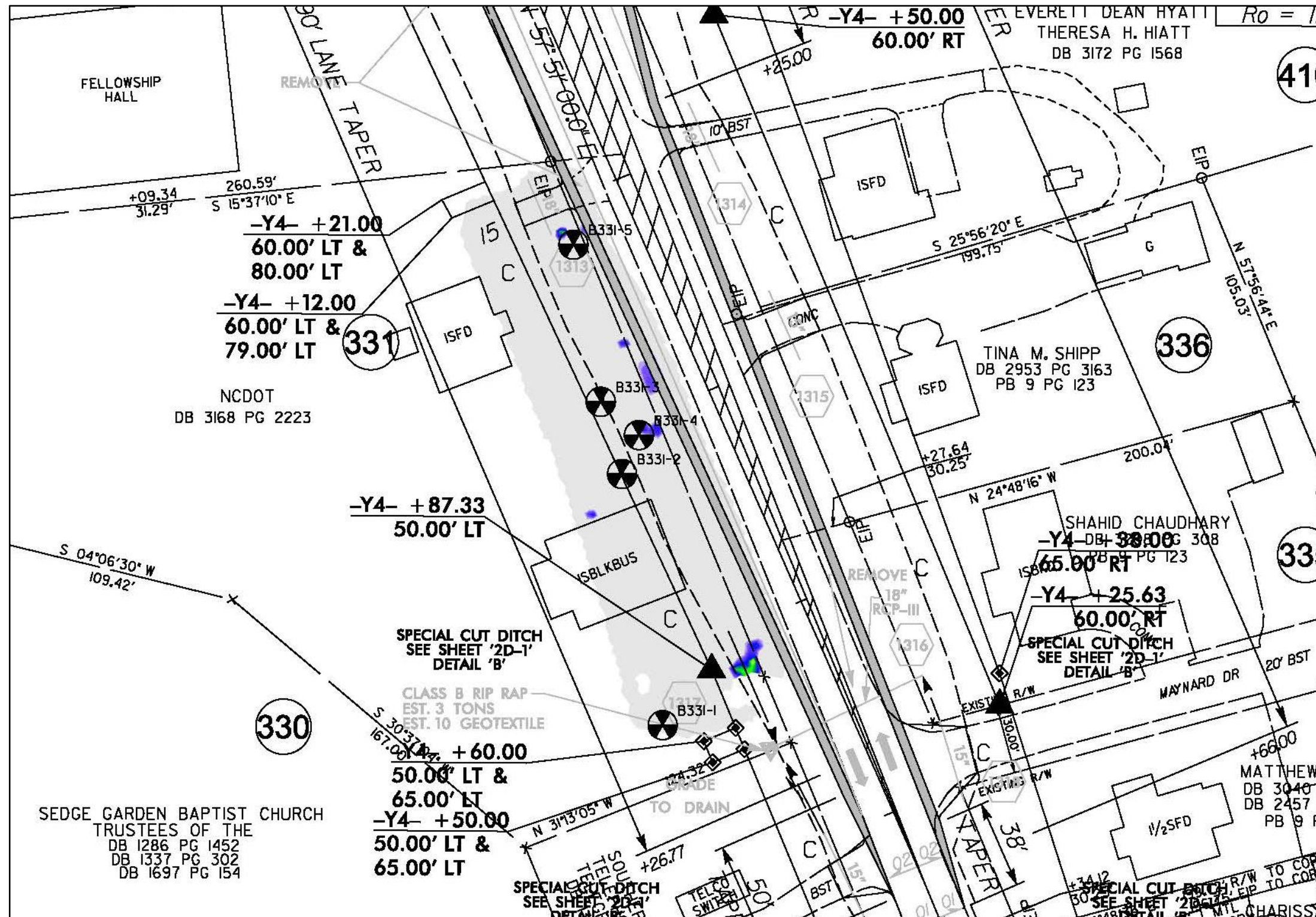
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- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

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DATE	11/6/18
BY	DMN
FIGURE 5 – PARCEL 331, NCDOT EM61 EARLY TIME GATE RESPONSE ON PLAN SHEET	
U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421 FORSYTH COUNTY, NORTH CAROLINA	

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- List of NCDOT reference files
- u2579ab_rdy_dsn.dgn
 - SS, u2579ab_rdy_ss.dgn
 - ROW, u2579ab_rdy_row.dgn
 - FinalSurvey\U2579AB_ncdot_fs.dgn
 - U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

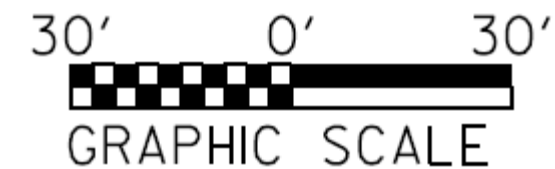
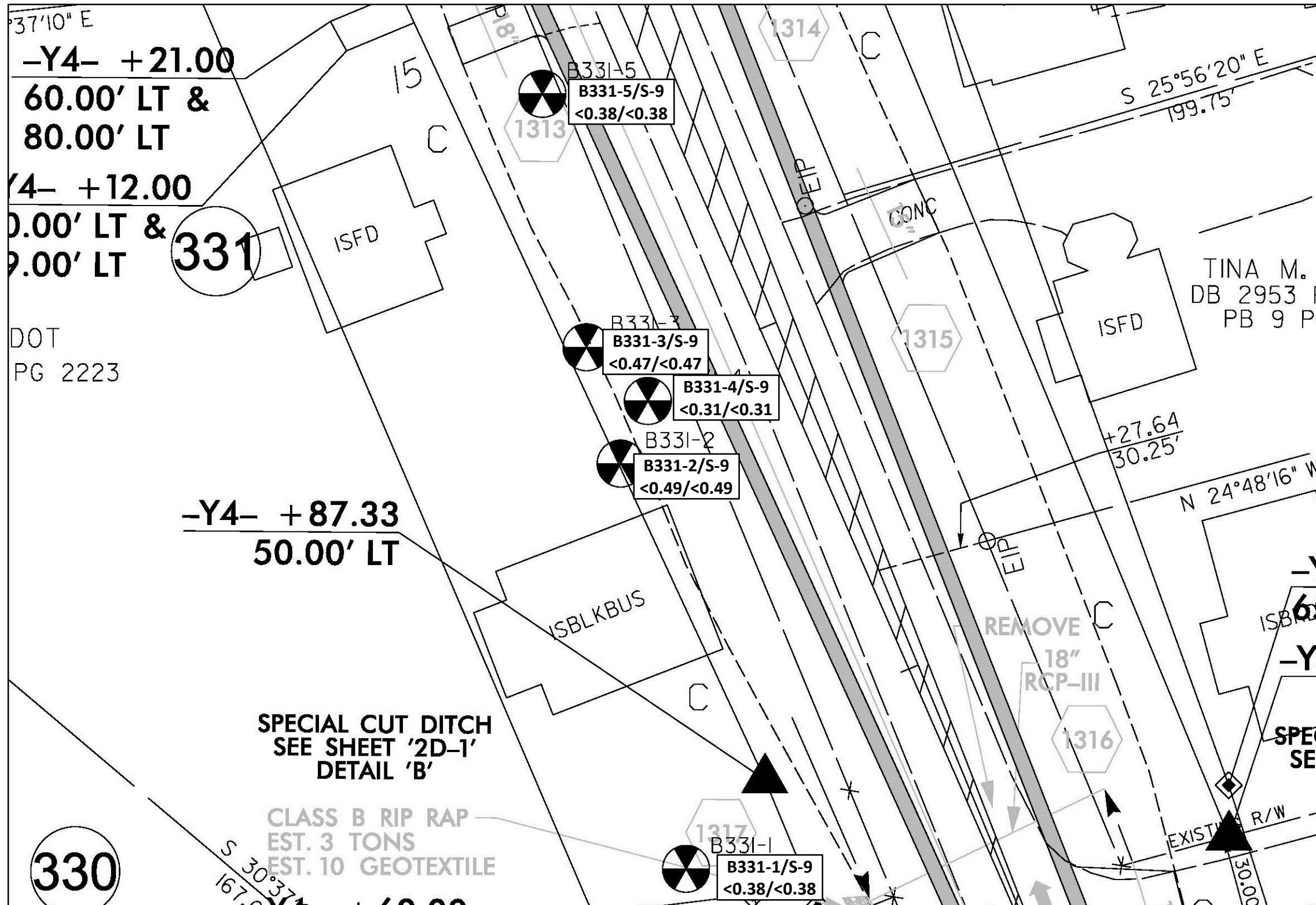
FIGURE 6- PARCEL 331, NCDOT
EM61 DIFFERENTIAL RESPONSE ON PLAN SHEET

U-2579AB, WINSTON SALEM - NORTHERN BELTWAY EASTERN SECTION
 (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
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Explanation	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> B331-1/S-9 <0.38/<0.38 </div>	Maximum Analytical Results per Boring Boring No./Sample No. GRO/DRO (mg/kg, ppm)

List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	1" = 30'
DATE	11/6/18
BY	DMN

**FIGURE 7 – PARCEL 331, NCDOT
SOIL ANALYTICAL RESULTS ON PLAN SHEET**

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
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STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale *S.U.E. = Subsurface Utility Engineering

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
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	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

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	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
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 RW Marker	
Proposed Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	
Proposed Temporary Construction Easement	
Proposed Temporary Drainage Easement	
Proposed Permanent Drainage Easement	
Proposed Permanent Drainage / Utility Easement	
Proposed Permanent Utility Easement	
Proposed Temporary Utility Easement	
Proposed Aerial Utility Easement	
Proposed Permanent Easement with Iron Pin and Cap Marker	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
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	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

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	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

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

PROJECT NO.	CS34.366
SCALE	N/A
DATE	11/6/18
BY	DMN

**FIGURE 8
LEGEND FOR PLAN SHEET FIGURES**

**U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA**



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APPENDIX A
SOIL BORING LOGS



FIELD BORING LOG

BORING NO.

B331-1

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: SW corner of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/7/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/7/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.5 Topsoil	Core 1 Rec 4.0/5.0'
1	S-1	1.0-1.5	0.3	0.5-8.3 Red-brown sandy silt	
2	S-2	2.0-2.5	0.1		
3	S-3	3.0-3.5	1.0		
4	S-4	No Rec	N/A		Core 2 Rec 5.0/5.0'
5	S-5	5.0-5.5	4.1		
6	S-6	6.0-6.5	2.2		
7	S-7	7.0-7.5	2.4		
8	S-8	8.0-8.5	1.9	8.3-10.0 Tan-gray sandy silt	
9	S-9	9.0-9.5	0.9		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B331-2

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Center of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/7/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/7/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.7 Gravel	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	4.0	0.7-3.4 Orange-red silty clay	
2	S-2	2.0-2.5	4.6		
3	S-3	3.0-3.5	4.0		
				3.4-10.0 Red-brown sandy, clayey silt	
4	S-4	4.0-4.5	3.7		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	3.6		
6	S-6	6.0-6.5	2.5		
7	S-7	7.0-7.5	4.0		
8	S-8	8.0-8.5	4.3		
9	S-9	9.0-9.5	3.6		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B331-3

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Center of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/7/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/7/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.5 Gravel	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	2.9	0.5-3.1 Orange-red silty clay	
2	S-2	2.0-2.5	3.4		
3	S-3	3.0-3.5	3.8		
				3.1-10.0 Red-brown sandy, clayey silt	
4	S-4	4.0-4.5	4.5		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	3.0		
6	S-6	6.0-6.5	3.6		
7	S-7	7.0-7.5	4.7		
8	S-8	8.0-8.5	3.5		
9	S-9	9.0-9.5	4.1		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B331-4

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Center of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/7/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/7/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Gravel	Core 1 Rec 5.0/5.0'
1	S-1	1.0-1.5	2.4	0.3-3.7 Orange-red silty clay	
2	S-2	2.0-2.5	3.3		
3	S-3	3.0-3.5	3.0		
				3.7-10.0 Orange-red sandy, clayey silt	
4	S-4	4.0-4.5	2.3		Core 2 Rec 5.0/5.0'
5	S-5	5.0-5.5	2.6		
6	S-6	6.0-6.5	3.8		
7	S-7	7.0-7.5	4.8		
8	S-8	8.0-8.5	3.7		
9	S-9	9.0-9.5	3.4		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B331-5

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: NW Corner of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/7/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/7/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Topsoil	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	3.3	0.3-3.5 Orange-red silty clay	
2	S-2	2.0-2.5	3.9		
3	S-3	3.0-3.5	3.5		
				3.5-8.3 Red-brown sandy, clayey silt	
4	S-4	4.0-4.5	3.5		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	2.8		
6	S-6	6.0-6.5	2.6		
7	S-7	7.0-7.5	3.1		
8	S-8	8.0-8.5	3.8	8.3-10.0 Tan-gray silty sand	
9	S-9	9.0-9.5	3.2		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis

APPENDIX B

RED LAB LABORATORY TESTING REPORT



Hydrocarbon Analysis Results

Client: ESP ASSOCIATES, INC
Address: 7011 ALBERT PICK ROAD
 SUITE E
 GREENSBORO NC 27409

Samples taken Monday, September 10, 2018
Samples extracted Monday, September 10, 2018
Samples analysed Wednesday, September 12, 2018

Contact: DILLON NANCE

Operator NICK HENDRIX

Project: U-2579 AB

U00904

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	B331-5 (S-9)	15.1	<0.38	<0.38	<0.38	<0.38	<0.08	<0.12	<0.015	0	100	0	,(FCM),(P)
s	B331-4 (S-9)	12.3	<0.31	<0.31	<0.31	<0.31	<0.06	<0.1	<0.012	0	0	0	,(FCM)
s	B331-3 (S-9)	18.7	<0.47	<0.47	<0.47	<0.47	<0.09	<0.15	<0.019	0	0	0	,(FCM),(P)
s	B331-2 (S-9)	19.4	<0.49	<0.49	<0.49	<0.49	<0.1	<0.16	<0.019	0	0	0	,(FCM)
s	B331-1 (S-9)	21.2	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	,(FCM)
s	B352-3 (S-9)	37.8	<0.95	<0.95	<0.95	<0.95	<0.19	<0.3	<0.038	0	100	0	,(FCM),(P)
s	B352-2 (S-8)	15.4	<0.38	<0.38	1.6	1.6	0.83	<0.12	<0.015	0	56.6	43.4	Deg.PHC 53.1%,(FCM),(BO)
s	B352-1 (S-9)	17.3	<0.43	1.7	<0.43	1.7	0.43	<0.14	<0.017	91.4	4.9	3.7	V.Deg.PHC 60.6%,(FCM),(BO)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

100.8 %

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**

APPENDIX C
CHAIN-OF-CUSTODY FORM

Client Name: ESP Associates, Inc.
 Address: 7011 Albert Pick Rd. Ste E
Greensboro, NC 27409
 Contact: Dillon Nance
 Project Ref.: U-2579 AB
 Email: d.nance@espsociates.com
 Phone #: 336-404-3117
 Collected by: D. Nance



RAPID ENVIRONMENTAL DIAGNOSTICS
CHAIN OF CUSTODY AND ANALYTICAL
REQUEST FORM

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

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

Sample Collection Date/Time	TAT Requested		Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour							
9/10/18		✓	S	B331-5 S-9	✓		49.2	43.9	5.3
				B331-4 S-9			52.7	45.6	8.1
				B331-3 S-9			51.6	44.1	7.5
				B331-2 S-9			53.0	45.8	7.2
				B331-1 S-9			52.0	45.4	6.6
				B352-3 S-9		47.4	52.7	43.7	3.7
				B352-2 S-9			52.8	43.7	9.1
				B352-1 S-9			51.9	43.8	8.1
				B342-6 S-3			49.8	44.4	5.4
				B342-5 S-9			52.2	44.1	8.1
				B342-4 S-5			51.8	44.4	6.9
				B342-4 S-9			52.0	44.0	8.0
				B342-3 S-9			52.1	44.4	7.7
				B342-2 S-9			50.7	43.7	7.0
				B342-1 S-9			50.1	43.9	6.2
				B54-1 S-9			51.0	44.1	6.9
				B54-2 S-8			51.2	43.5	7.7
				B54-3 S-9			51.9	44.0	7.9
				B54-4 S-7			49.8	44.3	5.5
				B54-5 S-9			51.2	44.3	

Comments: ***most samples underweight. Soil matrix representation affected - data results largely unaffected. (NH 9/12)**

RED Lab USE ONLY

Relinquished by <u>D. Nance</u>	Date/Time <u>9/10/18 16:00</u>	Accepted by <u>NH</u>	Date/Time <u>9/12 11:00</u>
Relinquished by	Date/Time	Accepted by	Date/Time



November 5, 2018

Mr. Cyrus Parker, L.G., P.E.
Geotechnical Engineering Unit
State of N.C. Department of Transportation – Division of Highways
P.O. Box 25201
Raleigh, NC 27611-5201

**RE: PRELIMINARY SITE ASSESSMENT OF PARCEL 342– Revision 1
ESP Project No. CS34.366**

WBS: 34839.1.8
TIP: U-2579AB
County: Forsyth
Description: Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40
Business/US 421
Parcel No.: 342
Owner: Taylor Family Properties
Address: 4401 Kernersville Road, Winston-Salem, NC

Dear Mr. Parker:

ESP Associates, Inc. (ESP) is pleased to submit this report on our Preliminary Site Assessment of the subject parcel. This work was performed in accordance with your Request for Proposal dated April 17, 2018 and our Cost Proposal dated May 3, 2018.

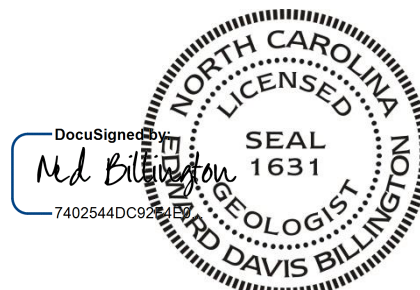
We appreciate the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

A handwritten signature in blue ink, appearing to read "Edward D. Billington".

Edward D. Billington, PG
Senior Geologist/Geophysicist
DMN/EDB/CJW



not considered Final unless all signatures are completed

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Appendix A	Soil Boring Logs
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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning to construct the Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40 Business/US 421 (Figure 1). The NCDOT requested that ESP Associates, Inc. (ESP) perform a Preliminary Site Assessment (PSA) of Parcel 342 within the proposed Right of Way (ROW) and/or easement to locate possible underground storage tanks (USTs), sample soil, and delineate potential contaminated soil.

2.0 HISTORY

This parcel is owned by Taylor Family Properties and is currently occupied by an active gas station/convenience store. The facility is listed in the North Carolina Department of Environmental Quality's (NCDEQ's) UST Section Registry with Facility ID #: 0-032502 and was assigned Ground Water Incident #: 44687.

3.0 SITE OBSERVATIONS

During our May 2018 field work, the site was operating as an active gas station/convenience store (Figure 2). There are currently four 12,000 gallon USTs in use. Four monitoring wells are on site at each corner of the tank pit and appear to be active but are locked with padlocks; therefore, ESP was unable to sample these wells (Figure 3). The ground in the study area was covered by asphalt, concrete, and grass.

4.0 METHODS

ESP performed a geophysical study of the area designated by the NCDOT on May 23, 2018. We performed direct-push drilling and sampling of subsurface soils within the proposed easement on September 6, 2018. A photoionization detector (PID) was used to screen subsurface soils in the field and select soil samples to send for laboratory analysis.

4.1 Geophysics

ESP performed a metal detector study over the accessible areas of the site using a Geonics EM61 MK2 with a line spacing of about three feet (Figures 3 and 4). Location control was provided in real-time using a differential global positioning system (DGPS). We collected ground-penetrating radar (GPR) data over selected EM61 anomalies and reinforced concrete areas using our Sensors and Software Noggin 250 GPR system. The GPR data were collected using a line spacing of one to two feet.

4.2 Borings

ESP performed direct-push drilling activities within the easement of Parcel 342 using a subcontractor, SAEDACCO of Fort Mill, South Carolina. Six borings were drilled, designated B342-1 through B342-6 (Figure 3). The soil borings were advanced using a GeoProbe 7822DT drill rig. Continuous soil samples were obtained to a depth of approximately ten feet using five-foot long Macro Cores®. Soil cores had a recovery of four to five feet. The sampling equipment was decontaminated prior to drilling and between borings by the driller using a Liquinox® detergent solution.

4.3 Soil Sample Protocol

Representative soil samples were taken from the Macro-Core tubes at approximate one-foot intervals by the ESP field geologist while wearing nitrile disposable gloves. Each sample was placed in a sealed plastic bag and then kept in a sunny area for at least 5 minutes prior to measuring volatile organic compound (VOC) levels in the head space with the PID. All of the soil samples obtained had a PID reading of less than 10 parts per million (ppm).

Soil samples selected for laboratory analysis were Sample S-9 (corresponding depth of 9.0-9.5 feet) from each of Borings B342-1, B342-2, B342-3, B342-4, and B342-5; Sample S-5 (5.0-5.5 feet) from Boring B342-4; and Sample S-3 (3.0-3.5 feet) from Boring B342-6. For each selected sample, an approximate 10-gram soil sample was collected from the Macro-Core tube using a Terra Core Sampler and placed into a laboratory-supplied 40-milliliter volatile organic analysis (VOA) vial containing methanol. Once sealed, the vial was labeled with the sample identification number and then shaken vigorously for about one minute. The samples were packed on ice and sent via overnight delivery to RED Lab, LLC (RED Lab), located in Wilmington, North Carolina, following proper chain-of-custody procedures (Appendix C).

RED Lab used a QED Hydrocarbon Analyzer to quantitatively analyze the soil samples using the ultraviolet fluorescence (UVF) method for benzene, toluene, ethylbenzene, and xylene (BTEX); gasoline range organics (GRO); diesel range organics (DRO); total petroleum hydrocarbons (TPH); total aromatics; polycyclic aromatic hydrocarbons (PAHs); and benzo(a)pyrene (BaP).

4.4 Groundwater

Groundwater was not encountered in the six borings drilled on the site.

5.0 RESULTS

5.1 Geophysics

The EM61 early time gate data show the response from both shallow and deeper metallic objects (Figure 3). The differential response reduces the effect of shallow anomalies and emphasizes

anomalies from larger and more deeply buried metallic objects, such as USTs (Figure 4). The EM61 differential results indicated several anomalies (response above background) that did not correspond to known site features.

GPR data were collected over the EM61 anomalies. The GPR data collected did not indicate the presence of unknown USTs within the study area.

The EM61 early time gate response and differential response are shown on the plan sheet on Figures 5 and 6, respectively.

5.2 Sample Data

The soil sample UVF hydrocarbon analysis results for BTEX, GRO, DRO, and PAHs are presented in Table 2. The RED Lab laboratory report, which includes results for TPH, total aromatics, and BaP, is provided in Appendix B. Values are provided in milligrams per kilogram (mg/kg or ppm).

5.3 Sample Observations

The results of the laboratory testing indicated that BTEX and GRO were below the detection limits for all samples. DRO was detected in 1 of the 7 soil samples tested but below the NCDEQ action level of 100 ppm. The highest DRO reading was 20.2 ppm in Sample S-5 (5.0-5.5 feet) from Boring B342-4. PAHs were detected in 1 of the 7 soil samples tested. The highest PAH reading was 0.54 ppm in Sample S-5 (5.0-5.5 feet) from boring B342-4.

6.0 CONCLUSIONS

6.1 Interpretation of Results

The results of the PSA for Parcel 342 of NCDOT Project U-2579AB do not indicate the presence of abandoned USTs. No petroleum hydrocarbon soil contamination at or above NCDEQ action levels was detected within the proposed construction easement on Parcel 342.

6.2 Geophysics

The geophysical data do not indicate the presence of abandoned USTs.

6.3 Soil

The results of the PID field screening readings and off-site UVF hydrocarbon analyses do not indicate the presence of contaminated soil at or above the NCDEQ action levels within the proposed construction easement on Parcel 342 (Figure 7).

7.0 RECOMMENDATIONS

The four known USTs are within the proposed ROW on Parcel 342 and should be removed prior to property acquisition. Other than the known USTs, no limitations on construction activities or special handling of excavated soil are recommended for Parcel 342.

8.0 LIMITATIONS

ESP's professional services have been performed, findings obtained, and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. ESP is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report.

The passage of time may result in a change in the environmental characteristics at this site and surrounding properties. ESP does not warrant against future operations or conditions, or against operations or conditions present of a type or at a location not investigated. ESP does not assume responsibility for other environmental issues that may be associated with the subject site.

TABLES

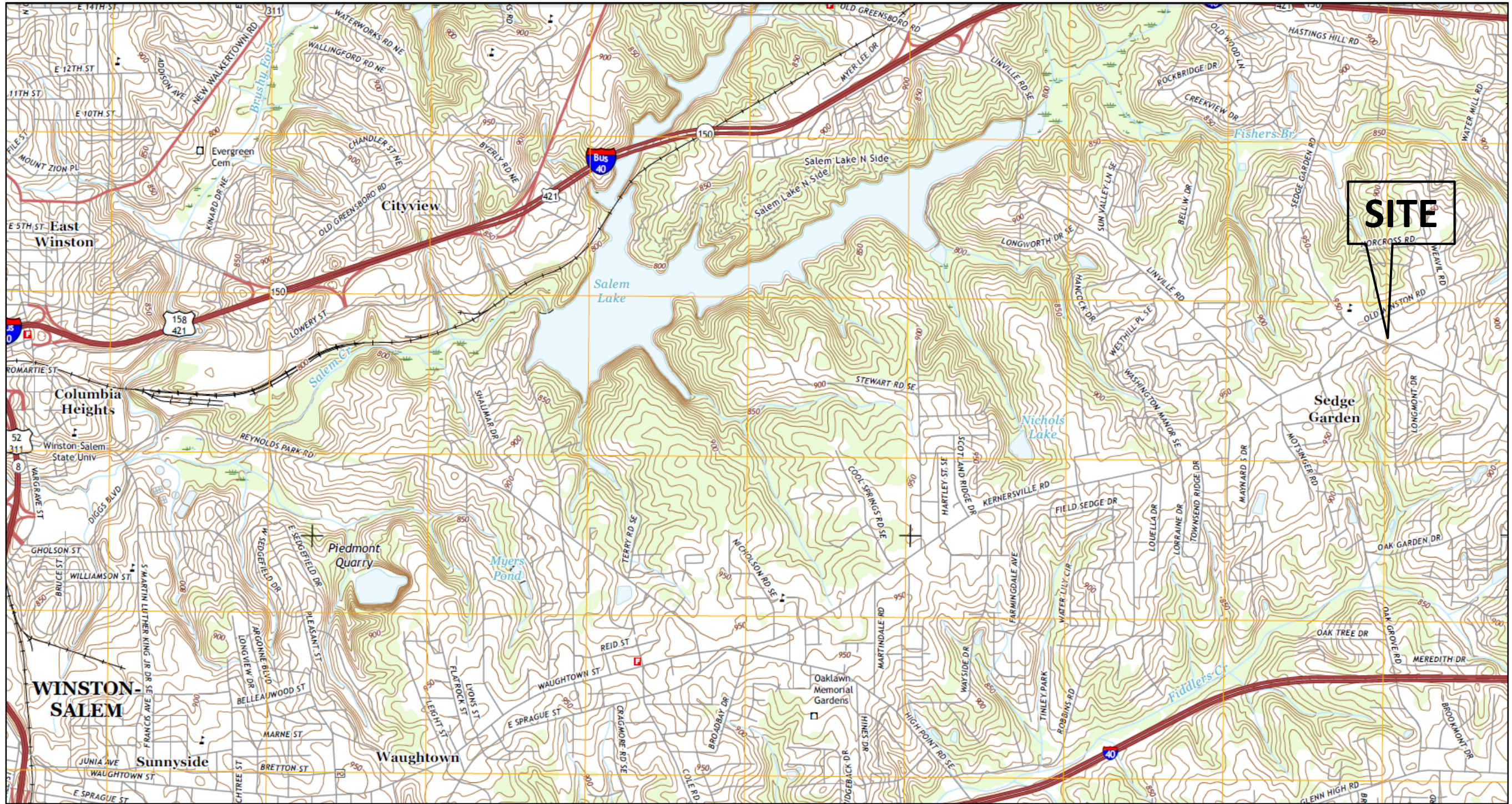
TABLE 1
SOIL SAMPLE PID READINGS

Boring	Sample Depth Range with PID > 10 ppm (feet bgs)	Maximum PID Reading (ppm) and Sample Depth (feet bgs)
B342-1	none	4.3 (5.0-5.5)
B342-2	none	3.9 (9.0-9.5)
B342-3	none	5.9 (7.0-7.5)
B342-4	none	7.0 (5.0-5.5)
B342-5	none	2.5 (1.0-1.5)
B342-6	none	2.9 (2.0-2.5)

TABLE 2
SOIL SAMPLE UVF RESULTS SUMMARY

Boring	Sample ID (depth in feet bgs)	Date Collected	BTEX (C6-C9) (mg/kg)	GRO (C5-C10) (mg/kg)	DRO (C10-C35) (mg/kg)	PAHs (mg/kg)
B342-1	S-9 (9.0-9.5)	9/10/18	<0.32	<0.32	<0.32	<0.1
B342-2	S-9 (9.0-9.5)	9/10/18	<0.5	<0.5	<0.5	<0.16
B342-3	S-9 (9.0-9.5)	9/10/18	<0.45	<0.45	<0.45	<0.15
B342-4	S-5 (5.0-5.5)	9/10/18	<0.51	<0.51	20.2	0.54
	S-9 (9.0-9.5)	9/10/18	<0.44	<0.44	<0.44	<0.14
B342-5	S-9 (9.0-9.5)	9/10/18	<0.43	<0.43	<0.43	<0.14
B342-6	S-3 (3.0-3.5)	9/10/18	<0.65	<0.65	<0.65	<0.21

FIGURES



From: USGS US Topo 7.5 - minute map for WINSTON-SALEM EAST, NC Date: 2016, Scale: 1:24,000

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

**FIGURE 1 – PARCEL 342, TAYLOR FAMILY PROPERTIES
SITE VICINITY MAP**

**U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA**



7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409

336.334.7724

www.espassociates.com




a. Photo from northeast side of site looking southwest.

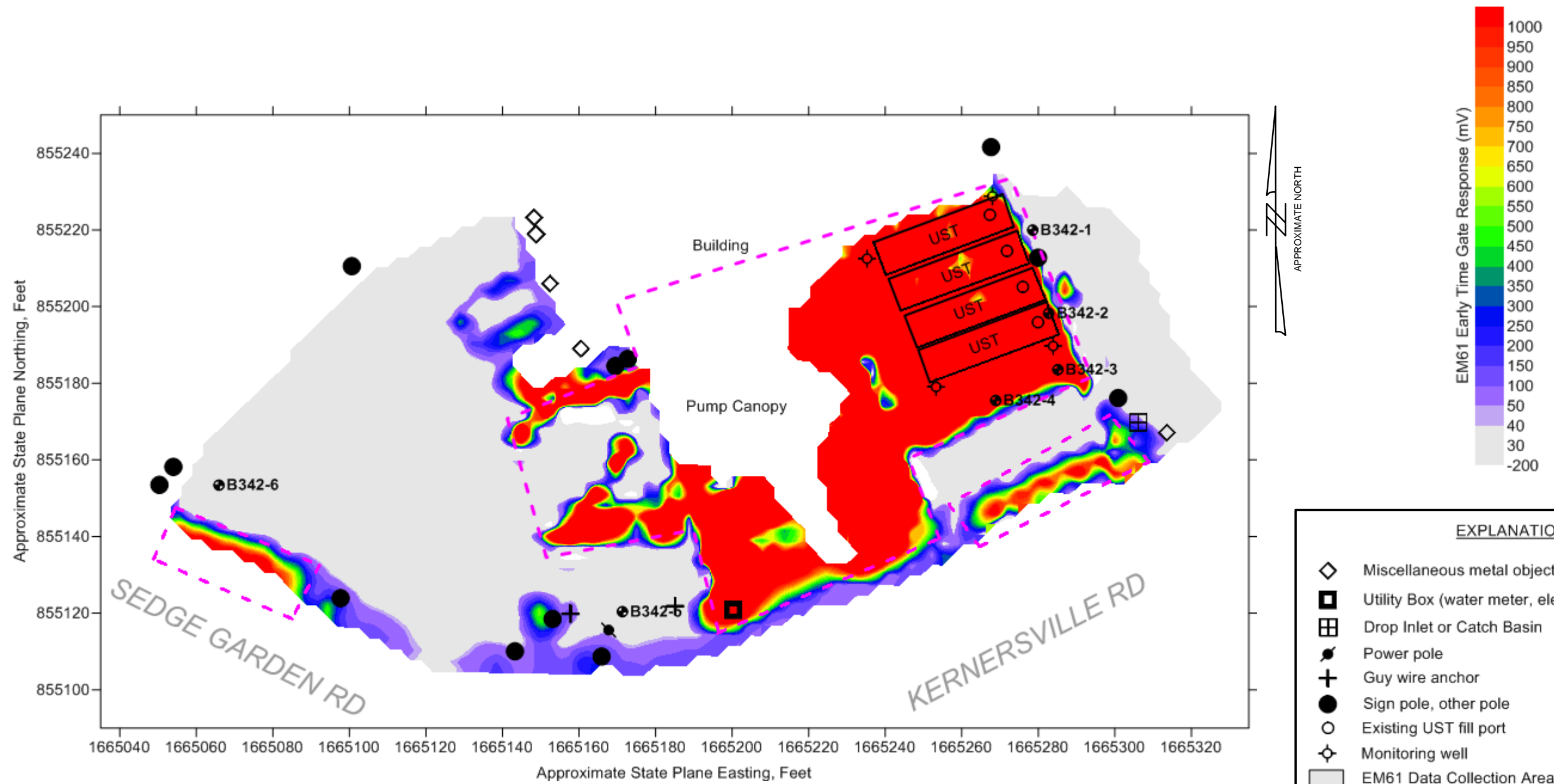


b. Photo from east side of site looking west.



c. Photo of marked known USTs.

PROJECT NO. CS34.366	FIGURE 2 – PARCEL 342, TAYLOR FAMILY PROPERTIES SITE PHOTOGRAPHS	 7011 Albert Pick Rd., Suite E Greensboro, NC 27409 336.334.7724 www.espassociates.com
SCALE AS SHOWN		
DATE 11/6/18	U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421 FORSYTH COUNTY, NORTH CAROLINA	
BY DMN		



EXPLANATION

- ◇ Miscellaneous metal object (pipe, debris, etc.)
- ▣ Utility Box (water meter, electrical outlet, etc.)
- ⊠ Drop Inlet or Catch Basin
- Power pole
- ⊕ Guy wire anchor
- Sign pole, other pole
- Existing UST fill port
- ⊙ Monitoring well
- ▭ EM61 Data Collection Areas
- ⋯ GPR Data Collection Areas
- ▭ UST Approximate location of known UST
- Approximate soil boring location

Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

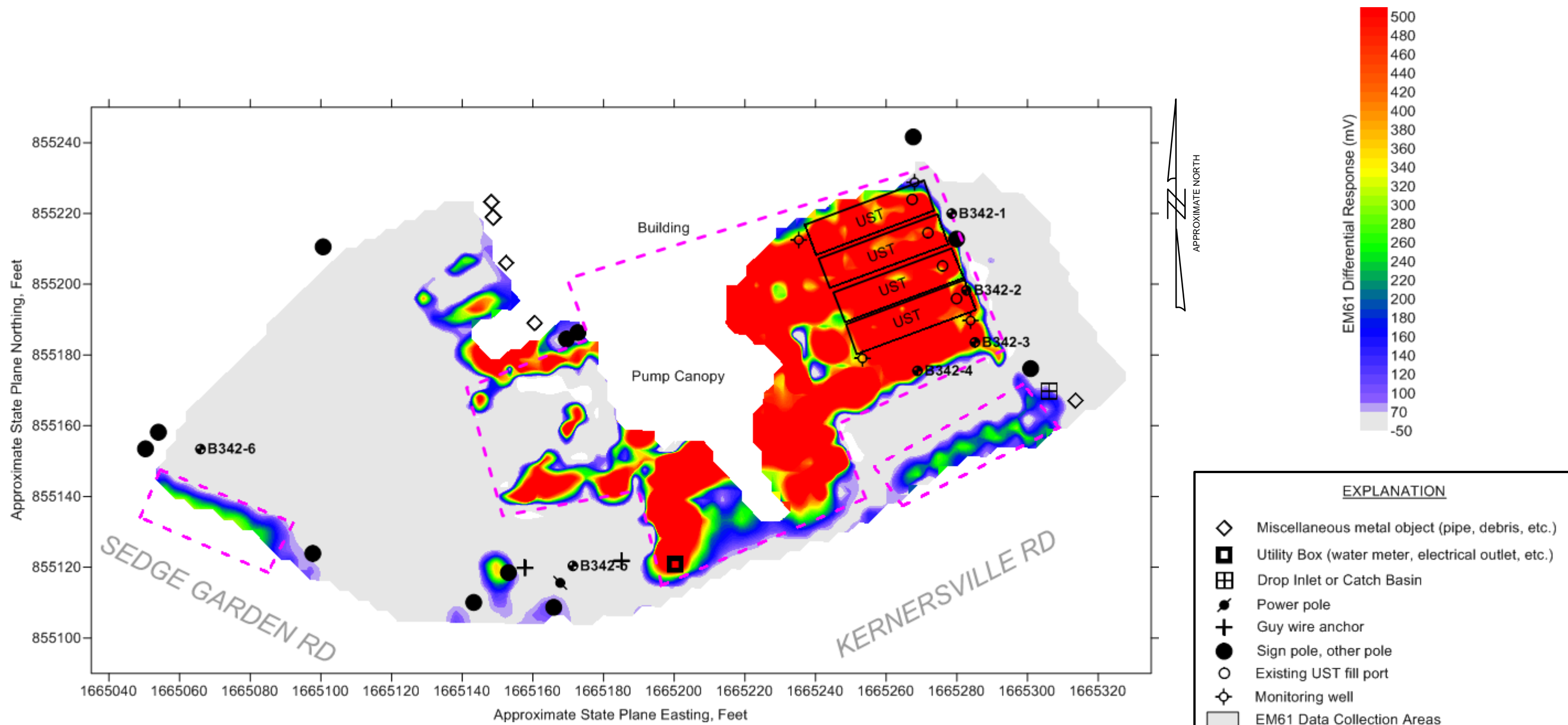
**FIGURE 3 – PARCEL 342, TAYLOR FAMILY PROPERTIES
EM61 EARLY TIME GATE RESPONSE**

*U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA*



7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409

336.334.7724
www.espassociates.com



EXPLANATION	
◇	Miscellaneous metal object (pipe, debris, etc.)
■	Utility Box (water meter, electrical outlet, etc.)
⊞	Drop Inlet or Catch Basin
●	Power pole
+	Guy wire anchor
●	Sign pole, other pole
○	Existing UST fill port
⊙	Monitoring well
■	EM61 Data Collection Areas
⋈	GPR Data Collection Areas
UST	Approximate location of known UST
●	Approximate soil boring location

Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

**FIGURE 4 – PARCEL 342, TAYLOR FAMILY PROPERTIES
EM61 DIFFERENTIAL RESPONSE**

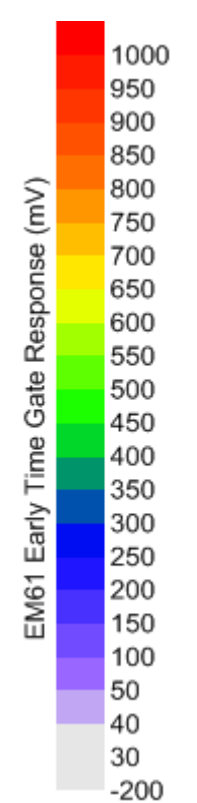
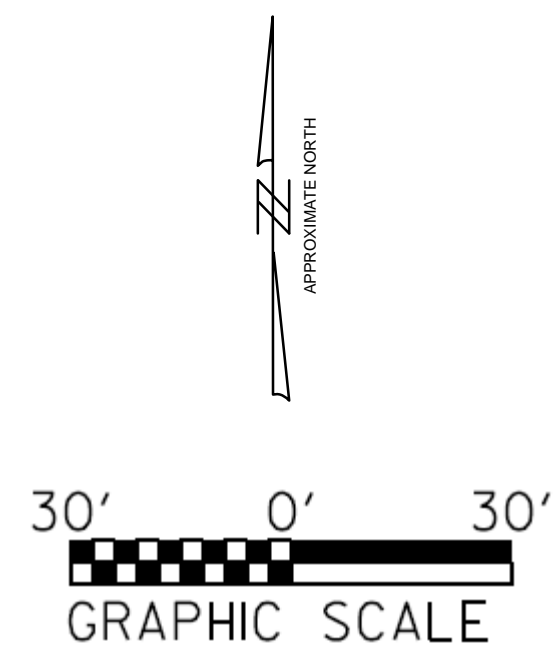
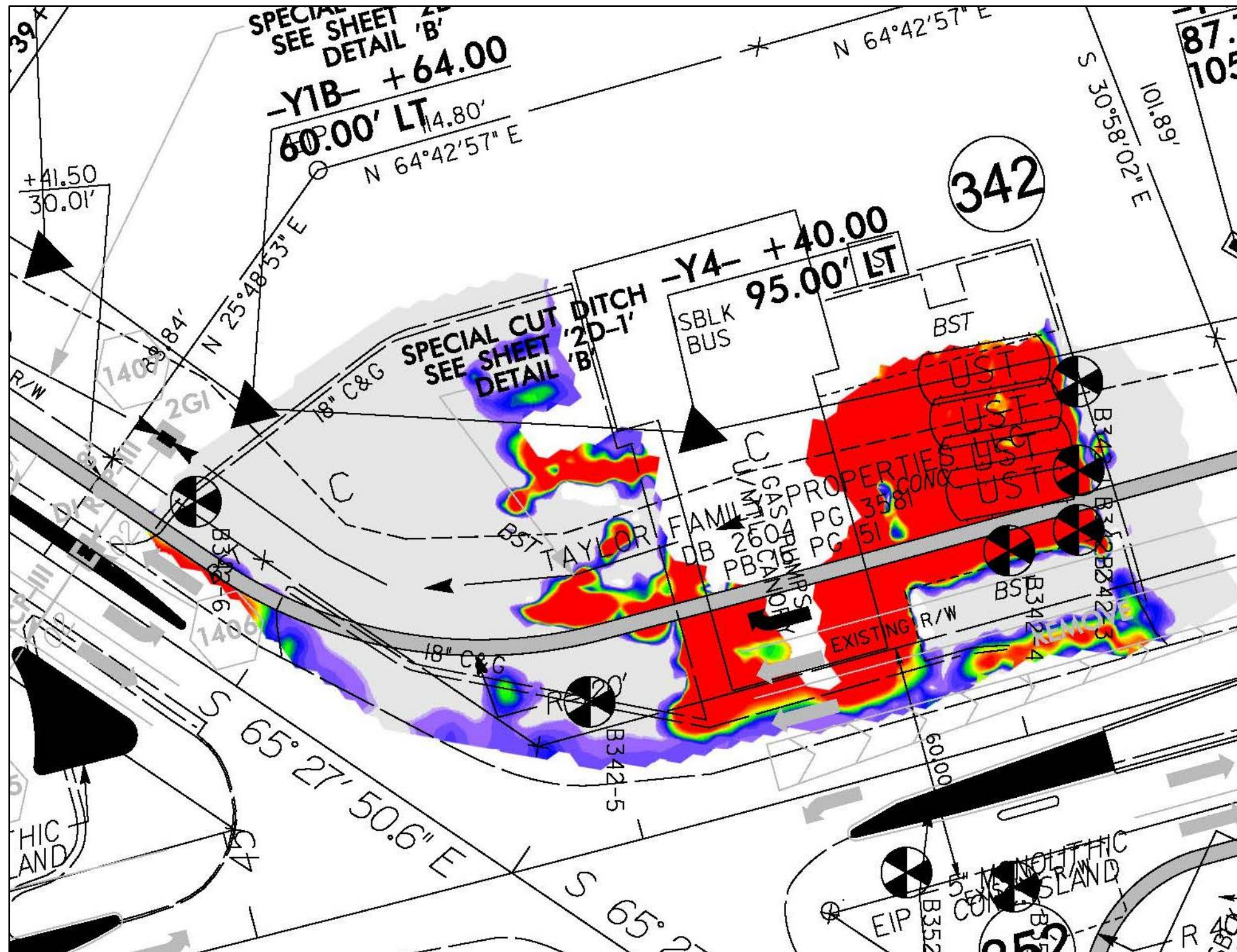
*U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA*



7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409

336.334.7724

www.espassociates.com



List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

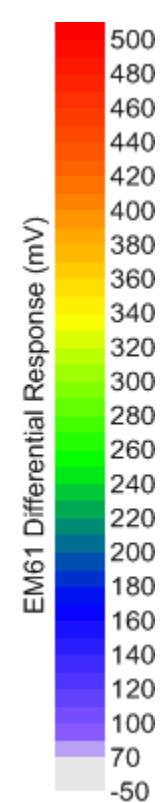
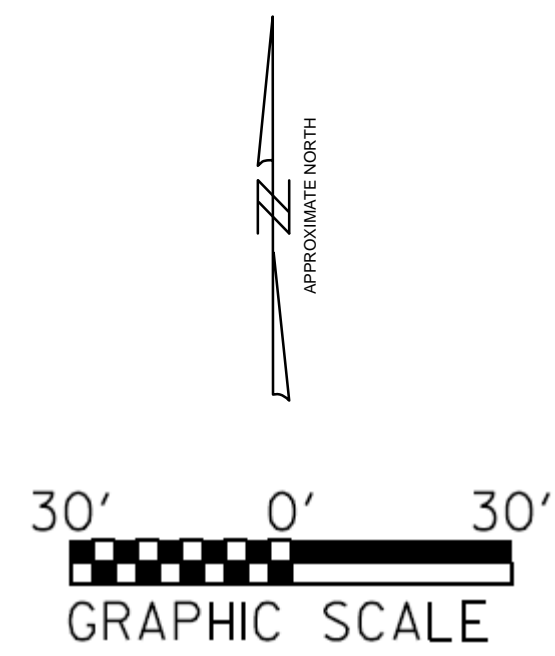
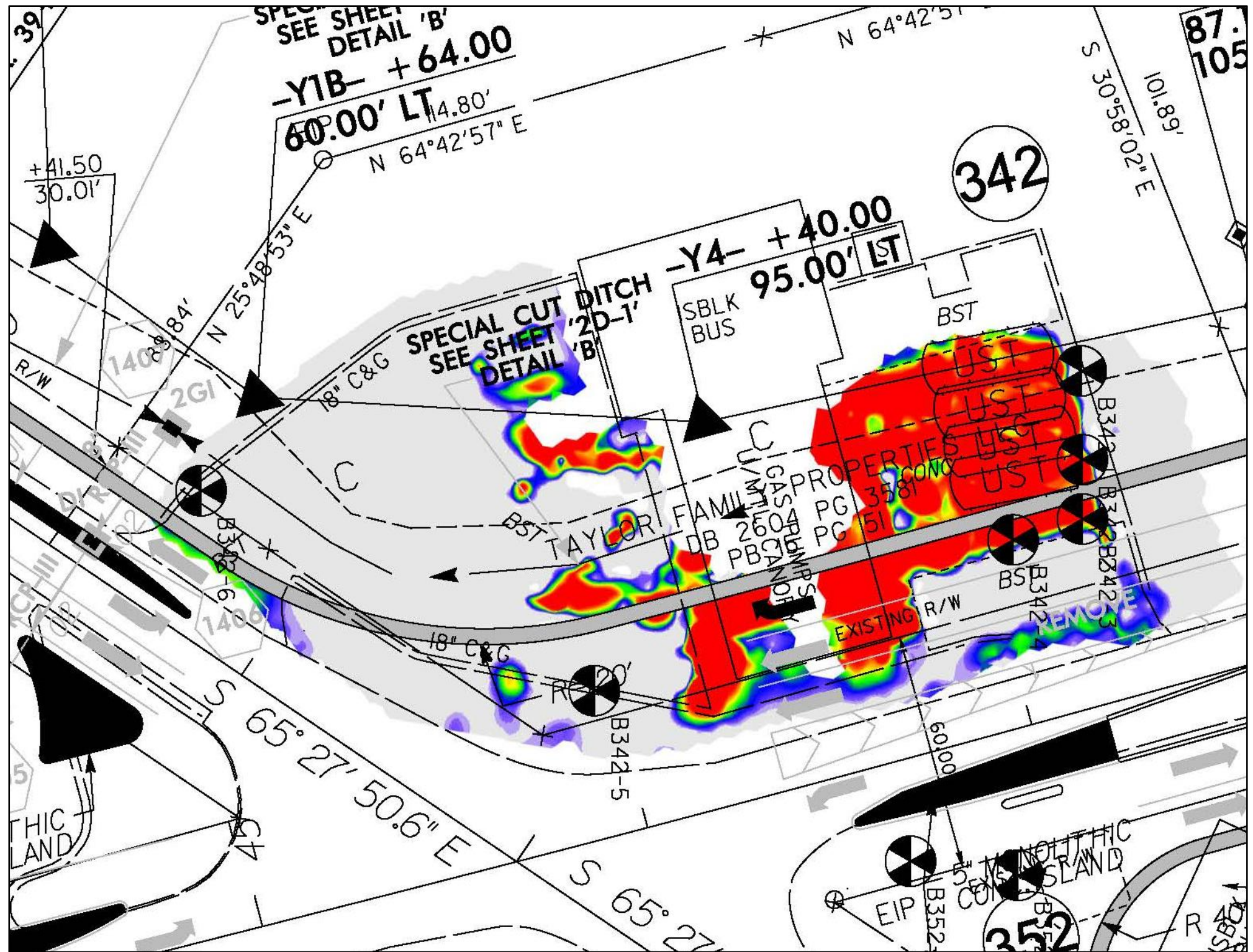
PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

**FIGURE 5 – PARCEL 342, TAYLOR FAMILY PROPERTIES
EM61 EARLY TIME GATE RESPONSE ON PLAN SHEET**

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA



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List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	11/6/18
BY	DMN

**FIGURE 6- PARCEL 342, TAYLOR FAMILY PROPERTIES
EM61 DIFFERENTIAL RESPONSE ON PLAN SHEET**

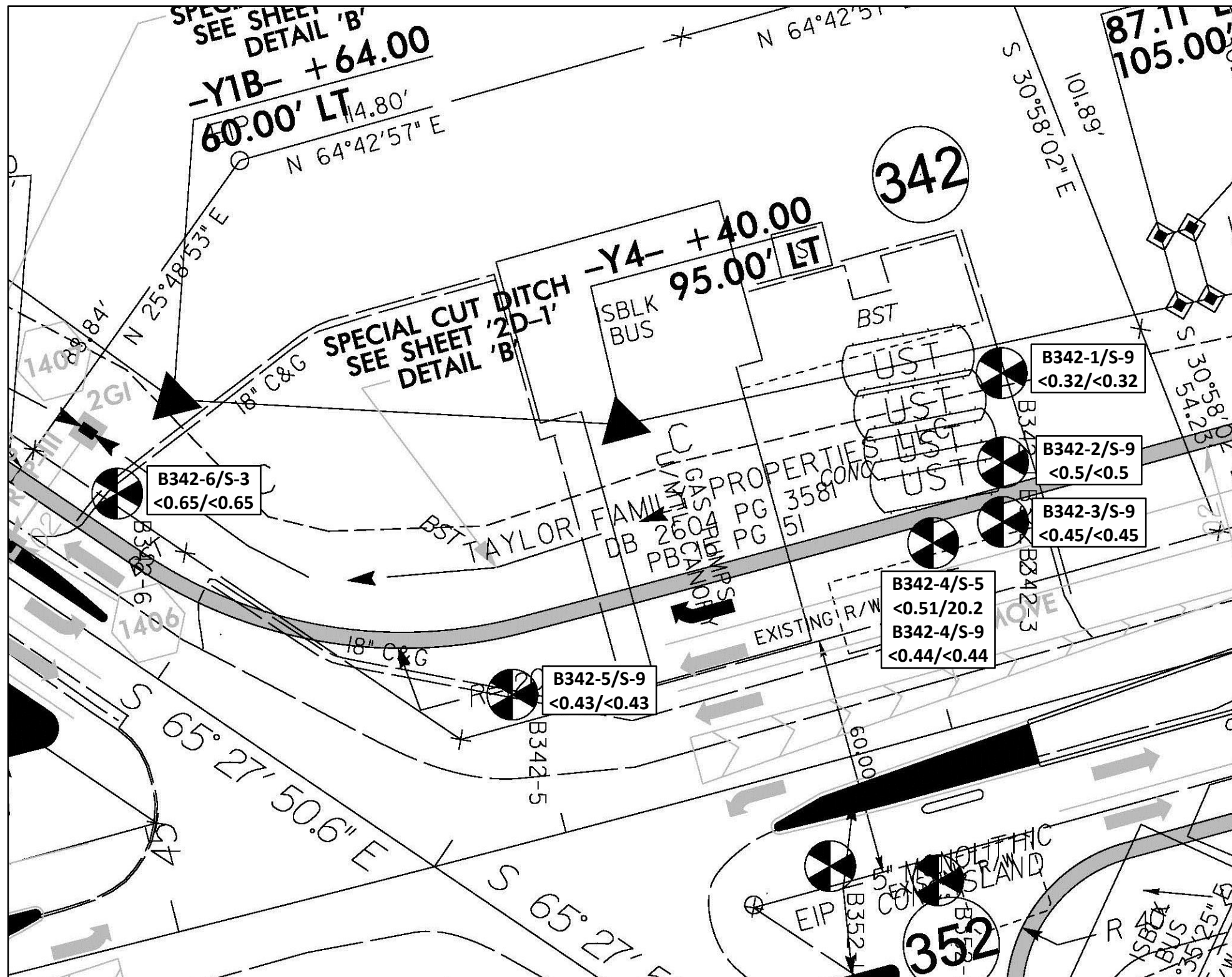
U-2579AB, WINSTON SALEM - NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA



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Explanation	
<div style="border: 1px solid black; padding: 2px; display: inline-block;"> B342-1/S-9 <0.32/<0.32 </div>	Maximum Analytical Results per Boring Boring No./Sample No. GRO/DRO (mg/kg, ppm)

List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	1" = 30'
DATE	11/6/18
BY	DMN

**FIGURE 7 – PARCEL 342, TAYLOR FAMILY PROPERTIES
SOIL ANALYTICAL RESULTS ON PLAN SHEET**

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA



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STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale *S.U.E. = Subsurface Utility Engineering

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
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	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

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	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
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 RW Marker	
Proposed Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	
Proposed Temporary Construction Easement	
Proposed Temporary Drainage Easement	
Proposed Permanent Drainage Easement	
Proposed Permanent Drainage / Utility Easement	
Proposed Permanent Utility Easement	
Proposed Temporary Utility Easement	
Proposed Aerial Utility Easement	
Proposed Permanent Easement with Iron Pin and Cap Marker	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
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	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

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	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	

PROJECT NO.	CS34.366
SCALE	N/A
DATE	11/6/18
BY	DMN

FIGURE 8
LEGEND FOR PLAN SHEET FIGURES

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA



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APPENDIX A
SOIL BORING LOGS



FIELD BORING LOG

BORING NO.

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: East side of USTs
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance

B342-1SHEET: 1 of 1TOTAL DEPTH: 10.0 ftDEPTH TO GW: Dry ft

COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.2 Topsoil	Core 1 Rec 5.0'/5.0'
				0.2-4.5 Red-brown sandy, clayey silt	
1	S-1	1.0-1.5	3.6		
2	S-2	2.0-2.5	4.3		
3	S-3	3.0-3.5	4.0		
4	S-4	4.0-4.5	3.4	4.5-5.0 Red-brown to tan silty sand	Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	4.3	5.0-7.3 Red-brown silty clay	
6	S-6	6.0-6.5	3.5		
7	S-7	7.0-7.5	3.1	7.3-10.0 Red-brown sandy, clayey silt	
8	S-8	8.0-8.5	4.2		
9	S-9	9.0-9.5	2.8		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: East side of USTs
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance

B342-2SHEET: 1 of 1TOTAL DEPTH: 10.0 ftDEPTH TO GW: Dry ft

COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Topsoil 0.3-1.7 Red-brown silty sand	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	0.4		
2	S-2	2.0-2.5	0.2	1.7-9.0 Red-brown silty, sandy clay	
3	S-3	3.0-3.5	0.2		
4	S-4	4.0-4.5	0.3		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	0.3		
6	S-6	6.0-6.5	0.2		
7	S-7	7.0-7.5	0.0		
8	S-8	8.0-8.5	2.6		
9	S-9	9.0-9.5	3.9	9.0-10.0 Red-brown sandy, clayey silt	
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B342-3

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: South side of USTs
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.2 Asphalt 0.2-0.9 Gravel	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	3.3	0.9-9.1 Red-brown sandy, silty clay	
2	S-2	2.0-2.5	3.3		
3	S-3	3.0-3.5	4.2		
4	S-4	4.0-4.5	5.0		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	4.4		
6	S-6	6.0-6.5	4.7		
7	S-7	7.0-7.5	5.9		
8	S-8	8.0-8.5	4.4		
9	S-9	9.0-9.5	2.9	9.1-10.0 Orange-tan to white silty sand	
10					Sample selected for laboratory analysis
11					
12					
13					
14					
15					



FIELD BORING LOG

BORING NO.

B342-4

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: South side of USTs
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.2 Asphalt 0.2-0.6 Gravel	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	3.9	0.6-6.0 Red-brown sandy, silty clay	
2	S-2	2.0-2.5	4.6		
3	S-3	3.0-3.5	4.8		
4	S-4	4.0-4.5	4.6		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	7.0		
6	S-6	6.0-6.5	4.2	6.0-10.0 Red-brown sandy, clayey silt	
7	S-7	7.0-7.5	3.4		
8	S-8	8.0-8.5	4.1		
9	S-9	9.0-9.5	3.7		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B342-5

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: South corner of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.1 Topsoil	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	2.5	0.1-6.4 Red-brown sandy, clayey silt	
2	S-2	2.0-2.5	1.5		
3	S-3	3.0-3.5	1.6		
4	S-4	4.0-4.5	2.3		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	1.6		
6	S-6	6.0-6.5	2.2	6.4-10.0 Orange to white-gray silty sand	
7	S-7	7.0-7.5	2.3		
8	S-8	8.0-8.5	2.0		
9	S-9	9.0-9.5	2.3		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B342-6

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: West side of site
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 5.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Asphalt 0.3-0.7 Gravel	Core 1 Rec 4.0/5.0'
1	S-1	1.0-1.5	1.3	0.7-4.0 Orange-brown sandy silt	
2	S-2	2.0-2.5	2.9		
3	S-3	3.0-3.5	2.3		
4	S-4	No Rec			Refusal at 5.0'
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis

APPENDIX B

RED LAB LABORATORY TESTING REPORT



Hydrocarbon Analysis Results

Client: ESP ASSOCIATES, INC.
Address: 7011 ALBERT PICK ROAD
 SUITE E
 GREENSBORO NC 27409

Samples taken Monday, September 10, 2018
Samples extracted Monday, September 10, 2018
Samples analysed Wednesday, September 12, 2018

Contact: DILLON NANCE

Operator NICK HENDRIX

Project: U-2579 AB

U00904

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	B342-6 (S-3)	25.9	<0.65	<0.65	<0.65	<0.65	<0.13	<0.21	<0.026	0	100	0	Residual HC
s	B342-5 (S-9)	17.3	<0.43	<0.43	<0.43	<0.43	<0.09	<0.14	<0.017	0	0	0	PHC not detected
s	B342-4 (S-5)	20.3	<0.51	<0.51	20.2	20.2	10.7	0.54	<0.02	0	81.6	18.4	V.Deg.PHC 77.4%,(FCM),(BO)
s	B342-4 (S-9)	17.5	<0.44	<0.44	<0.44	<0.44	<0.09	<0.14	<0.018	0	0	0	PHC not detected
s	B342-3 (S-9)	18.2	<0.45	<0.45	<0.45	<0.45	<0.09	<0.15	<0.018	0	100	0	PHC not detected
s	B342-2 (S-9)	20.0	<0.5	<0.5	<0.5	<0.5	<0.1	<0.16	<0.02	0	0	0	PHC not detected
s	B342-1 (S-9)	12.9	<0.32	<0.32	<0.32	<0.32	<0.06	<0.1	<0.013	0	0	0	(FCM)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

102.7 %

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**

APPENDIX C
CHAIN-OF-CUSTODY FORM

Client Name: ESP Associates, Inc.
 Address: 7011 Albert Pick Rd. Ste E
Greensboro, NC 27409
 Contact: Dillon Nance
 Project Ref.: U-2579 AB
 Email: d.nance@espsociates.com
 Phone #: 336-404-3117
 Collected by: D. Nance



RAPID ENVIRONMENTAL DIAGNOSTICS
CHAIN OF CUSTODY AND ANALYTICAL
REQUEST FORM

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

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

Sample Collection Date/Time	TAT Requested		Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour							
9/10/18		✓	S	B331-5 S-9	✓		49.2	43.9	5.3
				B331-4 S-9			52.7	45.6	8.1
				B331-3 S-9			51.6	44.1	7.5
				B331-2 S-9			53.0	45.8	7.2
				B331-1 S-9			52.0	45.4	6.6
				B352-3 S-9		47.4	52.7	43.7	3.7
				B352-2 S-9			52.8	43.7	9.1
				B352-1 S-9			51.9	43.8	8.1
				B342-6 S-3			49.8	44.4	5.4
				B342-5 S-9			52.2	44.1	8.1
				B342-4 S-5			51.8	44.4	6.9
				B342-4 S-9			52.0	44.0	8.0
				B342-3 S-9			52.1	44.4	7.7
				B342-2 S-9			50.7	43.7	7.0
				B342-1 S-9			50.1	43.9	6.2
				B54-1 S-9			51.0	44.1	6.9
				B54-2 S-8			51.2	43.5	7.7
				B54-3 S-9			51.9	44.0	7.9
				B54-4 S-7			49.8	44.3	5.5
				B54-5 S-9			51.2	44.3	

Comments: ***most samples underweight. Soil matrix representation affected - data results largely unaffected. (NH 9/12)**

RED Lab USE ONLY

Relinquished by <u>D. Nance</u>	Date/Time <u>9/10/18 16:00</u>	Accepted by <u>NH</u>	Date/Time <u>9/12 11:00</u>
Relinquished by	Date/Time	Accepted by	Date/Time



May 28, 2019
June 9, 2019 Revision

Mr. Gordon Box, LG
Geotechnical Engineering Unit
North Carolina Department of Transportation
1020 Birch Ridge Drive
Raleigh, NC 27610

**RE: ENVIRONMENTAL SITE ASSESSMENT OF PARCEL 342-REMNANT
Circle K, Taylor Family Properties
4401 Kernersville Road, Kernersville, North Carolina
ESP Project No. GR22.313**

TIP No.: U-2579AB
WBS N0.: 34839.1.8
County: Forsyth
Description: Winston-Salem - Northern Beltway Eastern Section (Future I-74) from I-40 to I-40
Business/US 421

Dear Mr. Box:

ESP Associates, Inc. (ESP) is pleased to submit this report on our Phase II Environmental Assessment of the subject parcel. This work was performed in accordance with your Request for Proposal dated April 1, 2019 and our Cost Proposal dated April 15, 2019.

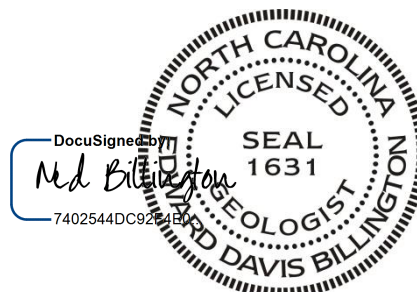
We appreciate the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

A handwritten signature in blue ink, appearing to read "Edward D. Billington".

Edward D. Billington, PG
Senior Geologist/Geophysicist
DMN/SBM/EDB/CJW



not considered Final unless all signatures are completed

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Appendix C	Chain-of-Custody Form

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning to construct the Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40 Business/US 421. In May 2018, ESP performed a Preliminary Site Assessment of the proposed right-of-way (ROW) of Parcel 342 that included Borings B342-1 through B342-6. The results of that work were provided in a report to the NCDOT dated November 5, 2018, and indicated that there were no abandoned USTs or petroleum hydrocarbon soil contamination at or above the NCDEQ action levels in the proposed ROW. Groundwater was not encountered within the drilling depths of 10 feet below ground surface.

In April 2019, the NCDOT requested that ESP perform a Phase II Environmental Assessment of the planned remnant of Parcel 342 to locate possible underground storage tanks (USTs), sample soil, and delineate potentially contaminated soil (Figure 1). The remnant is located outside of the proposed ROW.

2.0 HISTORY

This parcel is owned by Taylor Family Properties and is currently occupied by an active gas station/convenience store (Circle K). The facility is listed in the North Carolina Department of Environmental Quality's (NCDEQ's) UST Section Registry with Facility ID #00-0-0000032502. A release was reported in June 2016, assigned Ground Water Incident #44687, and was closed in September 2016. Our online search of the NCDEQ records did not indicate any relevant documents for this site.

3.0 SITE OBSERVATIONS

During our April and May 2019 field work, the site was operating as an active gas station/convenience store (Figure 2). There are currently four 12,000-gallon USTs in use (two gasoline, one diesel, and one kerosene). The ground in the study area was covered by asphalt, concrete, and grass. Portions of the study area were obstructed by air conditioner units, dumpsters, debris, and a shed.

4.0 METHODS

ESP performed a geophysical study of the area designated by the NCDOT on April 17, 18 and 23, 2019. We performed direct-push drilling and sampling of subsurface soils within the planned remnant of Parcel 342 on May 2, 2019. A photoionization detector (PID) was used to screen subsurface soils in the field and select soil samples to send for laboratory analysis.

4.1 Geophysics

ESP performed a metal detector study over the accessible areas of the site using a Geonics EM61 MK2 with a line spacing of about three feet (Figures 3 and 4). Location control was provided in real-time using a differential global positioning system (DGPS). We collected ground-penetrating radar (GPR) data over selected EM61 anomalies and areas of reinforced concrete using our Sensors and Software Noggin 250 GPR system. The GPR data were collected using a line spacing of one to two feet.

4.2 Borings

ESP performed direct-push drilling activities within the proposed remnant of Parcel 342 using a subcontractor, SAEDACCO of Fort Mill, South Carolina. Four borings were drilled on May 2, 2019 using direct-push drilling and hand augering (B342-7 through B342-10). The soil borings were advanced using a GeoProbe 54DT direct-push rig. Continuous soil samples were obtained to a depth of approximately ten feet using four-foot long Macro-Core® tubes. Due to the presence of nearby buried utilities, a hand auger was used by the driller for the first 3 to 4 feet of B342-8, B342-9, and B342-10. The sampling equipment was decontaminated prior to drilling and between borings by the driller using a Liquinox® detergent solution.

4.3 Soil Sample Protocol

Representative soil samples were taken from the Macro-Core tubes or hand auger at approximate one-foot intervals by the ESP field geologist while wearing nitrile disposable gloves. Each sample was placed in a sealed plastic bag and then kept in a sunny area for at least 5 minutes prior to measuring volatile organic compound (VOC) levels in the head space with the PID. The PID readings were less than 10 parts per million (ppm) for each soil sample.

For samples selected for laboratory analysis, an approximate 10-gram soil sample was collected from the Macro-Core tube using a Terra Core Sampler and placed into a laboratory-supplied 40-milliliter volatile organic analysis (VOA) vial containing methanol. Once sealed, the vial was labeled with the sample identification number and then shaken vigorously for about one minute. The samples were packed on ice and sent via overnight delivery to RED Lab, LLC (RED Lab), located in Wilmington, North Carolina, following proper chain-of-custody procedures (Appendix C).

RED Lab used a QED Hydrocarbon Analyzer to quantitatively analyze the soil samples using the ultraviolet fluorescence (UVF) method for benzene, toluene, ethylbenzene, and xylene (BTEX); gasoline range organics (GRO); diesel range organics (DRO); total petroleum hydrocarbons (TPH); total aromatics; polycyclic aromatic hydrocarbons (PAHs); and benzo(a)pyrene (BaP).

4.4 Groundwater

Groundwater was not encountered in the 4 borings drilled in the Parcel 342-Remnant.

5.0 RESULTS

5.1 Geophysics

The EM61 early time gate data show the response from both shallow and deeper metallic objects (Figure 3). The differential response reduces the effect of shallow anomalies and emphasizes anomalies from larger and more deeply buried metallic objects, such as USTs (Figure 4).

The EM61 differential results indicated several anomalies (response above background) that did not correspond to known site features. GPR data were collected over the EM61 anomalies. The GPR data collected did not indicate the presence of unknown USTs within the study area.

The EM61 early time gate response and differential response are shown on the plan sheet on Figures 5 and 6, respectively.

5.2 Sample Data

The soil sample UVF hydrocarbon analysis results for BTEX, GRO, DRO, and PAHs are presented in Table 2. The RED Lab laboratory report, which includes results for TPH, total aromatics, and BaP, is provided in Appendix B. Values are provided in milligrams per kilogram (mg/kg or ppm).

5.3 Sample Observations

The results of the laboratory testing indicated that BTEX, GRO, and PAHs were below the detection limits for the four samples tested. DRO was detected in one of the 4 soil samples tested (Sample B342-7/S4) at a concentration of 1.8 ppm, below the NCDEQ action level of 100 ppm.

6.0 CONCLUSIONS

6.1 Interpretation of Results

The results of the Phase II investigation of the planned remnant of Parcel 342 do not indicate the presence of abandoned USTs. No petroleum hydrocarbon soil contamination at or above NCDEQ action levels was detected within the planned remnant of Parcel 342.

6.2 Geophysics

The geophysical data do not indicate the presence of abandoned USTs.

6.3 Soil

The results of the PID field screening readings and off-site UVF hydrocarbon analyses do not indicate the presence of contaminated soil at or above the NCDEQ action levels within the planned remnant of Parcel 342 (Figure 7).

7.0 RECOMMENDATIONS

Other than the 4 known USTs within the proposed ROW on Parcel 342, no limitations on construction activities or special handling of excavated soil are recommended for the planned remnant of Parcel 342.

8.0 LIMITATIONS

ESP's professional services have been performed, findings obtained, and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. ESP is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report.

The passage of time may result in a change in the environmental characteristics at this site and surrounding properties. ESP does not warrant against future operations or conditions, or against operations or conditions present of a type or at a location not investigated. ESP does not assume responsibility for other environmental issues that may be associated with the subject site.

TABLES

TABLE 1
SOIL SAMPLE PID READINGS

Boring	Date Collected	Sample Depth Range with PID > 10 ppm (feet bgs)	Maximum PID Reading (ppm) and Sample Depth (feet bgs)
B342-7	5/2/19	none	3.3 (4.0-4.5)
B342-8	5/2/19	none	2.5 (1.0-1.5)
B342-9	5/2/19	none	3.5 (5.0-5.5)
B342-10	5/2/19	none	2.7 (9.0-9.5)

TABLE 2
SOIL SAMPLE UVF RESULTS SUMMARY

Boring	Sample ID (depth in feet bgs)	Date Collected	BTEX (C6-C9) (mg/kg)	GRO (C5-C10) (mg/kg)	DRO (C10-C35) (mg/kg)	PAHs (mg/kg)
B342-7	S4 (4.0-4.5)	5/2/19	<0.61	<0.61	1.8	<0.2
B342-8	S8 (8.0-8.5)	5/2/19	<0.26	<0.26	<0.26	<0.08
B342-9	S5 (5.0-5.5)	5/2/19	<0.15	<0.15	<0.15	<0.05
B342-10	S9 (9.0-9.5)	5/2/19	<0.36	<0.36	<0.36	<0.12

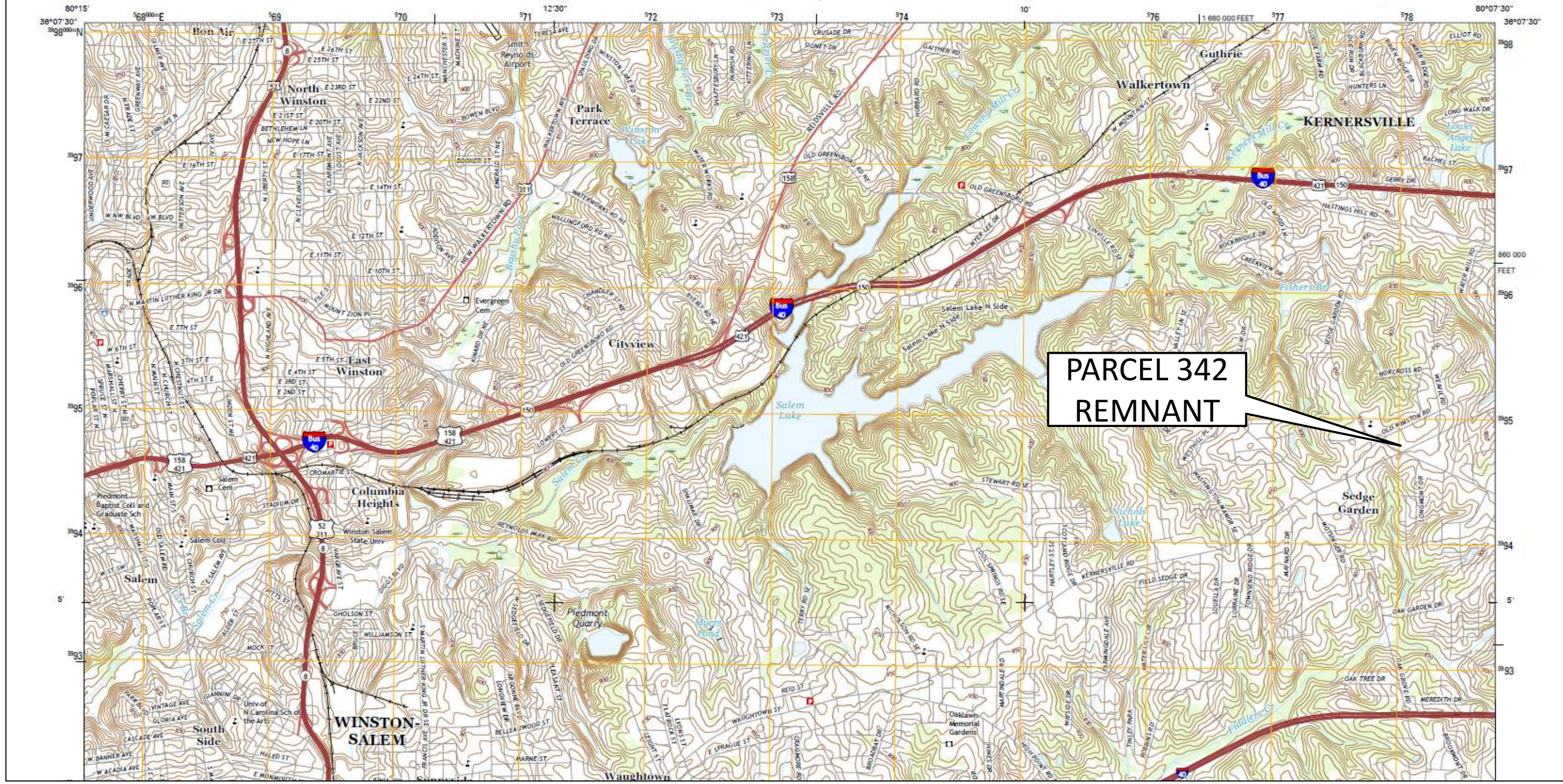
FIGURES



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



WINSTON-SALEM EAST QUADRANGLE
NORTH CAROLINA
7.5-MINUTE SERIES



From USGS US Topo 7.5 – minute map for Winston-Salem East QUADRANGLE, NC, Date: 2016, Original Scale 1:24,000

PROJECT NO.	GR22.313
SCALE	N/A
DATE	6/9/19
BY	SBM/EDB

**FIGURE 1 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP.
SITE VICINITY MAP**

**NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
BELTWAY EASTERN SECTION (FUTURE I-74)
FORSYTH COUNTY, NORTH CAROLINA**



ESP Associates, Inc.
7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409
336.334.7724
www.espassociates.com



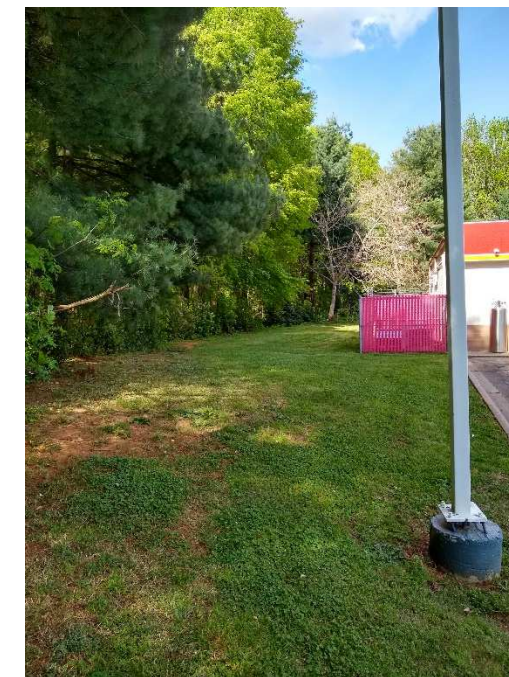
A. Photograph of edge of known USTs and part of study area on east side of the gas station, looking west.




B. Photograph of study area on the east side of the gas station, looking southwest.

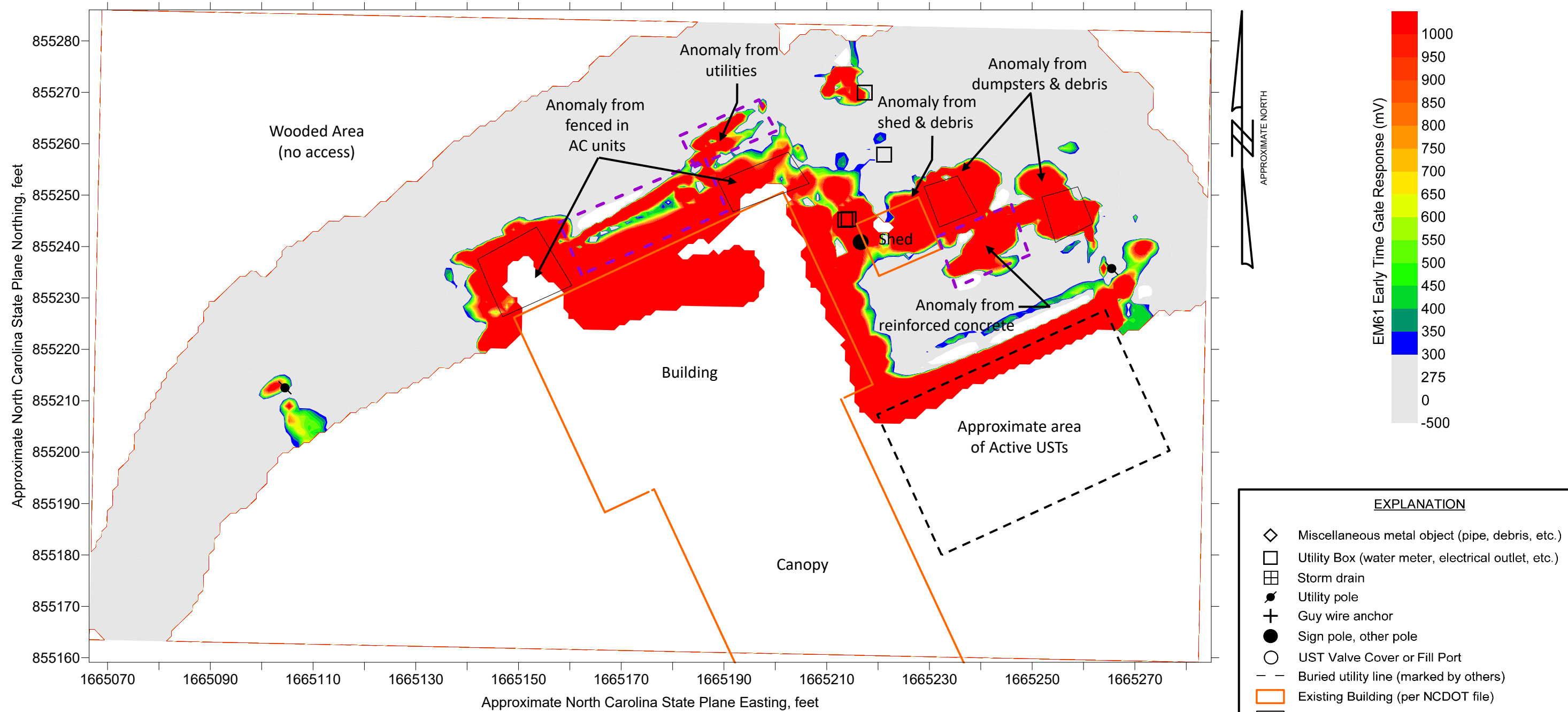


C. Photograph of rear of the gas station building with fenced-in air conditioning systems, looking southwest.



D. Photograph of western part of the study area, looking northeast.

PROJECT NO. GR22.313	FIGURE 2 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP. SITE PHOTOGRAPHS NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FORSYTH COUNTY, NORTH CAROLINA		ESP Associates, Inc.
SCALE N/A			7011 Albert Pick Rd., Suite E
DATE 6/9/19			Greensboro, NC 27409
BY SBM/EDB			336.334.7724 www.espassociates.com



EXPLANATION	
◇	Miscellaneous metal object (pipe, debris, etc.)
□	Utility Box (water meter, electrical outlet, etc.)
⊞	Storm drain
●	Utility pole
+	Guy wire anchor
●	Sign pole, other pole
○	UST Valve Cover or Fill Port
- -	Buried utility line (marked by others)
▭	Existing Building (per NCDOT file)
▭	EM61 Data Collection Areas
▭	GPR Data Collection Areas
▭	Underground Storage Tank

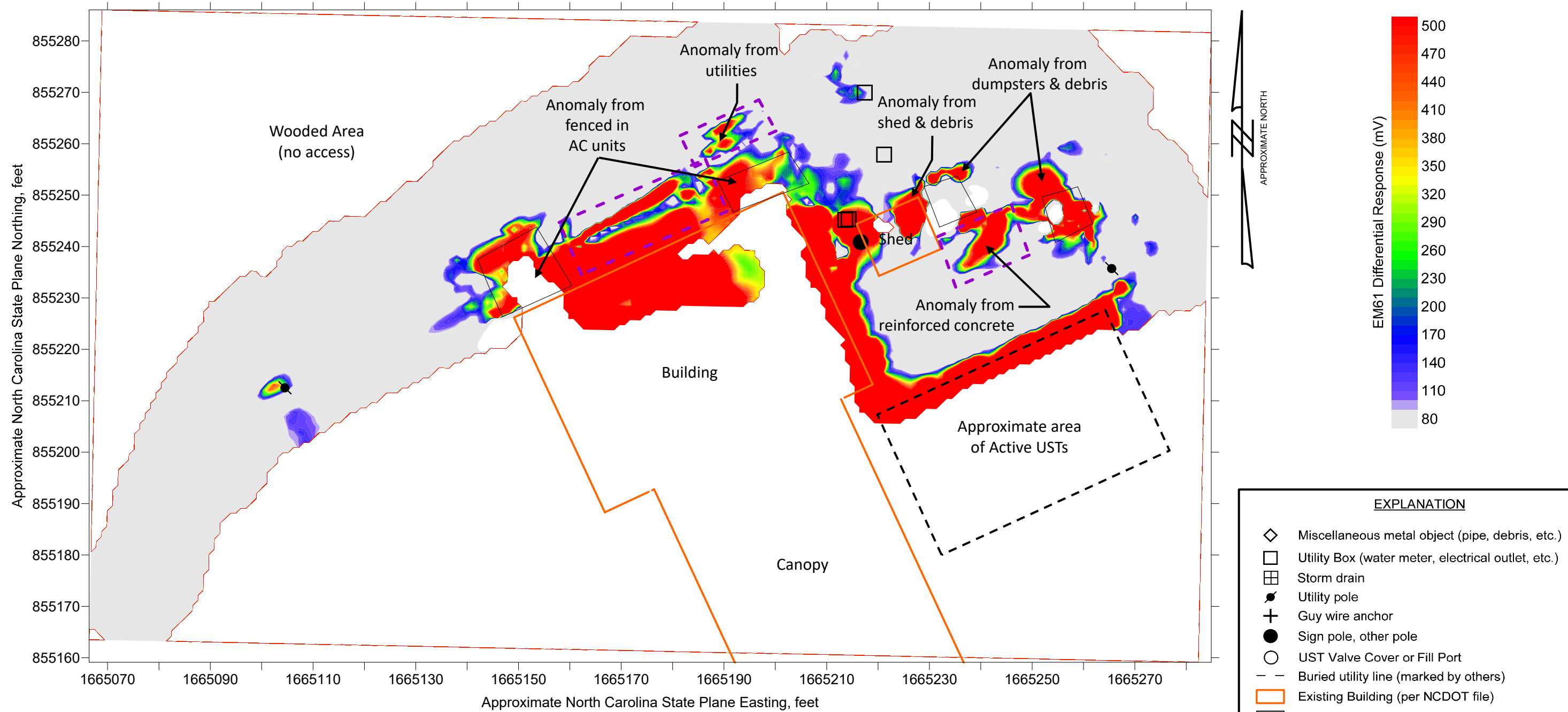
PROJECT NO.	GR22.313
SCALE	AS SHOWN
DATE	6/9/19
BY	SBM/EDB

**FIGURE 3 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP.
EM61 EARLY TIME GATE RESPONSE**

**NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
BELTWAY EASTERN SECTION (FUTURE I-74)
FORSYTH COUNTY, NORTH CAROLINA**



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EXPLANATION	
◇	Miscellaneous metal object (pipe, debris, etc.)
□	Utility Box (water meter, electrical outlet, etc.)
⊞	Storm drain
●	Utility pole
+	Guy wire anchor
●	Sign pole, other pole
○	UST Valve Cover or Fill Port
- -	Buried utility line (marked by others)
▭	Existing Building (per NCDOT file)
▭	EM61 Data Collection Areas
▭	GPR Data Collection Areas
▭	Underground Storage Tank

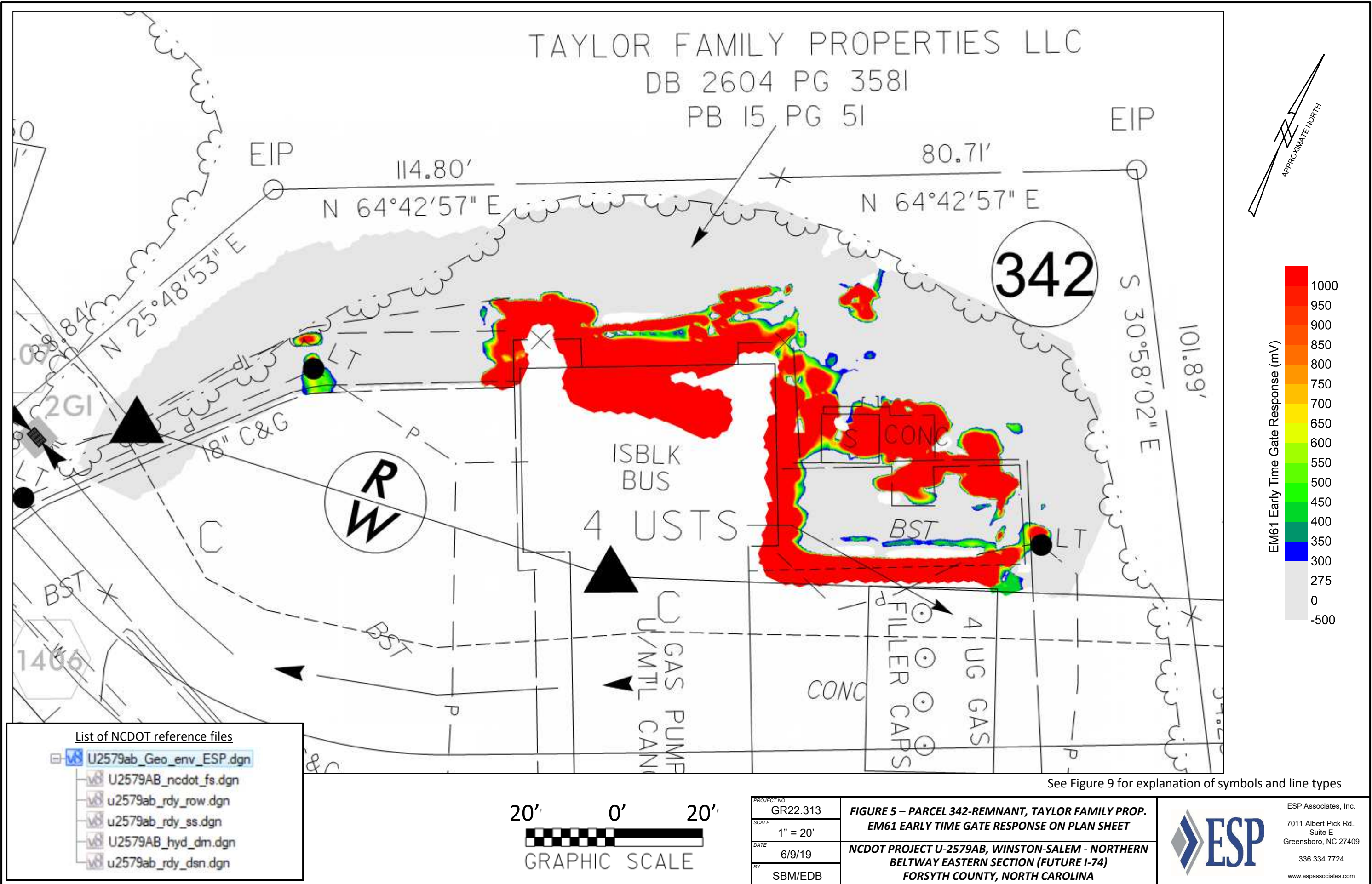
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SCALE	AS SHOWN
DATE	6/9/19
BY	SBM/EDB

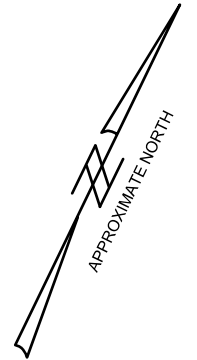
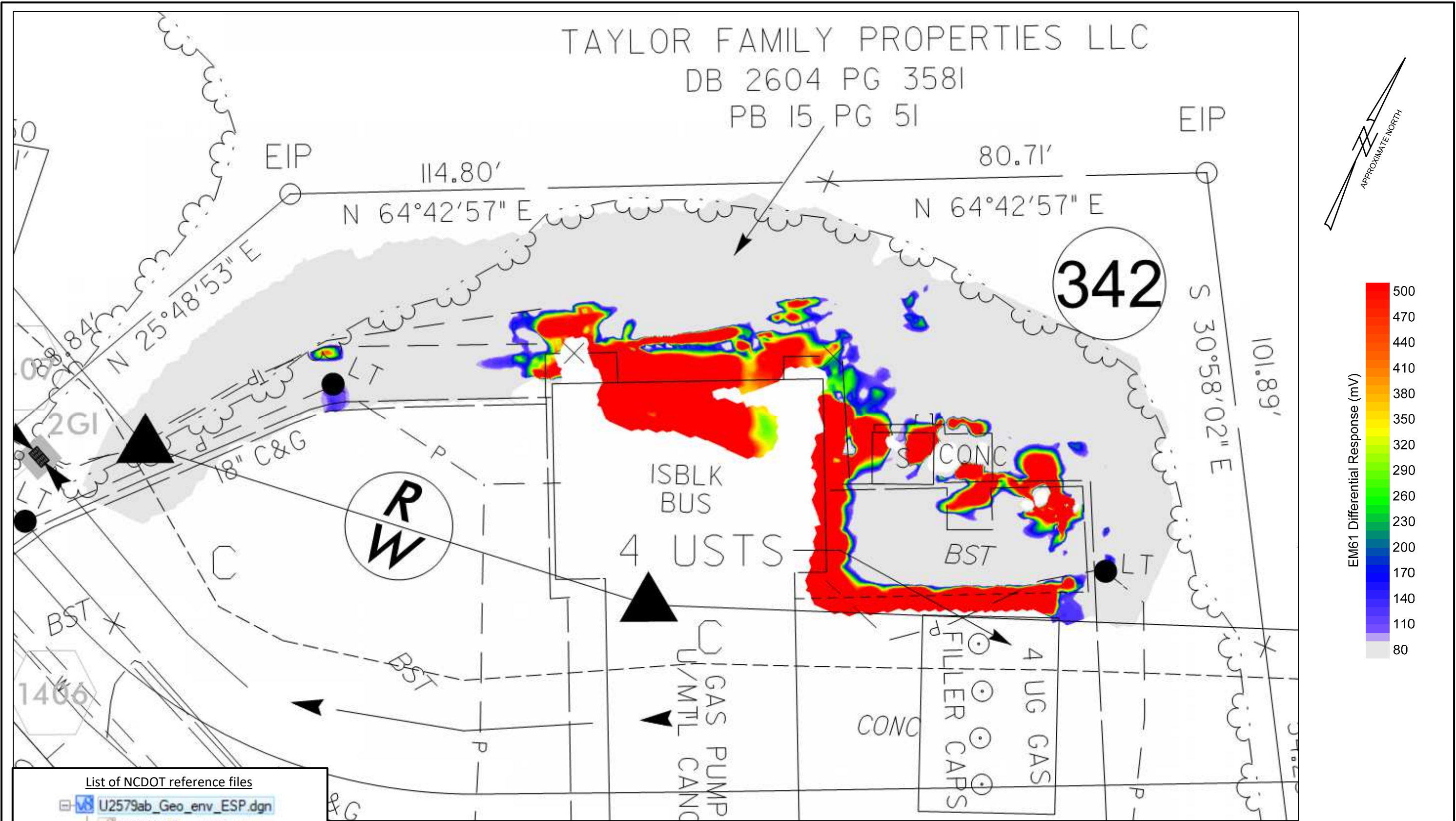
**FIGURE 4 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP.
EM61 DIFFERENTIAL RESPONSE**

**NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
BELTWAY EASTERN SECTION (FUTURE I-74)
FORSYTH COUNTY, NORTH CAROLINA**



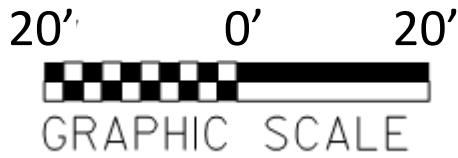
ESP Associates, Inc.
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Suite E
Greensboro, NC 27409
336.334.7724
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- List of NCDOT reference files
- U2579ab_Geo_env_ESP.dgn
 - U2579AB_ncdot_fs.dgn
 - u2579ab_rdy_row.dgn
 - u2579ab_rdy_ss.dgn
 - U2579AB_hyd_dm.dgn
 - u2579ab_rdy_dsn.dgn

See Figure 9 for explanation of symbols and line types



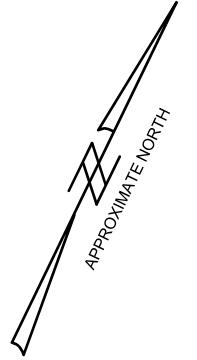
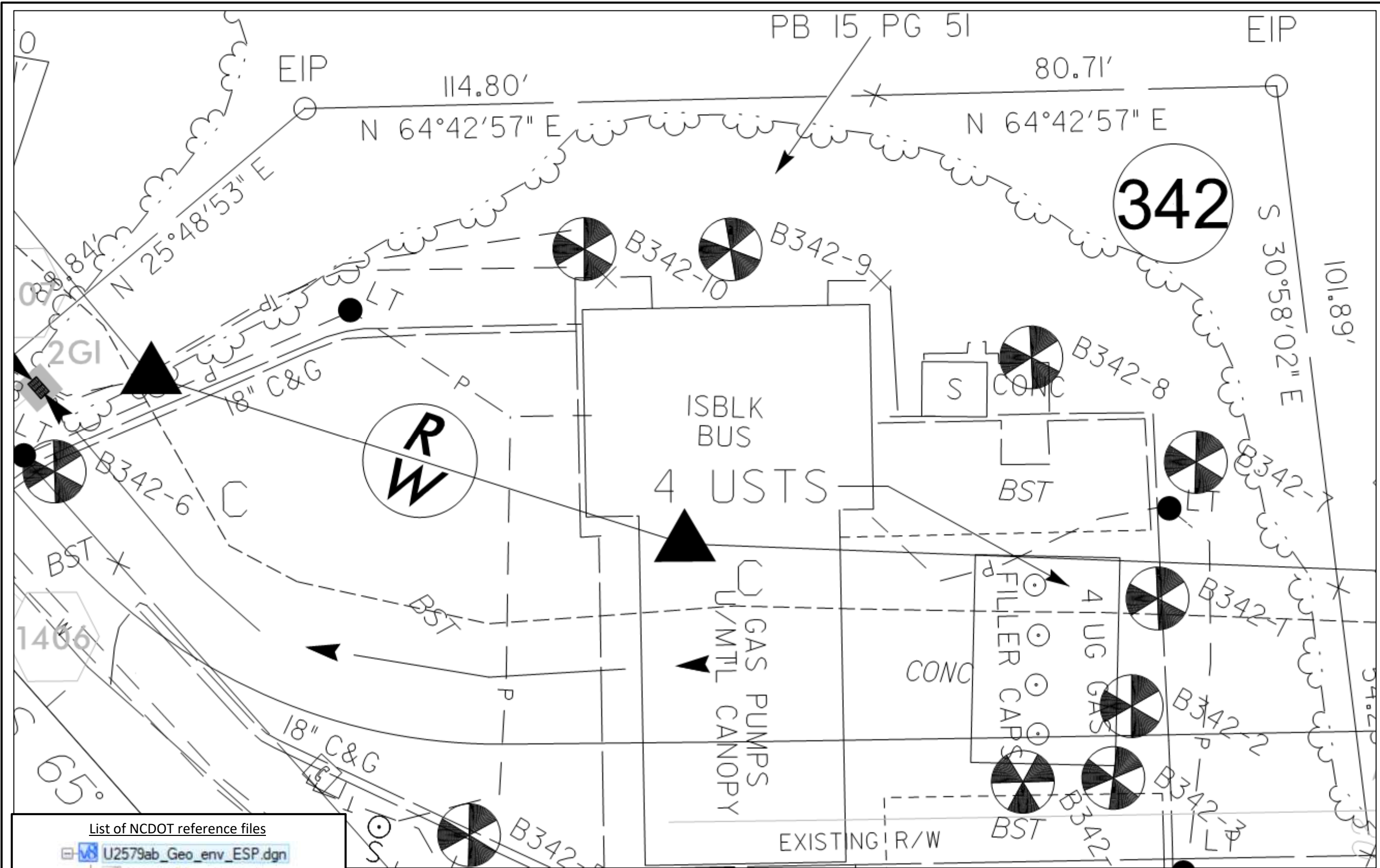
PROJECT NO.	GR22.313
SCALE	1" = 20'
DATE	6/9/19
BY	SBM/EDB

**FIGURE 6 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP.
EM61 DIFFERENTIAL RESPONSE ON PLAN SHEET**

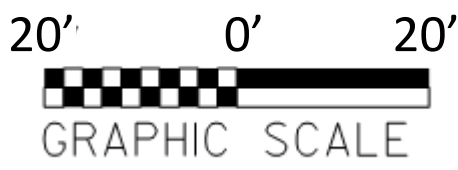
**NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
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- List of NCDOT reference files
- U2579ab_Geo_env_ESP.dgn
 - U2579AB_ncdot_fs.dgn
 - u2579ab_rdy_row.dgn
 - u2579ab_rdy_ss.dgn
 - U2579AB_hyd_dm.dgn
 - u2579ab_rdy_dsn.dgn



See Figure 9 for explanation of symbols and line types

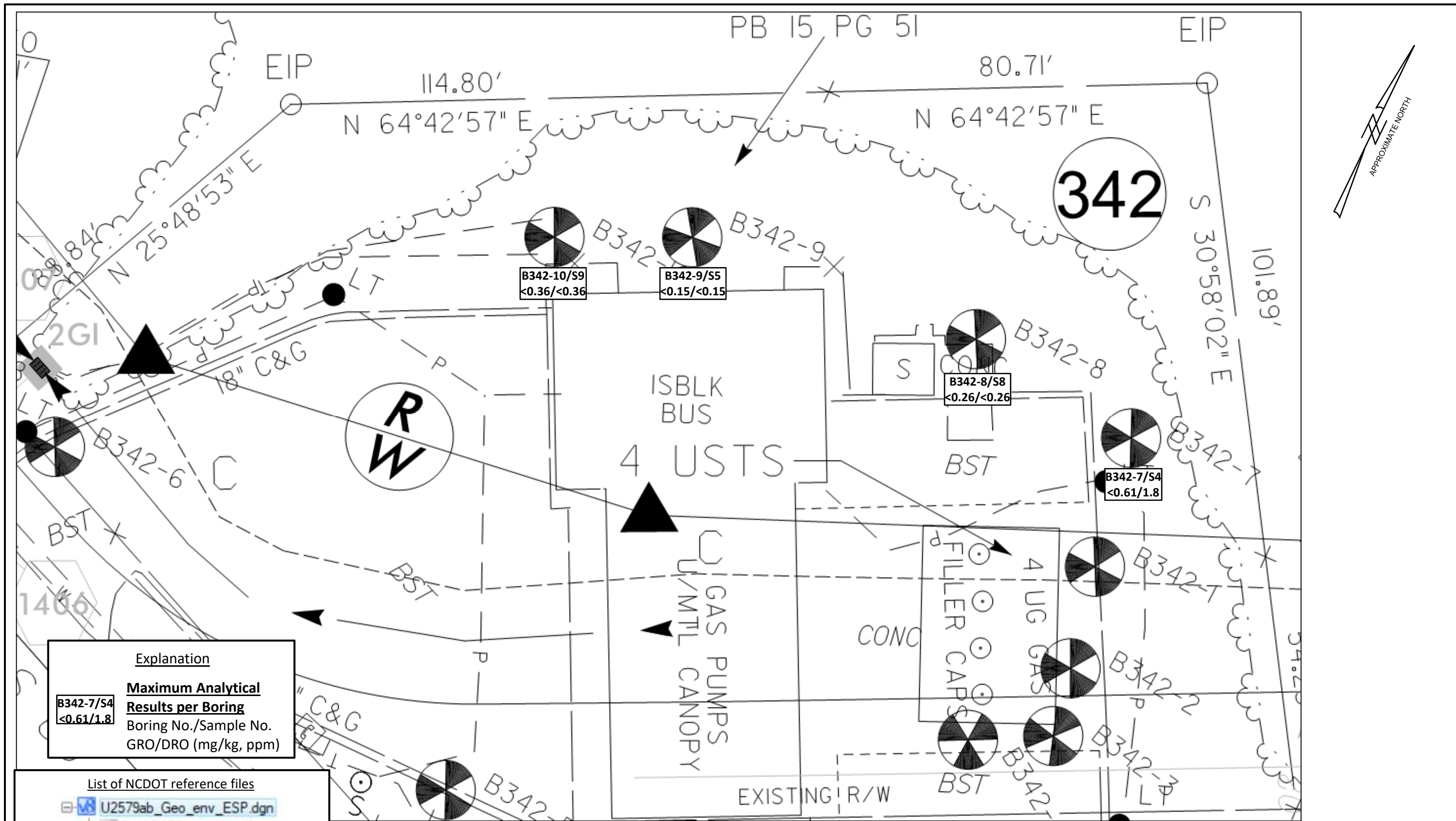
PROJECT NO.	GR22.313
SCALE	1" = 20'
DATE	6/9/19
BY	SBM/EDB

**FIGURE 7 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP.
BORING LOCATIONS ON PLAN SHEET**

**NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
BELTWAY EASTERN SECTION (FUTURE I-74)
FORSYTH COUNTY, NORTH CAROLINA**

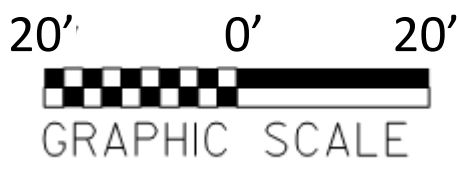


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Explanation	
Maximum Analytical Results per Boring	
B342-7/S4	<0.61/1.8
Boring No./Sample No. GRO/DRO (mg/kg, ppm)	

- List of NCDOT reference files
- U2579ab_Geo_env_ESP.dgn
 - U2579AB_ncdot_fs.dgn
 - u2579ab_rdy_row.dgn
 - u2579ab_rdy_ss.dgn
 - U2579AB_hyd_dm.dgn
 - u2579ab_rdy_dsn.dgn



PROJECT NO.	GR22.313
SCALE	1" = 20'
DATE	6/9/19
BY	SBM/EDB

FIGURE 8 – PARCEL 342-REMNANT, TAYLOR FAMILY PROP. SOIL ANALYTICAL RESULTS ON PLAN SHEET

NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FORSYTH COUNTY, NORTH CAROLINA

See Figure 9 for explanation of symbols and line types



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STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale *S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

State Line	—————
County Line	—————
Township Line	—————
City Line	—————
Reservation Line	—————
Property Line	—————
Existing Iron Pin	○
Property Corner	⊕
Property Monument	⊕
Parcel/Sequence Number	⊕
Existing Fence Line	—x—x—
Proposed Woven Wire Fence	—•—•—
Proposed Chain Link Fence	—■—■—
Proposed Barbed Wire Fence	—◇—◇—
Existing Wetland Boundary	—w—w—
Proposed Wetland Boundary	—w—w—
Existing Endangered Animal Boundary	—a—
Existing Endangered Plant Boundary	—p—
Existing Historic Property Boundary	—h—
Known Contamination Area: Soil	—x—x—
Potential Contamination Area: Soil	—x—x—
Known Contamination Area: Water	—w—w—
Potential Contamination Area: Water	—w—w—
Contaminated Site: Known or Potential	—x—x—

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	—————
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 RW Marker	—————
Proposed Control of Access Line with Concrete CA Marker	—————
Existing Control of Access	—————
Proposed Control of Access	—————
Existing Easement Line	—————
Proposed Temporary Construction Easement	—————
Proposed Temporary Drainage Easement	—————
Proposed Permanent Drainage Easement	—————
Proposed Permanent Drainage / Utility Easement	—————
Proposed Permanent Utility Easement	—————
Proposed Temporary Utility Easement	—————
Proposed Aerial Utility Easement	—————
Proposed Permanent Easement with Iron Pin and Cap Marker	—————

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	—————
Existing Curb	—————
Proposed Slope Stakes Cut	—————
Proposed Slope Stakes Fill	—————
Proposed Curb Ramp	—————
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	—————
Bridge Wing Wall, Head Wall and End Wall	—————
MINOR:	—————
Head and End Wall	—————
Pipe Culvert	—————
Footbridge	—————
Drainage Box: Catch Basin, DI or JB	—————
Paved Ditch Gutter	—————
Storm Sewer Manhole	—————
Storm Sewer	—————

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	—————
U/G Power Line LOS B (S.U.E.*)	—————
U/G Power Line LOS C (S.U.E.*)	—————
U/G Power Line LOS D (S.U.E.*)	—————

TELEPHONE:

Existing Telephone Pole	—————
Proposed Telephone Pole	—————
Telephone Manhole	—————
Telephone Pedestal	—————
Telephone Cell Tower	—————
U/G Telephone Cable Hand Hole	—————
U/G Telephone Cable LOS B (S.U.E.*)	—————
U/G Telephone Cable LOS C (S.U.E.*)	—————
U/G Telephone Cable LOS D (S.U.E.*)	—————
U/G Telephone Conduit LOS B (S.U.E.*)	—————
U/G Telephone Conduit LOS C (S.U.E.*)	—————
U/G Telephone Conduit LOS D (S.U.E.*)	—————
U/G Fiber Optics Cable LOS B (S.U.E.*)	—————
U/G Fiber Optics Cable LOS C (S.U.E.*)	—————
U/G Fiber Optics Cable LOS D (S.U.E.*)	—————

WATER:

Water Manhole	—————
Water Meter	—————
Water Valve	—————
Water Hydrant	—————
U/G Water Line LOS B (S.U.E.*)	—————
U/G Water Line LOS C (S.U.E.*)	—————
U/G Water Line LOS D (S.U.E.*)	—————
Above Ground Water Line	—————

TV:

TV Pedestal	—————
TV Tower	—————
U/G TV Cable Hand Hole	—————
U/G TV Cable LOS B (S.U.E.*)	—————
U/G TV Cable LOS C (S.U.E.*)	—————
U/G TV Cable LOS D (S.U.E.*)	—————
U/G Fiber Optic Cable LOS B (S.U.E.*)	—————
U/G Fiber Optic Cable LOS C (S.U.E.*)	—————
U/G Fiber Optic Cable LOS D (S.U.E.*)	—————

GAS:

Gas Valve	—————
Gas Meter	—————
U/G Gas Line LOS B (S.U.E.*)	—————
U/G Gas Line LOS C (S.U.E.*)	—————
U/G Gas Line LOS D (S.U.E.*)	—————
Above Ground Gas Line	—————

SANITARY SEWER:

Sanitary Sewer Manhole	—————
Sanitary Sewer Cleanout	—————
U/G Sanitary Sewer Line	—————
Above Ground Sanitary Sewer	—————
SS Forced Main Line LOS B (S.U.E.*)	—————
SS Forced Main Line LOS C (S.U.E.*)	—————
SS Forced Main Line LOS D (S.U.E.*)	—————

MISCELLANEOUS:

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

PROJECT NO.	GR22.313
SCALE	N/A
DATE	6/9/19
BY	SBM/EDB

FIGURE 9
LEGEND FOR PLAN SHEET FIGURES
NCDOT PROJECT U-2579AB, WINSTON-SALEM - NORTHERN
BELTWAY EASTERN SECTION (FUTURE I-74)
FORSYTH COUNTY, NORTH CAROLINA



ESP Associates, Inc.
7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409
336.334.7724
www.espassociates.com

APPENDIX A
SOIL BORING LOGS



FIELD BORING LOG

BORING NO.

B342-7

PROJECT NAME: NCDOT U-2579AB PROJ. NO.: GR22.313
 LOCATION: Northeast side of known USTs; in the grass
 TYPE OF BORING: Direct Push DATE STARTED: 5/2/19 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 5/2/19 TOTAL DEPTH: 10.0 ft
 DRILLER: Stefan Smith SAMPLE METHOD: 4' Macro Core DEPTH TO GW: N/A ft
 DRILL RIG: Geoprobe 54DT LOGGED BY: S. Montgomery COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0 - 0.1 Grass, root mat	Core 1 Rec 4.0'/4.0'
				0.1 - 3.0 Red to red brown clayey sand, dry	
1	S-1	1.0-1.5	1.7		
2	S-2	2.0-2.5	0.5		
3	S-3	3.0-3.5	0.3	3.0 - 4.0 Red to red brown clayey silt, dry	
4	S-4	4.0-4.5	3.3	4.0 - 5.0 Red to red brown and white sandy clay, dry	Core 2 Rec 4.0'/4.0'
5	S-5	5.0-5.5	0.4	5.0 - 8.5 Red to red brown clayey sand, dry	
6	S-6	6.0-6.5	2.5		
7	S-7	7.0-7.5	0.8		
8	S-8	8.0-8.5	1.0	8.5 - 10.0 Mottled white, gray and black sand, dry	Core 3 Rec 2.0'/2.0'
9	S-9	9.0-9.5	0.4		
10					
11					
12					
13					
14					
15					



FIELD BORING LOG

BORING NO.

B342-8

PROJECT NAME: NCDOT U-2579AB PROJ. NO.: GR22.313LOCATION: Behind dumpster # 1; in the grassTYPE OF BORING: Direct Push DATE STARTED: 5/2/19 SHEET: 1 of 1DRILLING FIRM: SAEDACCO DATE FINISHED: 5/2/19 TOTAL DEPTH: 10.0 ftDRILLER: Stefan Smith SAMPLE METHOD: 4' Macro Core DEPTH TO GW: N/A ftDRILL RIG: Geoprobe 54DT LOGGED BY: S. Montgomery COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0 - 0.1 Grass, root mat	Hand augering from 0.0' -3.0'
				0.1 - 8.0 Red to red brown clayey silt, dry	No odor
1	S-1 H.A.	1.0-1.5	2.5		
2	S-2 H.A.	2.0-2.5	1.3		
3	S-3 H.A.	3.0-3.5	0.7		Core 1 Rec 1.0'/1.0'
4	S-4	4.0-4.5	0.7		Core 2 Rec 4.0'/4.0'
5	S-5	5.0-5.5	0.3		
6	S-6	6.0-6.5	0.6		
7	S-7	7.0-7.5	0.3		
8	S-8	8.0-8.5	0.4	8.5 - 10.0 Mottled white, gray and black sand, dry	Core 3 Rec 2.0'/2.0' No odor
9	S-9	9.0-9.5	0.2		
10					
11					
12					
13					
14					
15					



FIELD BORING LOG

BORING NO.

B342-9

PROJECT NAME: NCDOT U-2579AB PROJ. NO.: GR22.313LOCATION: Behind gas station, center of buildingTYPE OF BORING: Direct Push DATE STARTED: 5/2/19 SHEET: 1 of 1DRILLING FIRM: SAEDACCO DATE FINISHED: 5/2/19 TOTAL DEPTH: 10.0 ftDRILLER: Stefan Smith SAMPLE METHOD: 4' Macro Core DEPTH TO GW: N/A ftDRILL RIG: Geoprobe 54DT, Hand Auger (H.A.) LOGGED BY: S. Montgomery COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0 - 0.1 Grass, root mat	
				0.1 - 8.0 Red to red brown clayey sand, dry	H.A. 0.0' -3.0'
1	S-1 H.A.	1.0-1.5	0.2		
2	S-2 H.A.	2.0-2.5	1.3		
3	S-3 H.A.	3.0-3.5	1.2		Core 1 Rec 1.0'/1.0'
4	S-4	4.0-4.5	2.3		Core 2 Rec 4.0'/4.0'
5	S-5	5.0-5.5	3.5		
6	S-6	6.0-6.5	2.8		
7	S-7	7.0-7.5	1.0		
8	S-8	8.0-8.5	1.2	8.0 - 10.0 Tan to red brown sandy clay, dry	Core 3 Rec 2.0'/2.0'
9	S-9	9.0-9.5	1.6		
10					
11					
12					
13					
14					
15					



FIELD BORING LOG

BORING NO.

B342-10

PROJECT NAME: NCDOT U-2579AB PROJ. NO.: GR22.313LOCATION: Behind AC unit, northwest corner of gas station buildingTYPE OF BORING: Direct Push DATE STARTED: 5/2/19 SHEET: 1 of 1DRILLING FIRM: SAEDACCO DATE FINISHED: 5/2/19 TOTAL DEPTH: 10.0 ftDRILLER: Stefan Smith SAMPLE METHOD: 4' Macro Core DEPTH TO GW: N/A ftDRILL RIG: Geoprobe 54DT LOGGED BY: S. Montgomery COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0 - 0.1 Grass, root mat	
				0.1 - 2.0 Red brown clayey sand, dry	H.A. from 0.0' -4.0'
1	S-1 H.A.	1.0-1.5	1.0		
2	S-2 H.A.	2.0-2.5	2.0	2.0 -4.5 Red Brown clayey sand, very wet	
3	S-3 H.A.	3.0-3.5	1.0		Wet clayey sand thought to have been from water main near the borehole 2' deep
4	S-4 H.A.	4.0-4.5	2.2	4.5 - 8.0 Red brown clayey sand, dry	Core 1 Rec 4.0'/4.0'
5	S-5	5.0-5.5	1.9		
6	S-6	6.0-6.5	0.9		
7	S-7	7.0-7.5	0.5		
8	S-8	8.0-8.5	1.3	8.0 - 8.5 Red brown clayey sand, moist 8.5 - 10.0 Dark gray sand, moist	Core 3 Rec 2.0'/2.0'
9	S-9	9.0-9.5	2.7		
10					
11					
12					
13					
14					
15					

APPENDIX B

RED LAB LABORATORY TESTING REPORT



Hydrocarbon Analysis Results

Client: ESP ASSOCIATES
Address: GREENSBORO, NC

Samples taken Thursday, May 2, 2019
Samples extracted Thursday, May 2, 2019
Samples analysed Tuesday, May 7, 2019

Contact: NED BILLINGTON

Operator CAROLINE STEVENS

Project: GR22.313 GROUP 2

											F03640		
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	B342-7 S4	24.5	<0.61	<0.61	1.8	1.8	1.3	<0.2	<0.025	0	50.3	49.7	V.Deg.PHC 75.8%,(FCM),(P)
s	B342-8 S8	10.4	<0.26	<0.26	<0.26	<0.26	<0.05	<0.08	<0.01	0	0	0	(FCM)
s	B342-9 S5	5.9	<0.15	<0.15	<0.15	<0.15	<0.03	<0.05	<0.006	0	0	0	(FCM)
s	B342-10 S9	14.4	<0.36	<0.36	<0.36	<0.36	<0.07	<0.12	<0.014	0	0	0	(FCM)
Initial Calibrator QC check			OK			Final FCM QC Check			OK			96.8 %	

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library
(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

APPENDIX C
CHAIN-OF-CUSTODY FORM

Client Name:	ESP Assoc.
Address:	Greensboro
Contact:	Ned Billington
Project Ref.:	GR 22.313
Email:	on file
Phone #:	
Collected by:	S. Montgomery



RAPID ENVIRONMENTAL DIAGNOSTICS
CHAIN OF CUSTODY AND ANALYTICAL
REQUEST FORM

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

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

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
5/2/19		✓	EDB	B39-1 54	55.9	44.9	11
5/2/19		✓	EDB	B39-2 59	57.1	45.2	11.9
5/2/19		✓	EDB	B39-3 58	56.2	44.7	11.5
5/2/19		✓	EDB	B39-4 54	56.9	44.5	12.4
5/2/19		✓	EDB	B39-4 59	55.7	44.7	11
5/2/19		✓	EDB	B39-5 55	54.8	44.9	9.9
} Group 1							
5/2/19		✓	EDB	B342-7 54	55.5	44.9	10.6
5/2/19		✓	EDB	B342-8 58	54.4	44.8	9.6
5/2/19		✓	EDB	B342-9 55	55.0	44.8	10.2
5/2/19		✓	EDB	B342-10 59	54.3	44.6	9.7
} Group 2							

Comments: UVF, pls report each group separately

Relinquished by	Date/Time	Accepted by	Date/Time
Ned Billington	5/6/19		
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

(10)

B



November 5, 2018

Mr. Cyrus Parker, L.G., P.E.
Geotechnical Engineering Unit
State of N.C. Department of Transportation – Division of Highways
P.O. Box 25201
Raleigh, NC 27611-5201

**RE: PRELIMINARY SITE ASSESSMENT OF PARCEL 352 – Revision 1
ESP Project No. CS34.366**

WBS: 34839.1.8
TIP: U-2579AB
County: Forsyth
Description: Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40
Business/US 421
Parcel No.: 352
Owner: Don M. Berrier
Address: 4400 Kernersville Road, Winston-Salem, NC

Dear Mr. Parker:

ESP Associates, Inc. (ESP) is pleased to submit this report on our Preliminary Site Assessment of the subject parcel. This work was performed in accordance with your Request for Proposal dated April 17, 2018 and our Cost Proposal dated May 3, 2018.

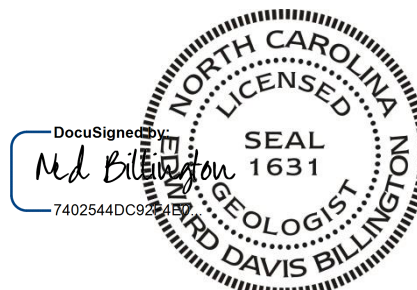
We appreciate the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

A handwritten signature in blue ink, appearing to read "Edward D. Billington".

Edward D. Billington, PG
Senior Geologist/Geophysicist
DMN/EDB/CJW



not considered Final unless all signatures are completed

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Appendix C	Chain-of-Custody Form

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning to construct the Winston-Salem - Northern Beltway Eastern Section (Future I-74) From I-40 to I-40 Business/US 421 (Figure 1). The NCDOT requested that ESP Associates, Inc. (ESP) perform a Preliminary Site Assessment (PSA) of Parcel 352 within the proposed Right of Way (ROW) and/or easement to locate possible underground storage tanks (USTs), sample soil, and delineate potential contaminated soil.

2.0 HISTORY

This parcel is owned by Don M. Berrier and is currently occupied by an active business. The facility is listed in the North Carolina Department of Environmental Quality's (NCDEQ's) UST Section Registry with UST No. WS-612. No other information is available for this site.

3.0 SITE OBSERVATIONS

During our May 2018 field work, the site was operating as an active florist shop (Figure 2). The ground in the study area was covered by asphalt, concrete, and grass.

4.0 METHODS

ESP performed a geophysical study of the area designated by the NCDOT on May 23, 2018. We performed direct-push drilling and sampling of subsurface soils within the proposed easement on September 6, 2018. A photoionization detector (PID) was used to screen subsurface soils in the field and select soil samples to send for laboratory analysis.

4.1 Geophysics

ESP performed a metal detector study over the accessible areas of the site using a Geonics EM61 MK2 with a line spacing of about three feet (Figures 3 and 4). Location control was provided in real-time using a differential global positioning system (DGPS). We collected ground-penetrating radar (GPR) data over selected EM61 anomalies and reinforced concrete areas using our Sensors and Software Noggin 250 GPR system. The GPR data were collected using a line spacing of one to two feet.

4.2 Borings

ESP performed direct-push drilling activities within the easement of Parcel 352 using a subcontractor, SAEDACCO of Fort Mill, South Carolina. Three borings were drilled, designated B352-1 through B352-3 (Figure 3). The soil borings were advanced using a GeoProbe 7822DT drill rig. Continuous soil samples were obtained to a depth of approximately ten feet using five-foot long Macro Cores®. Soil cores had a recovery of four to five feet. The sampling equipment

was decontaminated prior to drilling and between borings by the driller using a Liquinox® detergent solution.

4.3 Soil Sample Protocol

Representative soil samples were taken from the Macro-Core tubes at approximate one-foot intervals by the ESP field geologist while wearing nitrile disposable gloves. Each sample was placed in a sealed plastic bag and then kept in a sunny area for at least 5 minutes prior to measuring volatile organic compound (VOC) levels in the head space with the PID. All of the soil samples obtained had a PID reading of less than 10 parts per million (ppm).

Soil samples selected for laboratory analysis were Sample S-9 (corresponding depth of 9.0-9.5 feet) from each of Borings B352-1, and B352-3; Sample S-8 (8.0-8.5 feet) from Boring B352-2. For each selected sample, an approximate 10-gram soil sample was collected from the Macro-Core tube using a Terra Core Sampler and placed into a laboratory-supplied 40-milliliter volatile organic analysis (VOA) vial containing methanol. Once sealed, the vial was labeled with the sample identification number and then shaken vigorously for about one minute. The samples were packed on ice and sent via overnight delivery to RED Lab, LLC (RED Lab), located in Wilmington, North Carolina, following proper chain-of-custody procedures (Appendix C).

RED Lab used a QED Hydrocarbon Analyzer to quantitatively analyze the soil samples using the ultraviolet fluorescence (UVF) method for benzene, toluene, ethylbenzene, and xylene (BTEX); gasoline range organics (GRO); diesel range organics (DRO); total petroleum hydrocarbons (TPH); total aromatics; polycyclic aromatic hydrocarbons (PAHs); and benzo(a)pyrene (BaP).

4.4 Groundwater

Groundwater was not encountered in the three borings drilled on the site.

5.0 RESULTS

5.1 Geophysics

The EM61 early time gate data show the response from both shallow and deeper metallic objects (Figure 3). The differential response reduces the effect of shallow anomalies and emphasizes anomalies from larger and more deeply buried metallic objects, such as USTs (Figure 4). The EM61 differential results indicated several anomalies (response above background) that did not correspond to known site features.

GPR data were collected over the EM61 anomalies. The GPR data collected did not indicate the presence of unknown USTs within the study area.

The EM61 early time gate response and differential response are shown on the plan sheet on Figures 5 and 6, respectively.

5.2 Sample Data

The soil sample UVF hydrocarbon analysis results for BTEX, GRO, DRO, and PAHs are presented in Table 2. The RED Lab laboratory report, which includes results for TPH, total aromatics, and BaP, is provided in Appendix B. Values are provided in milligrams per kilogram (mg/kg or ppm).

5.3 Sample Observations

The results of the laboratory testing indicated that BTEX and PAHs were below the detection limits for all samples. GRO was detected in 1 of the 3 soil samples tested but below the NCDEQ action level of 50 ppm. The highest GRO reading was 1.7 ppm in Sample S-9 (9.0-9.5 feet) from Boring B352-1. DRO was detected in 1 of the 3 soil samples tested but below the NCDEQ action level of 100 ppm. The highest DRO reading was 1.6 ppm in Sample S-8 (8.0-8.5 feet) from Boring B352-2.

6.0 CONCLUSIONS

6.1 Interpretation of Results

The results of the PSA for Parcel 352 of NCDOT Project U-2579AB do not indicate the presence of abandoned USTs. No petroleum hydrocarbon soil contamination at or above NCDEQ action levels was detected within the proposed construction easement on Parcel 352.

6.2 Geophysics

The geophysical data do not indicate the presence of abandoned USTs.

6.3 Soil

The results of the PID field screening readings and off-site UVF hydrocarbon analyses do not indicate the presence of contaminated soil at or above the NCDEQ action levels within the proposed construction easement on Parcel 352 (Figure 7).

7.0 RECOMMENDATIONS

No limitations on construction activities or special handling of excavated soil are recommended for Parcel 352.

8.0 LIMITATIONS

ESP's professional services have been performed, findings obtained, and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. ESP is not responsible for the independent conclusions, opinions, or recommendations made by others based on the data presented in this report.

The passage of time may result in a change in the environmental characteristics at this site and surrounding properties. ESP does not warrant against future operations or conditions, or against operations or conditions present of a type or at a location not investigated. ESP does not assume responsibility for other environmental issues that may be associated with the subject site.

TABLES

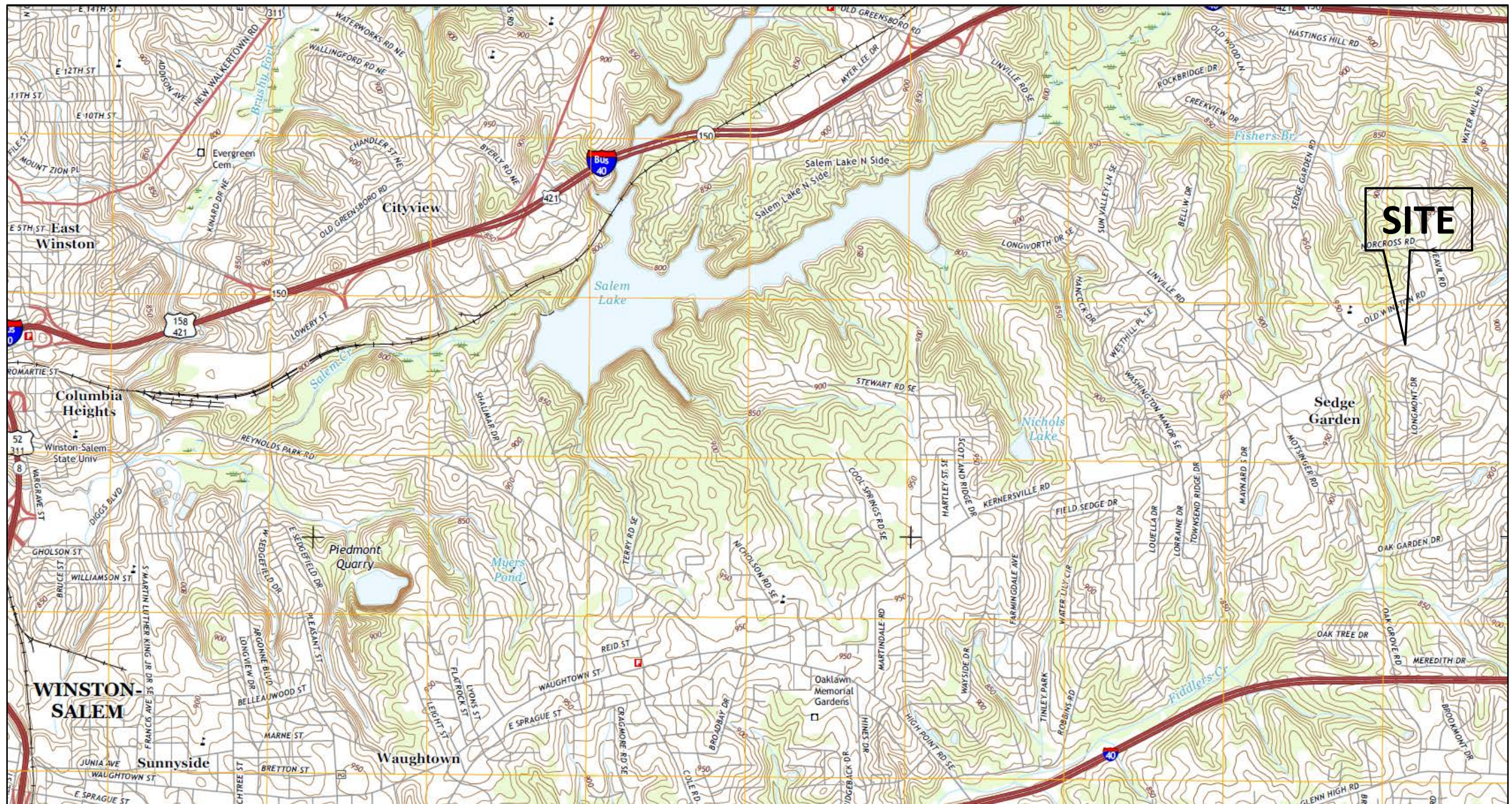
TABLE 1
SOIL SAMPLE PID READINGS

Boring	Sample Depth Range with PID > 10 ppm (feet bgs)	Maximum PID Reading (ppm) and Sample Depth (feet bgs)
B352-1	none	3.2 (7.0-7.5)
B352-2	none	4.6 (5.0-5.5)
B352-3	none	4.4 (6.0-6.5)

TABLE 2
SOIL SAMPLE UVF RESULTS SUMMARY

Boring	Sample ID (depth in feet bgs)	Date Collected	BTEX (C6-C9) (mg/kg)	GRO (C5-C10) (mg/kg)	DRO (C10-C35) (mg/kg)	PAHs (mg/kg)
B352-1	S-9 (9.0-9.5)	9/10/18	<0.43	1.7	<0.43	<0.14
B352-2	S-8 (8.0-8.5)	9/10/18	<0.38	<0.38	1.6	<0.12
B352-3	S-9 (9.0-9.5)	9/10/18	<0.95	<0.95	<0.95	<0.3

FIGURES



From: USGS US Topo 7.5 - minute map for WINSTON-SALEM EAST, NC Date: 2016, Scale: 1:24,000

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	9/XX/18
BY	DMN

**FIGURE 1 – PARCEL 352, DON M. BERRIER
SITE VICINITY MAP**

**U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA**



7011 Albert Pick Rd.,
Suite E
Greensboro, NC 27409
336.334.7724
www.espassociates.com



a. Photo from north side of site looking south.




b. Photo from west side of site looking east.

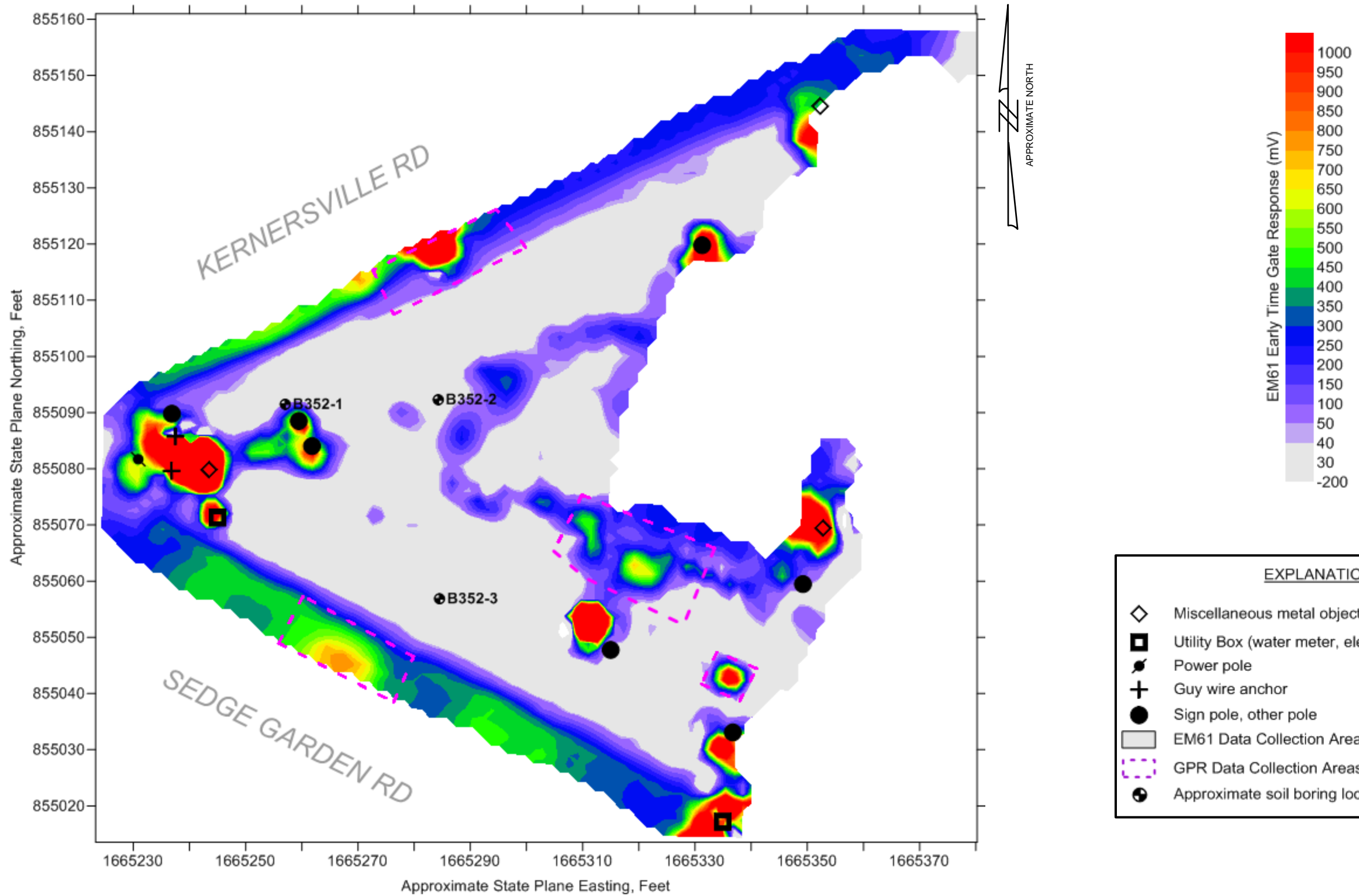


c. Photo from southeast side of site looking northwest.



d. Photo from south side of site looking north.

PROJECT NO. CS34.366	FIGURE 2 – PARCEL 352, DON M. BERRIER SITE PHOTOGRAPHS	U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421 FORSYTH COUNTY, NORTH CAROLINA	 ESP	7011 Albert Pick Rd., Suite E Greensboro, NC 27409
SCALE AS SHOWN				336.334.7724
DATE 9/XX/18				www.espassociates.com
BY DMN				



EXPLANATION	
◇	Miscellaneous metal object (pipe, debris, etc.)
□	Utility Box (water meter, electrical outlet, etc.)
⚡	Power pole
+	Guy wire anchor
●	Sign pole, other pole
■	EM61 Data Collection Areas
⋯	GPR Data Collection Areas
⊕	Approximate soil boring location

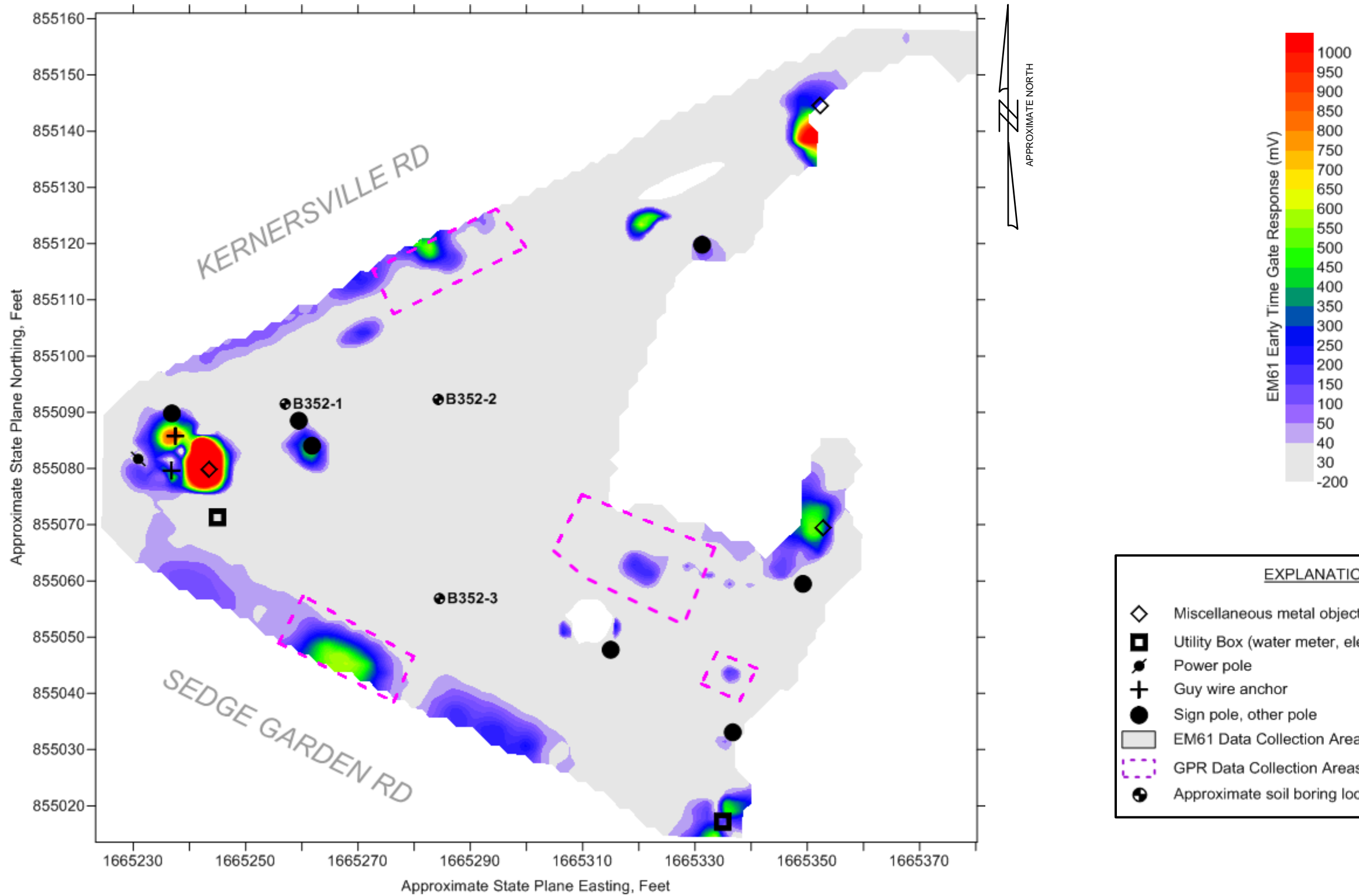
Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	9/XX/18
BY	DMN

FIGURE 3 – PARCEL 352, DON M. BERRIER
EM61 EARLY TIME GATE RESPONSE
 U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
 (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
 FORSYTH COUNTY, NORTH CAROLINA



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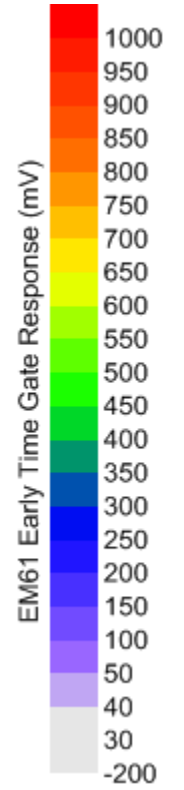
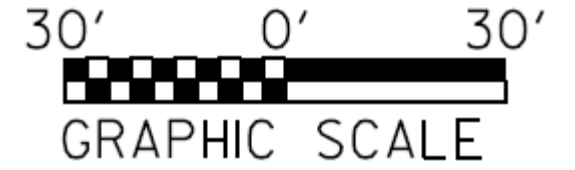
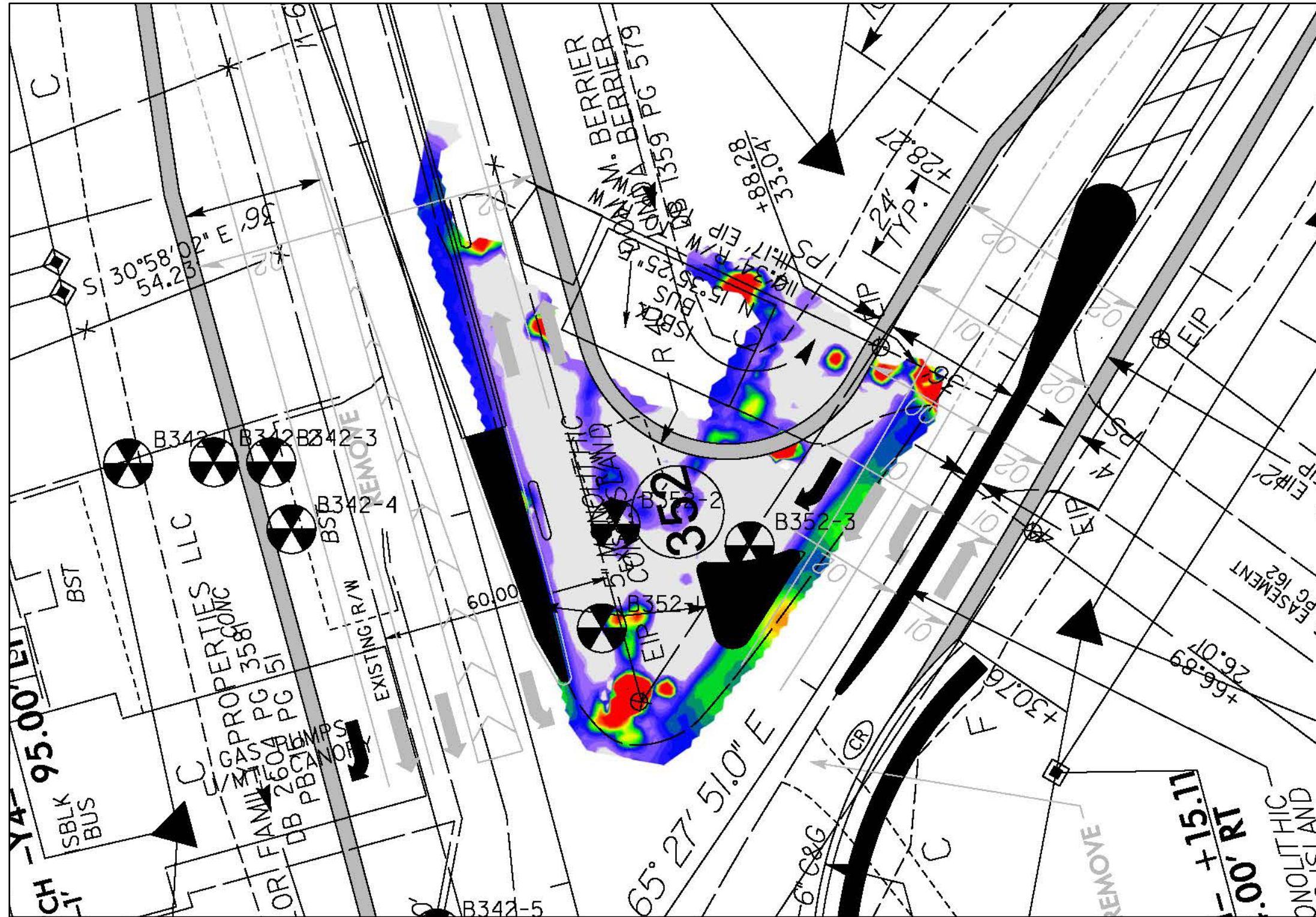
Note: Locations of data and features are approximate and were collected using a DGPS instrument. ESP makes no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	9/XX/18
BY	DMN

FIGURE 4- PARCEL 352, DON M. BERRIER
EM61 DIFFERENTIAL RESPONSE
 U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
 (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
 FORSYTH COUNTY, NORTH CAROLINA



7011 Albert Pick Rd.,
 Suite E
 Greensboro, NC 27409
 336.334.7724
 www.espassociates.com



List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

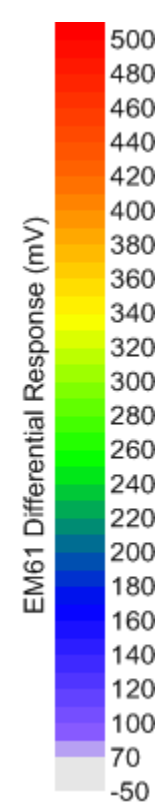
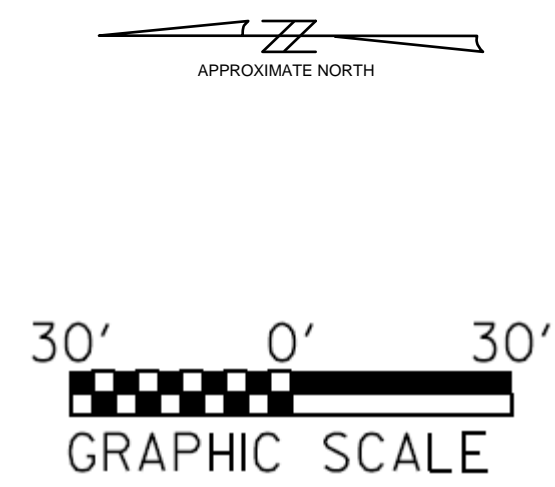
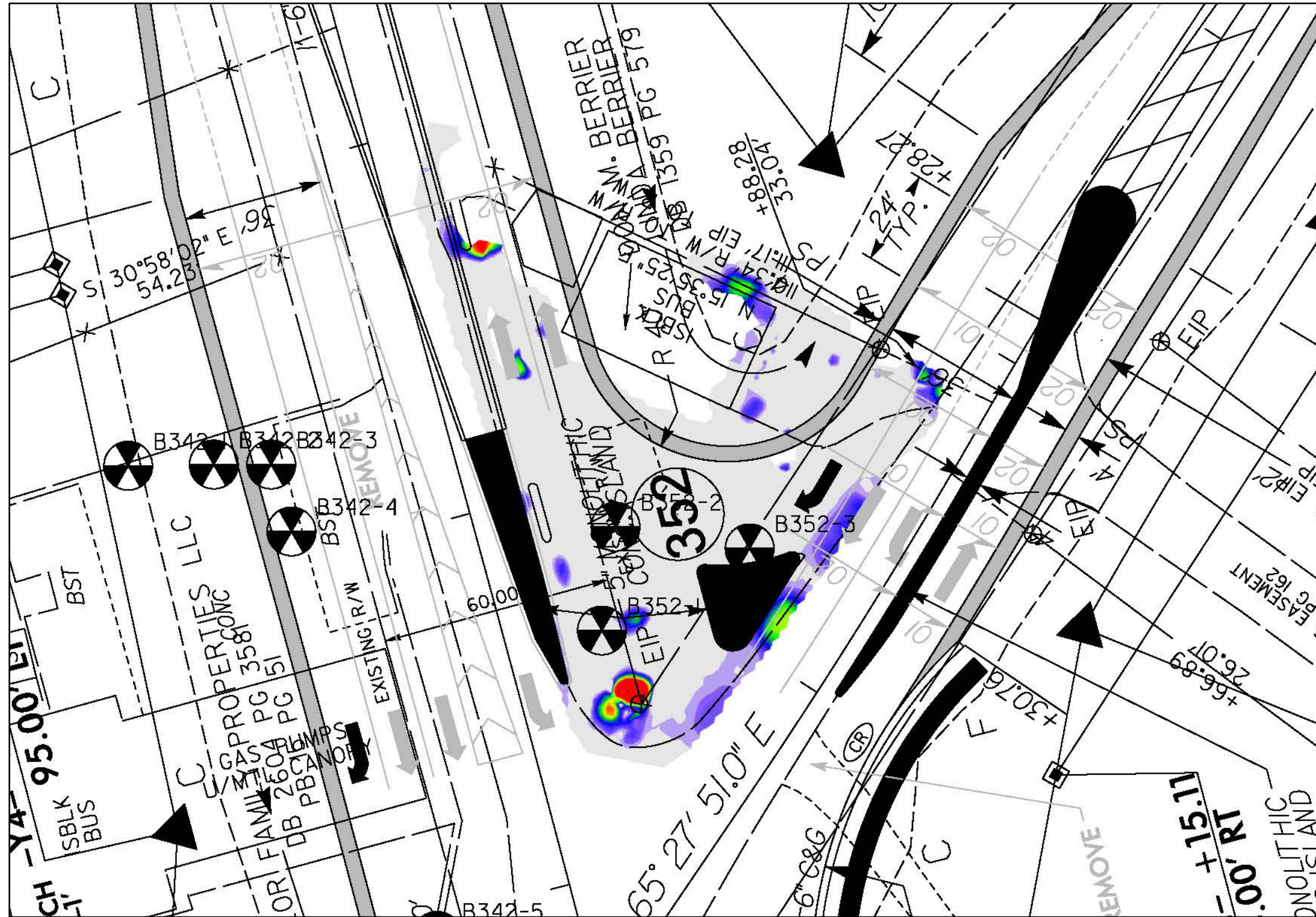
See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	9/XX/18
BY	DMN

FIGURE 5 – PARCEL 32, DON M. BERRIER
EM61 EARLY TIME GATE RESPONSE ON PLAN SHEET
 U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
 (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
 FORSYTH COUNTY, NORTH CAROLINA



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List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	AS SHOWN
DATE	9/XX/18
BY	DMN

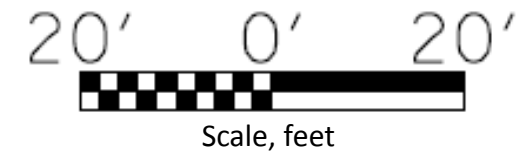
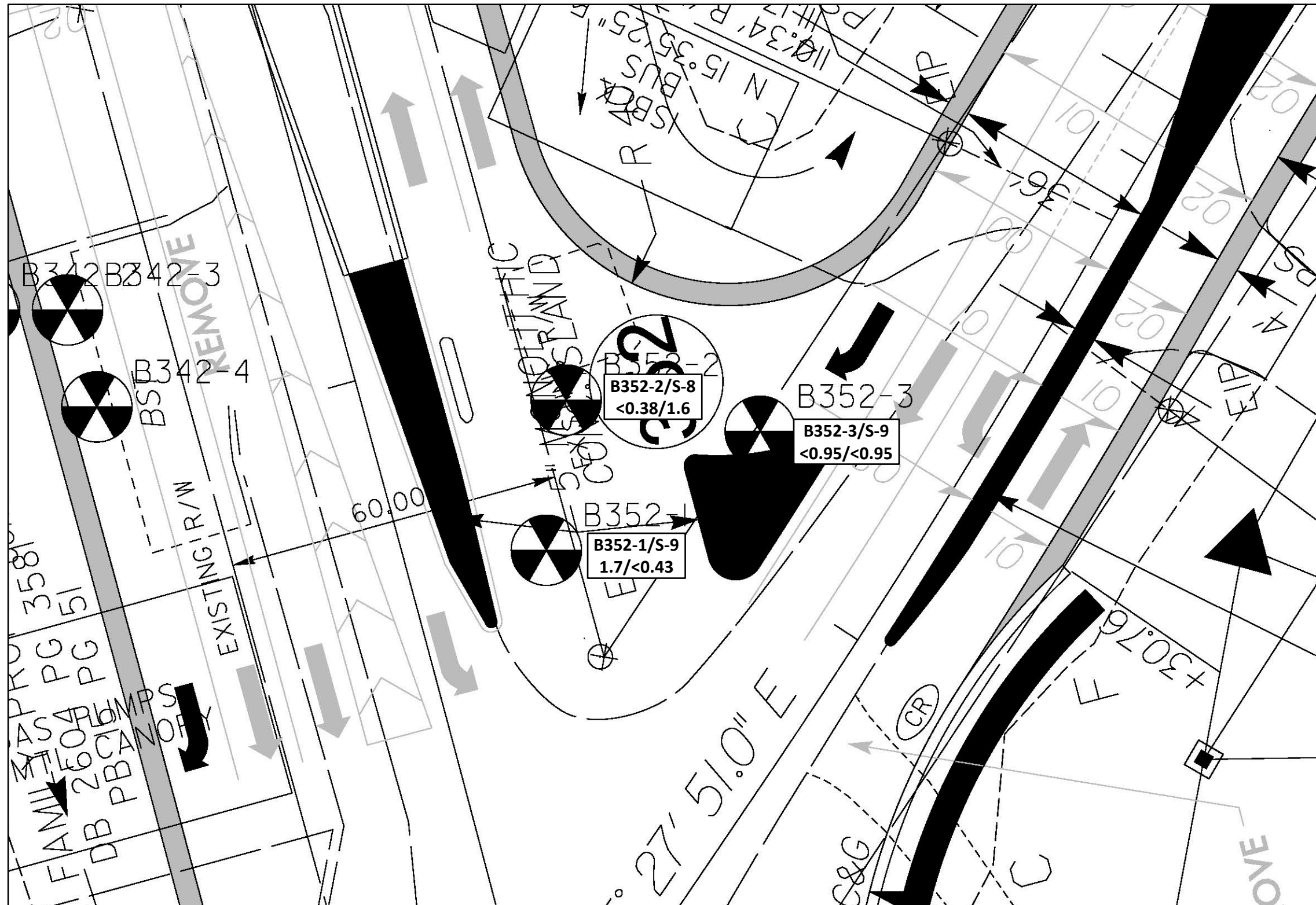
FIGURE 6- PARCEL 352, DON M. BERRIER
EM61 DIFFERENTIAL RESPONSE ON PLAN SHEET

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
 (FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
 FORSYTH COUNTY, NORTH CAROLINA



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Explanation	
B352-1/S-9 1.7/<0.43	Maximum Analytical Results per Boring Boring No./Sample No. GRO/DRO (mg/kg, ppm)

List of NCDOT reference files

- u2579ab_rdy_dsn.dgn
- SS, u2579ab_rdy_ss.dgn
- ROW, u2579ab_rdy_row.dgn
- FinalSurvey\U2579AB_ncdot_fs.dgn
- U2579AB_hyd_dm.dgn

See Figure 8 for explanation of symbols and line types

PROJECT NO.	CS34.366
SCALE	1" = 20'
DATE	9/XX/18
BY	DMN

**FIGURE 7 – PARCEL 352, DON M. BERRIER
SOIL ANALYTICAL RESULTS ON PLAN SHEET**

U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA



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STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale *S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

State Line	—————
County Line	—————
Township Line	—————
City Line	—————
Reservation Line	—————
Property Line	—————
Existing Iron Pin	○
Property Corner	⊕
Property Monument	⊕
Parcel/Sequence Number	⊕
Existing Fence Line	—x—x—x—
Proposed Woven Wire Fence	—o—o—o—
Proposed Chain Link Fence	—□—□—□—
Proposed Barbed Wire Fence	—◇—◇—◇—
Existing Wetland Boundary	—w—w—w—
Proposed Wetland Boundary	—w—w—w—
Existing Endangered Animal Boundary	—a—
Existing Endangered Plant Boundary	—p—
Existing Historic Property Boundary	—h—
Known Contamination Area: Soil	—x—x—x—
Potential Contamination Area: Soil	—x—x—x—
Known Contamination Area: Water	—x—x—x—
Potential Contamination Area: Water	—x—x—x—
Contaminated Site: Known or Potential	—x—x—x—

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	—————
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 RW Marker	—————
Proposed Control of Access Line with Concrete CA Marker	—————
Existing Control of Access	—————
Proposed Control of Access	—————
Existing Easement Line	—————
Proposed Temporary Construction Easement	—————
Proposed Temporary Drainage Easement	—————
Proposed Permanent Drainage Easement	—————
Proposed Permanent Drainage / Utility Easement	—————
Proposed Permanent Utility Easement	—————
Proposed Temporary Utility Easement	—————
Proposed Aerial Utility Easement	—————
Proposed Permanent Easement with Iron Pin and Cap Marker	—————

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	—————
Existing Curb	—————
Proposed Slope Stakes Cut	—————
Proposed Slope Stakes Fill	—————
Proposed Curb Ramp	—————
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	—————
Bridge Wing Wall, Head Wall and End Wall	—————
MINOR:	—————
Head and End Wall	—————
Pipe Culvert	—————
Footbridge	—————
Drainage Box: Catch Basin, DI or JB	—————
Paved Ditch Gutter	—————
Storm Sewer Manhole	—————
Storm Sewer	—————

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	—————
U/G Power Line LOS B (S.U.E.*)	—————
U/G Power Line LOS C (S.U.E.*)	—————
U/G Power Line LOS D (S.U.E.*)	—————

TELEPHONE:

Existing Telephone Pole	—————
Proposed Telephone Pole	—————
Telephone Manhole	—————
Telephone Pedestal	—————
Telephone Cell Tower	—————
U/G Telephone Cable Hand Hole	—————
U/G Telephone Cable LOS B (S.U.E.*)	—————
U/G Telephone Cable LOS C (S.U.E.*)	—————
U/G Telephone Cable LOS D (S.U.E.*)	—————
U/G Telephone Conduit LOS B (S.U.E.*)	—————
U/G Telephone Conduit LOS C (S.U.E.*)	—————
U/G Telephone Conduit LOS D (S.U.E.*)	—————
U/G Fiber Optics Cable LOS B (S.U.E.*)	—————
U/G Fiber Optics Cable LOS C (S.U.E.*)	—————
U/G Fiber Optics Cable LOS D (S.U.E.*)	—————

WATER:

Water Manhole	—————
Water Meter	—————
Water Valve	—————
Water Hydrant	—————
U/G Water Line LOS B (S.U.E.*)	—————
U/G Water Line LOS C (S.U.E.*)	—————
U/G Water Line LOS D (S.U.E.*)	—————
Above Ground Water Line	—————

TV:

TV Pedestal	—————
TV Tower	—————
U/G TV Cable Hand Hole	—————
U/G TV Cable LOS B (S.U.E.*)	—————
U/G TV Cable LOS C (S.U.E.*)	—————
U/G TV Cable LOS D (S.U.E.*)	—————
U/G Fiber Optic Cable LOS B (S.U.E.*)	—————
U/G Fiber Optic Cable LOS C (S.U.E.*)	—————
U/G Fiber Optic Cable LOS D (S.U.E.*)	—————

GAS:

Gas Valve	—————
Gas Meter	—————
U/G Gas Line LOS B (S.U.E.*)	—————
U/G Gas Line LOS C (S.U.E.*)	—————
U/G Gas Line LOS D (S.U.E.*)	—————
Above Ground Gas Line	—————

SANITARY SEWER:

Sanitary Sewer Manhole	—————
Sanitary Sewer Cleanout	—————
U/G Sanitary Sewer Line	—————
Above Ground Sanitary Sewer	—————
SS Forced Main Line LOS B (S.U.E.*)	—————
SS Forced Main Line LOS C (S.U.E.*)	—————
SS Forced Main Line LOS D (S.U.E.*)	—————

MISCELLANEOUS:

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

PROJECT NO.	CS34.366
SCALE	N/A
DATE	9/XX/18
BY	DMN

**FIGURE 8
LEGEND FOR PLAN SHEET FIGURES**

**U-2579AB, WINSTON SALEM – NORTHERN BELTWAY EASTERN SECTION
(FUTURE I-74) FROM I-40 TO I-40 BUSINESS/US421
FORSYTH COUNTY, NORTH CAROLINA**



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Greensboro, NC 27409
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APPENDIX A
SOIL BORING LOGS



FIELD BORING LOG

BORING NO.

B352-1

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Near Kernersville Rd.
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT:

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Asphalt	Core 1 Rec 5.0'/5.0'
1	S-1	1.0-1.5	0.7	0.3-2.0 Orange-brown sandy silt	
2	S-2	2.0-2.5	1.5	2.0-7.9 Orange-brown sandy, silty clay	
3	S-3	3.0-3.5	1.1		
4	S-4	4.0-4.5	1.4		Core 2 Rec 5.0'/5.0'
5	S-5	5.0-5.5	2.4		
6	S-6	6.0-6.5	2.4		
7	S-7	7.0-7.5	3.2	7.9-10.0 Orange-red sandy silt	
8	S-8	8.0-8.5	1.4		
9	S-9	9.0-9.5	1.2		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B352-2

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Near concrete area
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.3 Asphalt	Core 1 Rec 4.5/5.0'
1	S-1	1.0-1.5	2.5	0.3-3.0 Orange-red silty clay	
2	S-2	2.0-2.5	3.3		
3	S-3	3.0-3.5	2.0	3.0-3.7 Asphalt 3.7-7.0 Orange-red silty clay	
4	S-4	No Rec	2.4		Core 2 Rec 4.0/5.0'
5	S-5	5.0-5.5	4.6		
6	S-6	6.0-6.5	3.4		
7	S-7	7.0-7.5	4.1	7.0-9.0 Orange-tan silty sand	
8	S-8	8.0-8.5	4.5		
9					
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis



FIELD BORING LOG

BORING NO.

B352-3

PROJECT NAME: NCDOT U-2579AB PSA PROJ. NO.: CS34.366
 LOCATION: Near Sedge Garden Rd.
 TYPE OF BORING: Direct Push DATE STARTED: 9/6/18 SHEET: 1 of 1
 DRILLING FIRM: SAEDACCO DATE FINISHED: 9/6/18 TOTAL DEPTH: 10.0 ft
 DRILLER: Brian Ewing SAMPLE METHOD: 5' Macro Core DEPTH TO GW: Dry ft
 DRILL RIG: Geoprobe 7822 DT LOGGED BY: D. Nance COMMENT: _____

DEPTH (ft)	SAMPLE NO.	SAMPLE DEPTH (ft)	PID READING (ppm)	FIELD CLASSIFICATION AND PHYSICAL DESCRIPTION	REMARKS
				0.0-0.4 Asphalt 0.4-0.7 Gravel	Core 1 Rec 4.0/5.0'
1	S-1	1.0-1.5	2.5	0.7-5.2 Orange-red silty, sandy clay	
2	S-2	2.0-2.5	2.4		
3	S-3	3.0-3.5	2.7		
4	S-4	No Rec	N/A		Core 2 Rec 5.0/5.0'
5	S-5	5.0-5.5	3.7	5.2-10.0 Orande-brown sandy, silty clay	
6	S-6	6.0-6.5	4.4		
7	S-7	7.0-7.5	4.3		
8	S-8	8.0-8.5	4.1	8.3-10.0 Tan-gray sandy silt	
9	S-9	9.0-9.5	2.4		
10					
11					
12					
13					
14					
15					

Sample selected for laboratory analysis

APPENDIX B

RED LAB LABORATORY TESTING REPORT



Hydrocarbon Analysis Results

Client: ESP ASSOCIATES, INC
Address: 7011 ALBERT PICK ROAD
 SUITE E
 GREENSBORO NC 27409

Samples taken Monday, September 10, 2018
Samples extracted Monday, September 10, 2018
Samples analysed Wednesday, September 12, 2018

Contact: DILLON NANCE

Operator NICK HENDRIX

Project: U-2579 AB

U00904

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	B331-5 (S-9)	15.1	<0.38	<0.38	<0.38	<0.38	<0.08	<0.12	<0.015	0	100	0	,(FCM),(P)
s	B331-4 (S-9)	12.3	<0.31	<0.31	<0.31	<0.31	<0.06	<0.1	<0.012	0	0	0	,(FCM)
s	B331-3 (S-9)	18.7	<0.47	<0.47	<0.47	<0.47	<0.09	<0.15	<0.019	0	0	0	,(FCM),(P)
s	B331-2 (S-9)	19.4	<0.49	<0.49	<0.49	<0.49	<0.1	<0.16	<0.019	0	0	0	,(FCM)
s	B331-1 (S-9)	21.2	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	,(FCM)
s	B352-3 (S-9)	37.8	<0.95	<0.95	<0.95	<0.95	<0.19	<0.3	<0.038	0	100	0	,(FCM),(P)
s	B352-2 (S-8)	15.4	<0.38	<0.38	1.6	1.6	0.83	<0.12	<0.015	0	56.6	43.4	Deg.PHC 53.1%,(FCM),(BO)
s	B352-1 (S-9)	17.3	<0.43	1.7	<0.43	1.7	0.43	<0.14	<0.017	91.4	4.9	3.7	V.Deg.PHC 60.6%,(FCM),(BO)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

100.8 %

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**

APPENDIX C
CHAIN-OF-CUSTODY FORM

Client Name: ESP Associates, Inc.
 Address: 7011 Albert Pick Rd. Ste E
Greensboro, NC 27409
 Contact: Dillon Nance
 Project Ref.: U-2579 AB
 Email: d.nance@espsociates.com
 Phone #: 336-404-3117
 Collected by: D. Nance



RAPID ENVIRONMENTAL DIAGNOSTICS
CHAIN OF CUSTODY AND ANALYTICAL
REQUEST FORM

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

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

Sample Collection Date/Time	TAT Requested		Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour							
9/10/18		✓	S	B331-5 S-9	✓		49.2	43.9	5.3
				B331-4 S-9			52.7	45.6	8.1
				B331-3 S-9			51.6	44.1	7.5
				B331-2 S-9			53.0	45.8	7.2
				B331-1 S-9			52.0	45.4	6.6
				B352-3 S-9		47.4	52.7	43.7	3.7
				B352-2 S-9			52.8	43.7	9.1
				B352-1 S-9			51.9	43.8	8.1
				B342-6 S-3			49.8	44.4	5.4
				B342-5 S-9			52.2	44.1	8.1
				B342-4 S-5			51.8	44.4	6.9
				B342-4 S-9			52.0	44.0	8.0
				B342-3 S-9			52.1	44.4	7.7
				B342-2 S-9			50.7	43.7	7.0
				B342-1 S-9			50.1	43.9	6.2
				B54-1 S-9			51.0	44.1	6.9
				B54-2 S-8			51.2	43.5	7.7
				B54-3 S-9			51.9	44.0	7.9
				B54-4 S-7			49.8	44.3	5.5
				B54-5 S-9			51.2	44.3	

Comments: ***most samples underweight. Soil matrix representation affected - data results largely unaffected. (NH 9/12)**

RED Lab USE ONLY

Relinquished by <u>D. Nance</u>	Date/Time <u>9/10/18 16:00</u>	Accepted by <u>NH</u>	Date/Time <u>9/12 11:00</u>
Relinquished by	Date/Time	Accepted by	Date/Time