



November 23, 2012

Gordon Box, LG  
NCDOT, Geotechnical Engineering Unit  
1020 Birch Ridge Drive  
Raleigh, NC 27610

RE:           State Project:   U-3315  
              WBS Element:  35781.1.2  
              County:       Pitt  
              Description:  Stantonsburg Road/Tenth Street Connector from Memorial Drive (US 13)  
                                  to Evans Street

**Subject:       Project 11821014.17, Report on Geophysical Surveys  
                  Parcels 198 &199, Michael John Carey & WF Miriam P Carey Properties, Greenville,  
                  North Carolina**

Dear Mr. Box:

**SCHNABEL ENGINEERING SOUTH, PC** (Schnabel) is pleased to present this report on the geophysical surveys performed on the subject properties and in the adjacent roadway. The report includes two 11x17 color figures and two 8.5x11 color figures with relevant data collected for this study. This study was performed in accordance with our proposal for Geophysical Surveys to Locate Possible USTs dated July 3, 2012, as approved by Cathy Houser on July 26, 2012, the subsequent approval via Gordon Box to add these properties to the scope described in our proposal, and our agreement dated June 2, 2011.

## **INTRODUCTION**

The field work described in this report was performed on October 30, 2012, by Schnabel under our 2011 contract with the NCDOT. The purpose of the geophysical surveys was to investigate the presence of metal underground storage tanks (USTs) in the accessible areas of the right-of-way and/or easement and in the first adjacent roadway lane. The NCDOT provided a Sanborn map showing a suspected UST location, which is in the south-bound lane near the southeastern limits of Parcels 198 and 199. The Sanborn map is shown in Appendix A. We performed the surveys over the accessible areas of the sites and roadway lane as defined by the NCDOT. Photographs of the sites are included on Figure 1. The sites are located in the northwest quadrant of Evans Street and W. 11<sup>th</sup> Street in Greenville, NC.

The geophysical surveys consisted of an electromagnetic (EM) induction survey. The EM survey was performed using a Geonics EM61-MK2 instrument. The EM61 is a time domain metal detector that stores data digitally for later processing and review. Sensitivity to metallic objects is dependent on the size, depth and orientation of the buried object, and the amount of noise (i.e. response from spurious metallic objects) in the area. The EM61 can generally observe a single buried 55 gallon drum at a depth of more than 10 ft. The EM61 makes measurements by creating an electromagnetic pulse and then measuring the response from metallic objects with time after the pulse is generated. We recorded the response at several times after the pulse to help evaluate relative size and depth of metallic objects in the earth. A photograph of the equipment used is shown on Figure 2.

## **FIELD METHODOLOGY**

Locations of geophysical data points were obtained using a sub-meter Trimble Pro-XRT DGPS system. References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in US survey feet. We recorded the locations of existing site features (monitoring wells, signs, other metal objects, etc.) with the Trimble system for later correlation with the geophysical data and locations provided by the NCDOT.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing.

## **DISCUSSION OF RESULTS**

The contoured EM61 data are shown on Figures 3 and 4. The EM61 early time gate data are plotted on Figure 3. Early time data provide a more sensitive detection of all metal objects than the later time data, which tends to highlight deeper and/or larger objects. Figure 4 shows the differential response between top and bottom coils of the EM61 instrument, which tends to filter out the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as USTs.

The early time gate and differential results show anomalies apparently caused by buried utilities or known site features (Figures 3 and 4). GPR data were not collected at the site due to a lack of differential EM61 anomalies that suggest the presence of unknown USTs. The geophysical data do not indicate the presence of metallic USTs within the areas surveyed.

## **CONCLUSIONS**

Our evaluation of the geophysical data collected on the subject property on Project U-3315 in Greenville, NC indicates that metallic USTs are unlikely to be encountered in the areas surveyed on the subject property.

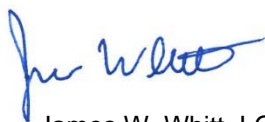
## **LIMITATIONS**

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

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

Sincerely,

**SCHNABEL ENGINEERING SOUTH, PC**



James W. Whitt, LG  
Senior Staff Geophysicist



Nigel Miller, PE  
Associate

JW:MHD:NM:GR

Attachments: Figures (4), Appendix (1)

FILE: G:\2011-SDE-JOBS\11821014\_00\_NCDOT\_2011\_GEOTECHNICAL\_UNIT\_SERVICES\11821014\_17\_U-3315\_PITT\_COUNTY\REPORT\PARCELS 198-199\SCHNABEL GEOPHYSICAL REPORT ON PARCELS 198 & 199.DOCX

Attachments:

- Figure 1 - Parcels 198 & 199 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - Parcels 198 & 199 Early Time Gate Response
- Figure 4 - Parcels 198 & 199 Differential Response
- Appendix A - Sanborn Map (Greenville1923Sheet8parcel199-200 GHB.pdf)



Parcels 198 & 199 (Michael John Carey and WF Miriam P Carey Property),  
looking west



Parcels 198 & 199 (Michael John Carey and WF Miriam P Carey Property),  
looking west



Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit

Note: Stock photograph – not taken on site.

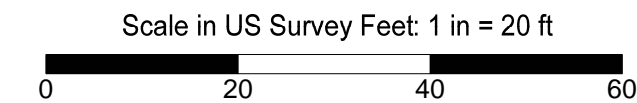
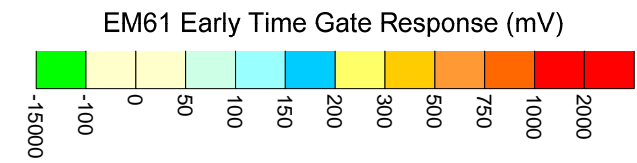
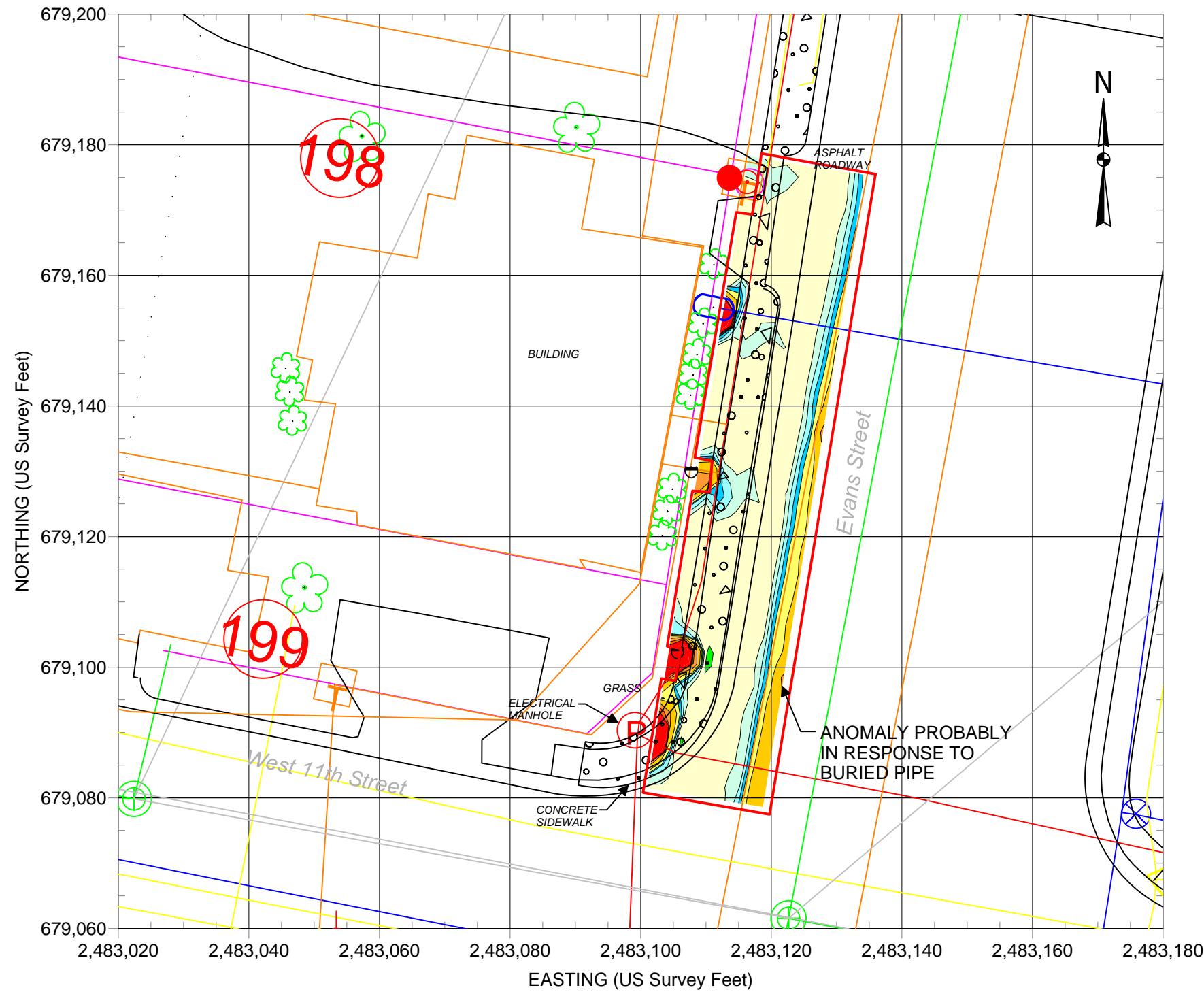


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PROJECT NO. 11821014.17

PHOTO OF  
GEOPHYSICAL  
EQUIPMENT USED

FIGURE 2

PARCELS 198 & 199



EXPLANATION	
	SIGN
	UTILITY MANHOLE, METER, BOX, ETC.
	PROPERTY LINE
	EM61 SURVEY AREA

BASE PLAN FROM NCDOT FILE:  
u3315\_rdy\_psh11.dgn  
(FOR SOME SITE FEATURES)

Note: The contour plot shows the earliest and more sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on October 30, 2012, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum.

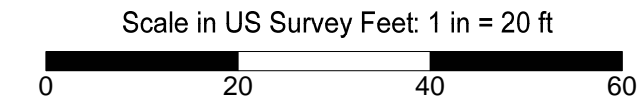
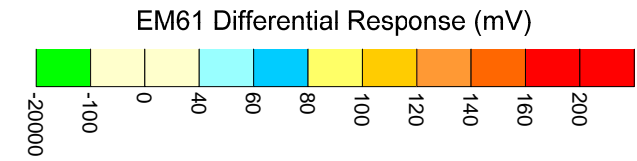
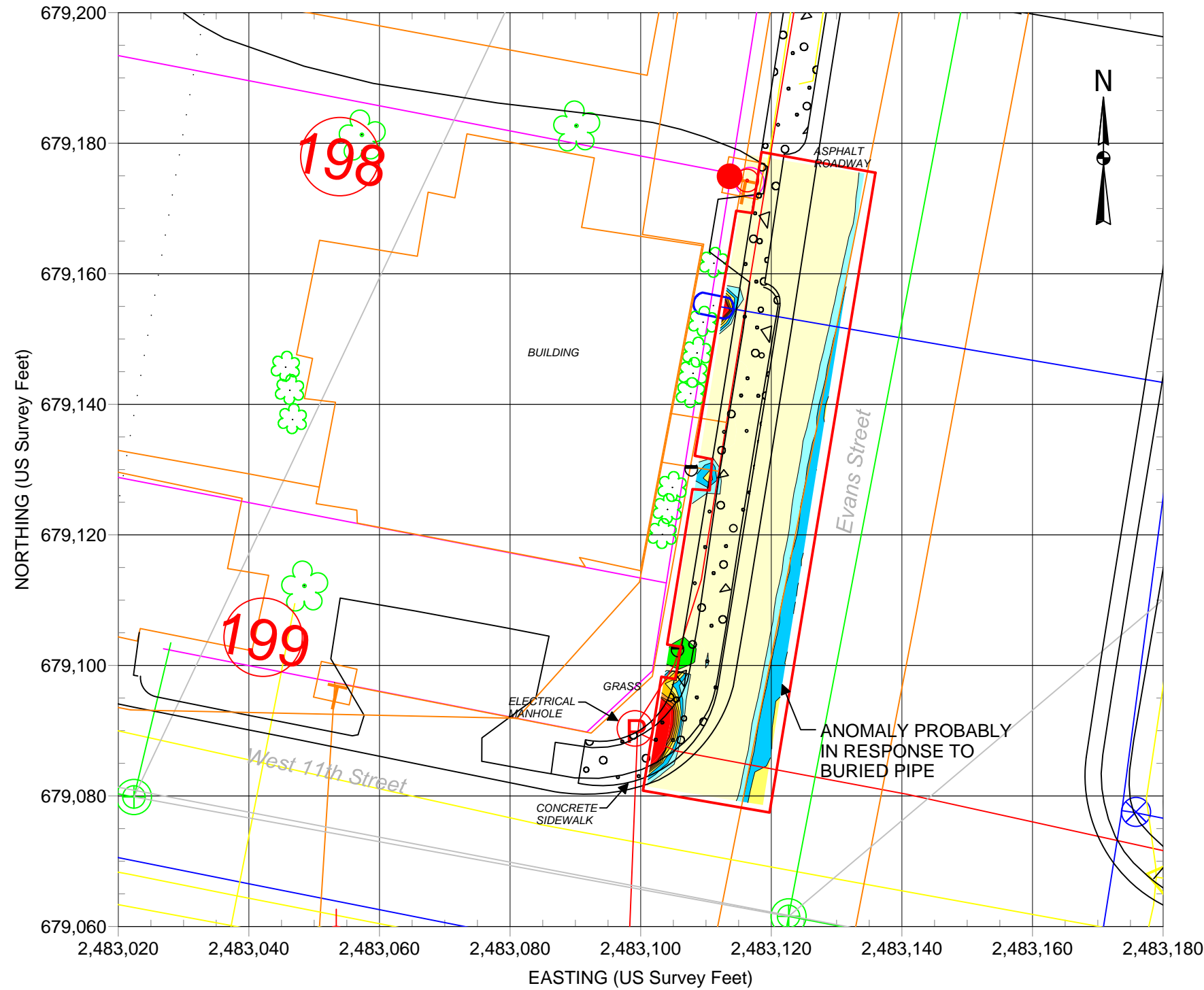


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PITT COUNTY, NC  
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EM61  
EARLY TIME GATE  
RESPONSE

FIGURE 3

PARCELS 198 & 199



EXPLANATION	
	SIGN
	UTILITY MANHOLE, METER, BOX, ETC.
	PROPERTY LINE
	EM61 SURVEY AREA

BASE PLAN FROM NCDOT FILE:  
u3315\_rdy\_psh11.dgn  
(FOR SOME SITE FEATURES)

Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on October 30, 2012, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum.

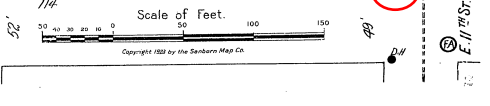
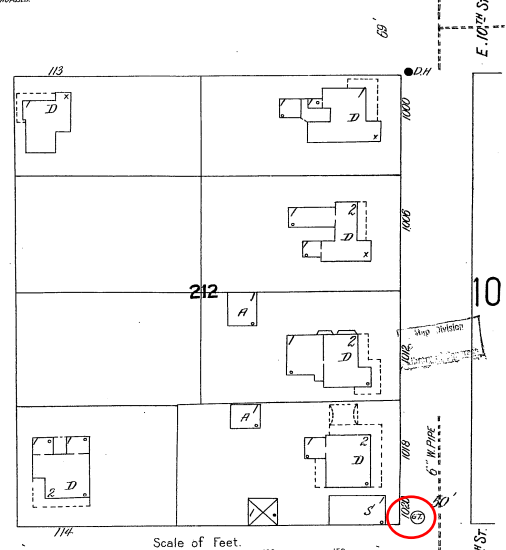
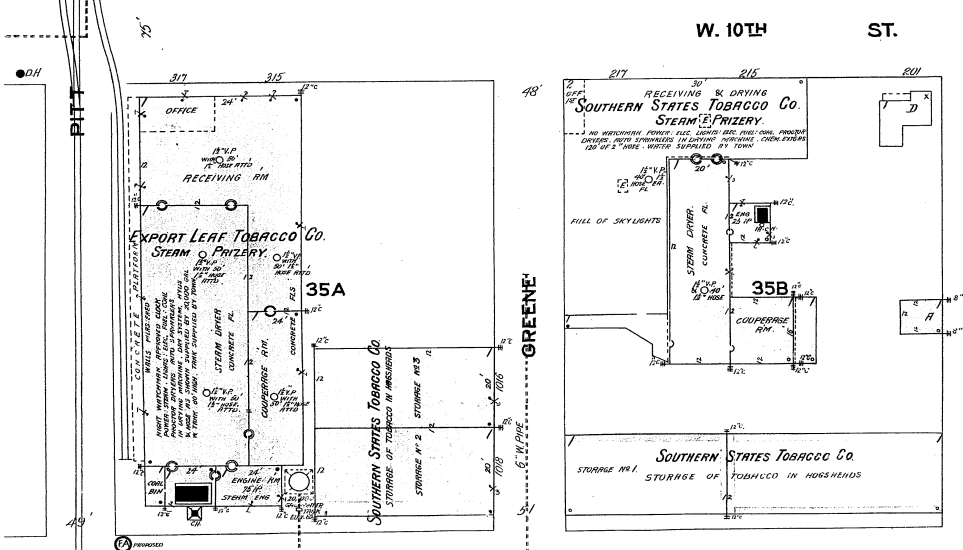
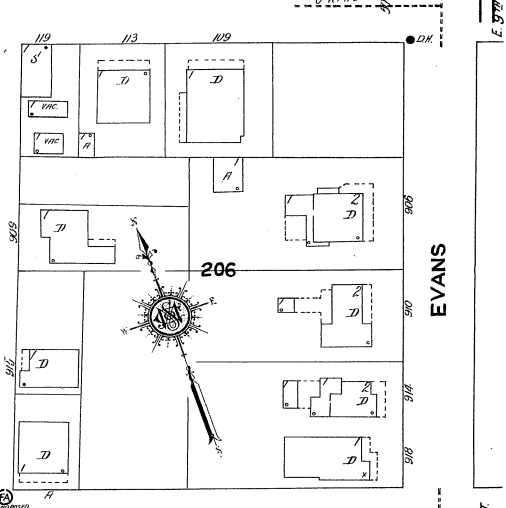
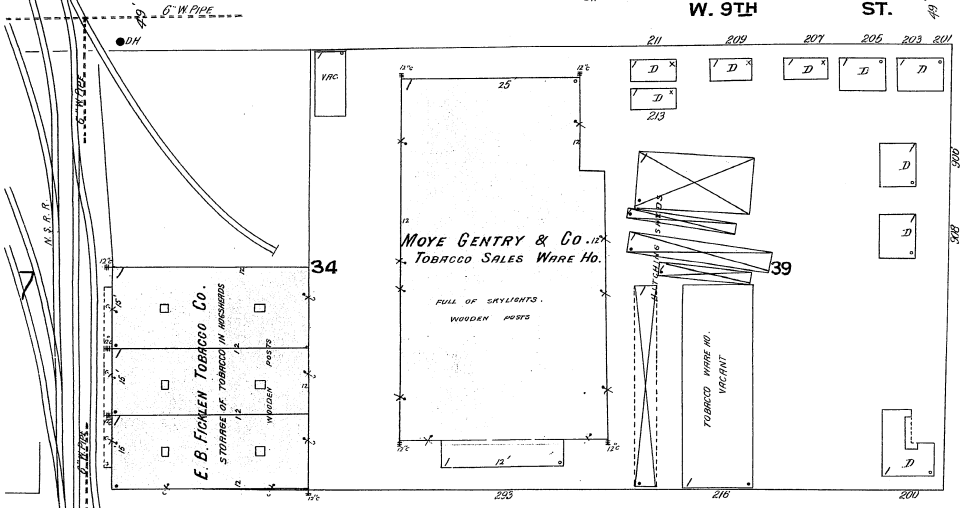
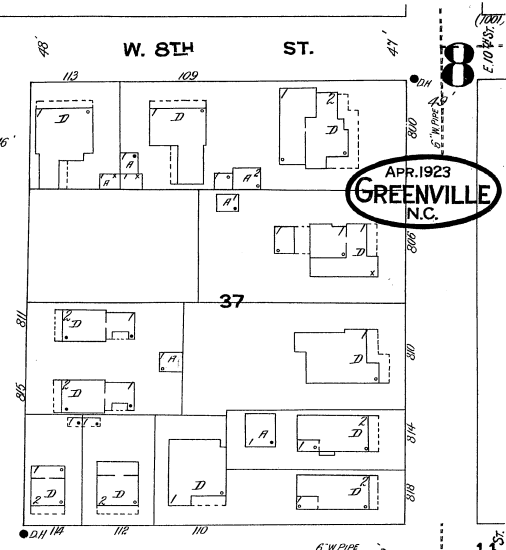
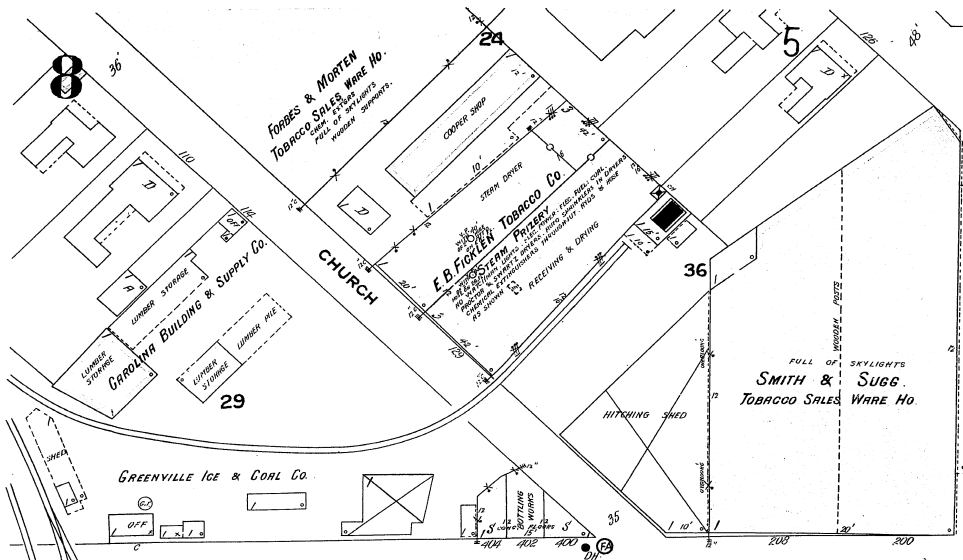


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PROJECT NO. 11821014.17

EM61  
DIFFERENTIAL  
RESPONSE

## APPENDIX A





APR. 1923  
GREENVILLE  
N.C.

8

EVANS

10

W. 9TH ST.

W. 10TH ST.

W. 11TH ST.

W. 8TH ST.

E. 10TH ST.

E. 9TH ST.

E. 10TH ST.

E. 11TH ST.

GREENE

10