

October 17, 2006

Ms. Helen Corley, L.G.  
AMEC Earth and Environmental  
9800 West Kincey Avenue  
Suite 190  
Huntersville, NC 28078

Via email (pdf)

cc: Mr. Cyrus Parker, Mr. Don Moore, NCDOT, via email (pdf)

RE: State Project: B-4054, WBS Element: 33419.1.1, Caldwell County  
Bridge 334 over Yadkin River on SR 1517 (Whisnant Road)

SUBJECT: Report on Geophysical Surveys for Locating Possible USTs on 1 Parcel  
Schnabel Engineering Project No. 06210013.01-02

Dear Ms. Corley:

This letter contains our report on the geophysical surveys we conducted on the subject property. This letter report includes two 8.5x11 color figures and two 11x17 color figures.

## **1.0 INTRODUCTION**

The work described in this report was conducted by Schnabel Engineering under our contract with the NCDOT. The work was conducted at the location indicated by AMEC to support their environmental assessment of the subject parcel. The purpose of the geophysical survey was to locate possible metal underground storage tanks (USTs) in the accessible areas within the proposed right-of-way of the site.

Schnabel Engineering conducted geophysical surveys on September 21, 2006, in the accessible areas within the proposed right-of-way on Parcel 1. This property, owned by Omni Supply, Inc., is located at the northeast corner of the intersection of Yadkin River Road and Whisnant Road in Caldwell County. Photographs of Parcel 1 are included on Figure 1.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. The EM61 metal detector is used to locate metal objects buried up to about eight feet below ground surface. Ground-penetrating radar (GPR) investigations were conducted using a Geophysical Survey Systems SIR-2000 system equipped with a 400 MHz antenna. Photographs of these instruments are shown in Figure 2.

## **2.0 FIELD METHODOLOGY**

### **2.1 Location Control**

An X-Y survey grid was set up on Parcel 1 to determine relative locations of geophysical data points and site features. References to direction and location in this report are based on this local site grid. The locations of existing site features (concrete pads, signs, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

### **2.2 Data Collection**

The EM61 data were collected in the accessible portions of the parcel along east-west trending parallel survey lines spaced approximately 2.5 feet apart. The EM61 data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced 2.5 feet apart in orthogonal directions over areas of reinforced concrete and over anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

### **3.0 DISCUSSION OF RESULTS**

The contoured EM61 data are shown on Figures 3 and 4. The EM61 early time gate results are plotted on Figure 3. The early time gate data provide the most sensitive detection of metal object targets, regardless of size. Figure 4 shows the difference between the response of the top and bottom coils of the EM61 instrument (differential response). The difference is taken to remove 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 (Figures 3 and 4) show several linear anomalies probably caused by buried utilities, several small anomalies probably caused by insignificant buried metal objects, and several anomalies caused by known site features. GPR surveys were conducted over and around the reinforced concrete pad, and in an area by one of the trailers. The GPR data did not indicate the presence of USTs in the areas surveyed.

### **4.0 CONCLUSIONS**

Our evaluation of the geophysical data collected on Parcel 1 on State Project B-4054 in Caldwell County, NC indicate the following:

- The geophysical data do not indicate the presence of USTs in the areas surveyed on Parcel 1.
- Survey areas were limited by the presence of trailers and other equipment. USTs may be present in these locations.

## 5.0 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.

Thank you for the opportunity to serve you on this project. Please call if you need additional information or have any questions.

Sincerely,



Jeremy S. Strohmeyer, L.G.  
Project Manager

JS/FR/NB

Attachment: Figures (1-4)

FILE: G:\2006\_PROJECTS\06210013 (NCDOT GEOPHYSICS-GEOTECH 2006)\PHASE 1 GEOPHYSICAL TASKS\TASK 02 (B-4054, CALDWELL COUNTY)\REPORT\REPORT ON TASK 2 (B-4054, CALDWELL COUNTY) WITH FIGURES.DOC



Parcel 1, Omni Supply, Inc. Property, looking northeast



Parcel 1, Omni Supply, Inc. Property, looking northeast



NC Department of Transportation  
Geotechnical Engineering Unit

State Project No. B-4054  
Caldwell County, North Carolina

**SITE PHOTOS**

FIGURE 1





Geonics EM61-MK2



Geophysical Survey Systems SIR-2000 with 400 MHz antenna

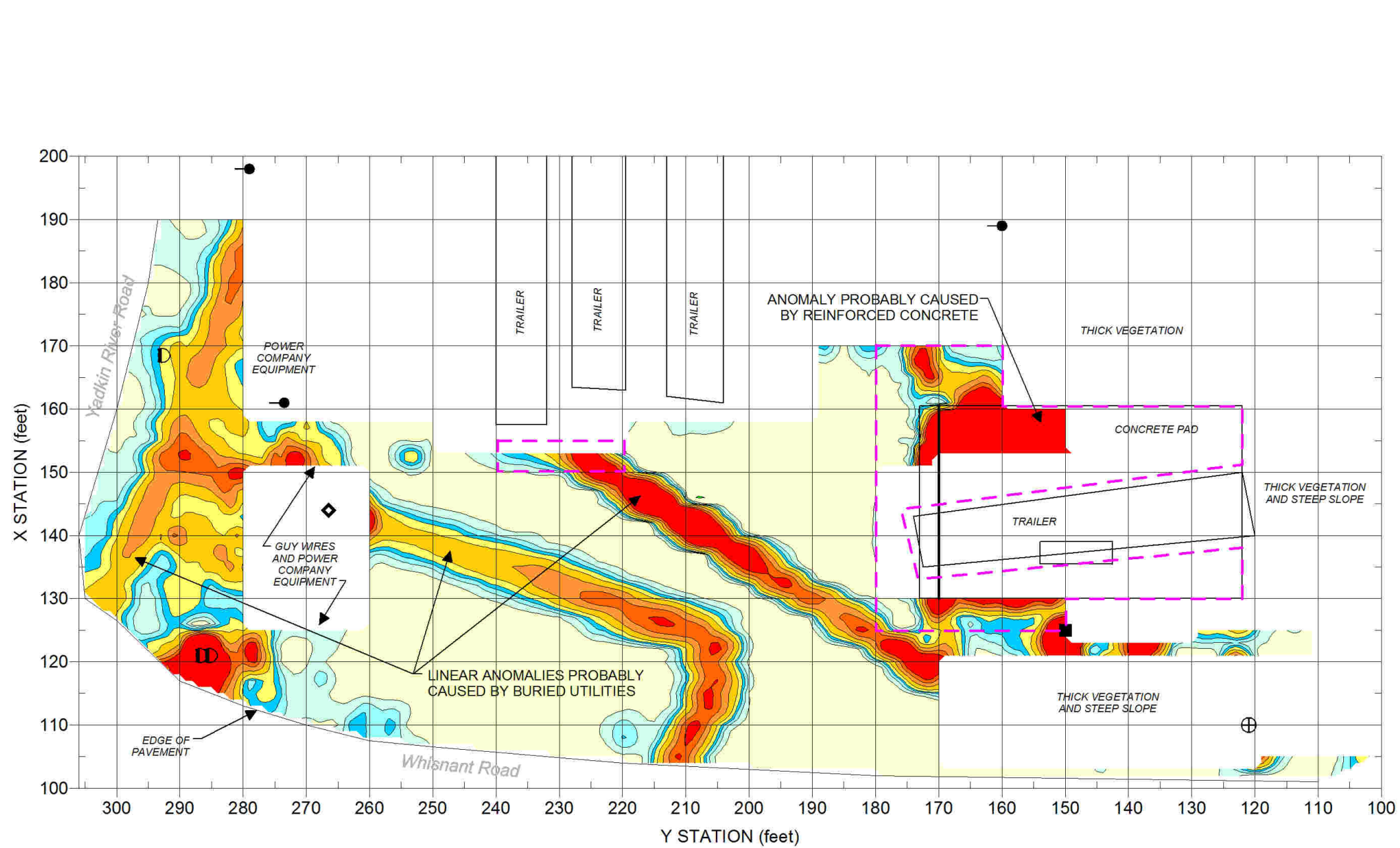


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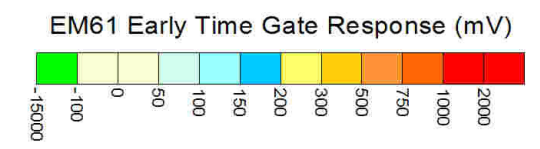
State Project No. B-4054  
Caldwell County, North Carolina

**PHOTOS OF  
GEOPHYSICAL  
EQUIPMENT**

FIGURE 2



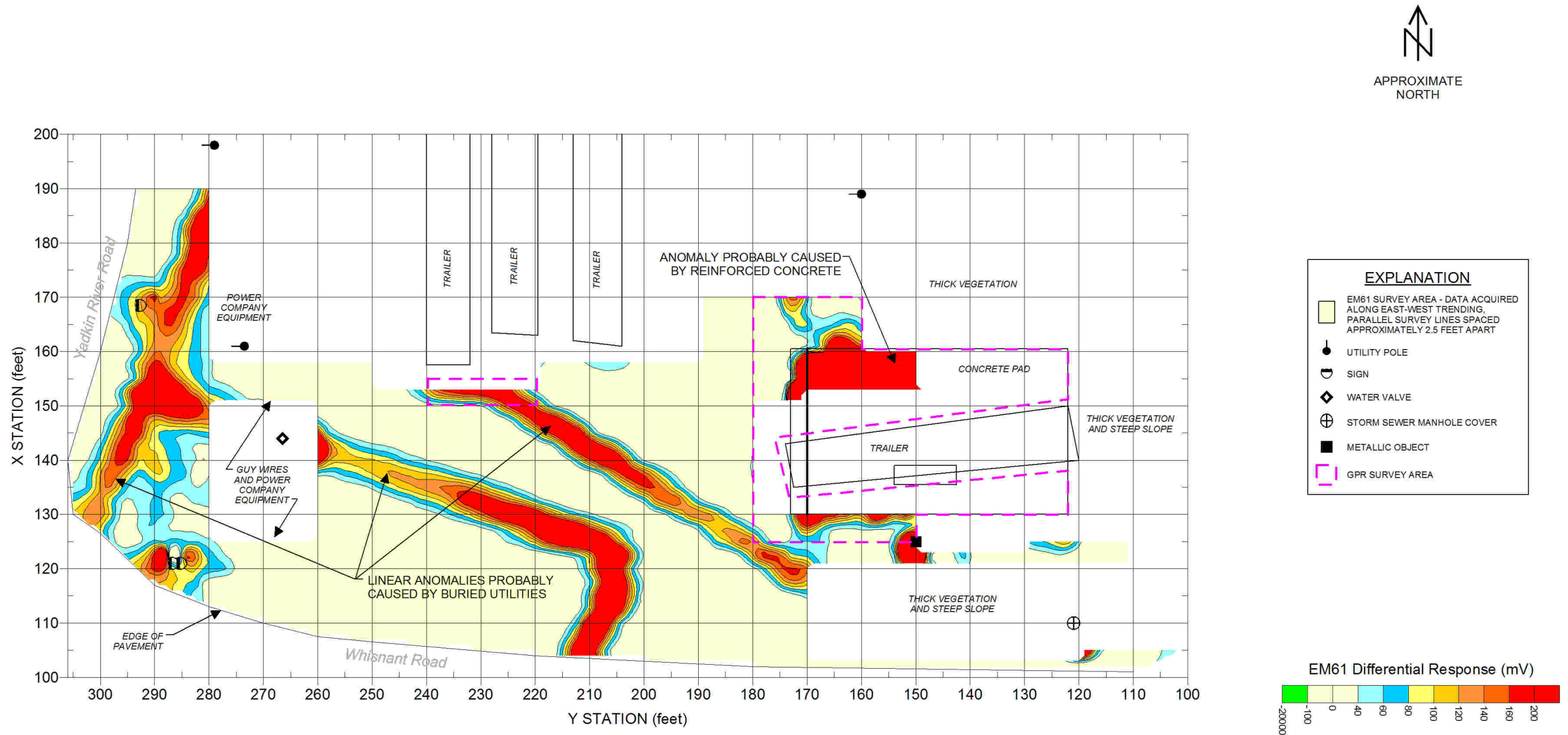
EXPLANATION	
	EM61 SURVEY AREA - DATA ACQUIRED ALONG EAST-WEST TRENDING. PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	SIGN
	WATER VALVE
	STORM SEWER MANHOLE COVER
	METALLIC OBJECT
	GPR SURVEY AREA




Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on September 21, 2006, using a Geonics EM61-MK2 instrument. An X-Y survey grid was set up across this parcel as location control for the geophysical surveys. GPR data were acquired on September 21, 2006, using a Geophysical Survey Systems, Inc. SIR-2000 equipped with a 400 MHz antenna.

	NC Department of Transportation Geotechnical Engineering Unit	<b>PARCEL 1</b> <b>EM61 EARLY TIME</b> <b>GATE RESPONSE</b> FIGURE 3
	State Project No. B-4054 Caldwell County, North Carolina	





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 pipes and tanks. The EM data were collected on September 21, 2006, using a Geonics EM61-MK2 instrument. An X-Y survey grid was set up across this parcel as location control for the geophysical surveys. GPR data were acquired on September 21, 2006, using a Geophysical Survey Systems, Inc. SIR-2000 equipped with a 400 MHz antenna.

	NC Department of Transportation Geotechnical Engineering Unit	<b>PARCEL 1          EM61 DIFFERENTIAL          RESPONSE</b>
	State Project No. B-4054 Caldwell County, North Carolina	