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# PRELIMINARY SITE ASSESSMENT
# PARCEL 042 – WESLEY DENHAM PROPERTY
# 2132 FAYETTEVILLE ROAD (US HIGHWAY 1)
# ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
# WBS ELEMENT: 34950.1.1 (NCDOT PROJECT: U-3456)

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**Solutions-IES Project No. 2730.05A2.NDOT**

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**January 5, 2006**

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## 1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening Fayetteville Road (US-1) in Rockingham, Richmond County, North Carolina. The project will require the NCDOT to acquire additional property for roadway construction. On November 3, 2005, Solutions-IES submitted a proposal to conduct Preliminary Site Assessments (PSAs) for 14 parcels of land within the proposed right of way that contain or reportedly contained underground storage tanks (USTs), or are areas of concern identified by NCDOT. This report summarizes the results of field and laboratory activities conducted during the PSA of the Wesley Denham property located at 2132 Fayetteville Road (US Highway 1) in Rockingham, Richmond County, North Carolina. The site is identified by the NCDOT as Parcel 042 on the U-3456 roadway plans. The location of Parcel 042 is also identified on Figures 1 and 2. The scope of work executed at the site was performed in accordance with Solutions-IES proposal NC05449P dated November 3, 2005, and a Notice to Proceed issued by the NCDOT Geotechnical Engineering Unit dated November 7, 2005.

## 2.0 BACKGROUND AND SITE DESCRIPTION

Parcel 042 is located at 2132 Fayetteville Road (US Highway 1) in Rockingham, North Carolina in an area of commercial properties. Revision of the right of way by the NCDOT will include the acquisition of portions of Parcel 042 along the northern edge and northwestern corner of the parcel. Along the northern edge, approximately 15 feet of land will be acquired, while along the northwestern corner, a triangular section measuring approximately 60 by 60 by 30 feet will be acquired. The property is the present location of a commercial oil-changing operation, situated at the front (northern side) of the parcel, as well as a car wash, located at the rear (southern side) of the parcel. Photographs of the study area on the site are presented in **Appendix A**. Preliminary observations suggest that land in the immediate vicinity of the study area has been developed with commercial property. The site is bordered along the northern side by the existing Fayetteville Road, encompassing a 60-foot right of way.

## 3.0 FIELD ACTIVITIES

Prior to mobilizing to the site to conduct subsurface sampling, Solutions-IES contacted North Carolina One Call to locate underground utilities in the study area of the site. In addition, Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electro-magnetic survey of the subsurface in the proposed right-of-way and easement area. The EM61 survey, performed November 15, 2005, identified various magnetic anomalies within the study area, but did not clearly identify the location(s) of any USTs. A ground penetrating radar (GPR) survey was then performed on November 22, 2005

utilizing a Geophysical Survey Systems SIR 2000 instrument. Images of these surveys are presented on **Figure 14** in **Appendix B**.

Subsequent to reviewing the geophysical report, Solutions-IES mobilized to the site on December 6, 2005 to obtain soil samples from locations within the proposed right-of-way. A total of four soil borings were advanced at the site in the locations depicted on **Figure 3**. Each of these borings (42-1 through 42-4) was advanced to total depths of 8 feet below ground surface (ft bgs) employing the use of a truck mounted a Geoprobe®. Borings 42-1, 42-2 and 42-3 were located within the existing northern right of way of Fayetteville Road and were spaced approximately 50 feet apart. The remaining boring, 42-4, was located within the proposed right of way along the northwestern corner of the property (**Figure 3**).

Soil samples were obtained within each boring using a MacroCore® sampler fitted with single-use, disposable polyvinyl chloride (PVC) liners. Each soil sample was split into two aliquots. Each aliquot was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the remaining bag was sealed and placed at ambient temperature for field screening of volatile vapors with a flame ionization detector (FID). Prior to use, the FID was calibrated in accordance with the manufacturer's instructions.

Volatile organic compounds (VOCs) were allowed to accumulate in the headspace of each bag for approximately 20 minutes. Then, each sealed bag was scanned with the FID. The FID readings were entered on the boring logs along with the soil description and any indications of petroleum staining or odor, if present (**Appendix C**).

With the exception of boring 42-4, each boring was advanced from surface grade through 3 inches of asphalt. Soils in each boring (including 42-4) consisted of dry, tan, clayey fine sand (Unified Soil Classification SC) to depths of 8 ft. bgs, excepting soils in the 6 to 8 foot range within boring 42-3. These soils consisted of damp, tan clayey medium sand. Soils identified within each boring were thought to represent native soils.

Screening of soils with the FID revealed the presence of minimal volatile vapors in samples obtained from each of the borings performed at the site. Values measured in samples from these borings ranged from 0.1 to 3.2 parts per million (ppm). These values are presented in **Table 1**.

Soil samples for laboratory analysis were retained from borings 42-2 (4-6 feet) and 42-3 (6-8 feet). These samples were selected for analysis because the locations of the borings from which they originated are

situated in the middle of the study area on the site, and would more likely provide evidence of a release, if a release was present. The samples were placed in laboratory-supplied jars and stored on ice pending shipment to Pace Analytical Services, Inc. (Pace) in Huntersville, NC. Samples collected from borings 42-2 and 42-3 were recorded on the chain of custody document, and submitted for chemical analysis of total petroleum hydrocarbons (TPH), gasoline range organics (GRO) by Modified EPA Method 5030/8015 and TPH, diesel range organics (DRO) by Modified EPA Method 3545/8015.

Groundwater was not encountered in any of the borings advanced on the site on December 6, 2005; therefore, no groundwater samples were collected from the site for chemical analysis.

## 4.0 LABORATORY RESULTS

Laboratory analysis of the two soil samples (42-2 and 42-3) submitted to Pace did not indicate the presence of TPH GRO or TPH DRO at concentrations exceeding the respective method reporting limits, or at levels in excess of *the Cleanup Requirements for Contaminated Soil*, defined by the *Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater, Volume I, Sources Other than Petroleum Underground Storage Tanks, July, 2000*. These data are summarized in **Table 2**. Laboratory reports associated with the analysis of these samples are presented in **Appendix D**.

## 5.0 DISCUSSION AND CONCLUSIONS

Solutions-IES found no evidence of petroleum underground storage tanks (past or present) within the study area at the Parcel 042 site, located at 2132 Fayetteville Road in Rockingham, NC. Results of the electro-magnetic surveys conducted by Pyramid did not reveal the presence of any subsurface structures which might be identified as USTs, nor did Solutions-IES personnel observe any obvious structures (vent pipes, fill ports, etc.) which would be indicative of a UST system or systems.

Screening of soil samples with the FID indicated the presence of volatile vapors at very low concentrations (0.1 to 3.2 ppm), but no evidence of a release (soil staining, petroleum odors) was noted in any of the soils observed during the course of site activities.

Laboratory analysis of the two soil samples (42-2 and 42-3) submitted to Pace did not indicate the presence of TPH GRO or TPH DRO at concentrations exceeding the respective method reporting limits, or at levels in excess of *the Cleanup Requirements for Contaminated Soil*, defined by the *Groundwater Section Guidelines for the Investigation and Remediation of Soil and Groundwater, Volume I, Sources*

*Other than Petroleum Underground Storage Tanks, July, 2000.* These data tend to indicate that no obvious impact to the soils of the site has occurred at the locations from which samples were obtained.

Based on Solutions-IES observations made at the time of the performance of the PSA, coupled with very low FID measurements and analytical data indicative of no releases at the site, Solutions-IES concludes that no apparent release of petroleum hydrocarbons has impacted the area in which the PSA was conducted. As a result, Solutions-IES does not recommend additional assessment activities at this time.

# TABLES

**TABLE 1**
**SUMMARY OF SOIL FIELD SCREENING**
**Parcel 042 - Wesley Denham Property**
**2132 Fayetteville Road (US Highway 1)**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**December 6, 2005**

| Sample Depth Below Ground Surface | Soil Borings | | | |
|---|---|---|---|---|
| | 42-1 | 42-2 | 42-3 | 42-4 |
| | FID Reading (ppm) | | | |
| 0 - 2 feet | 0.5 | 0.2 | 0.0 | 0.0 |
| 2 - 4 feet | 0.3 | 0.2 | 0.1 | 0.0 |
| 4 - 6 feet | 0.6 | 0.3 | 0.2 | 3.2 |
| 6 - 8 feet | 0.4 | 0.4 | 0.2 | 0.0 |

Notes:

1. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
2. Samples denoted by shaded cells were submitted for laboratory analysis.

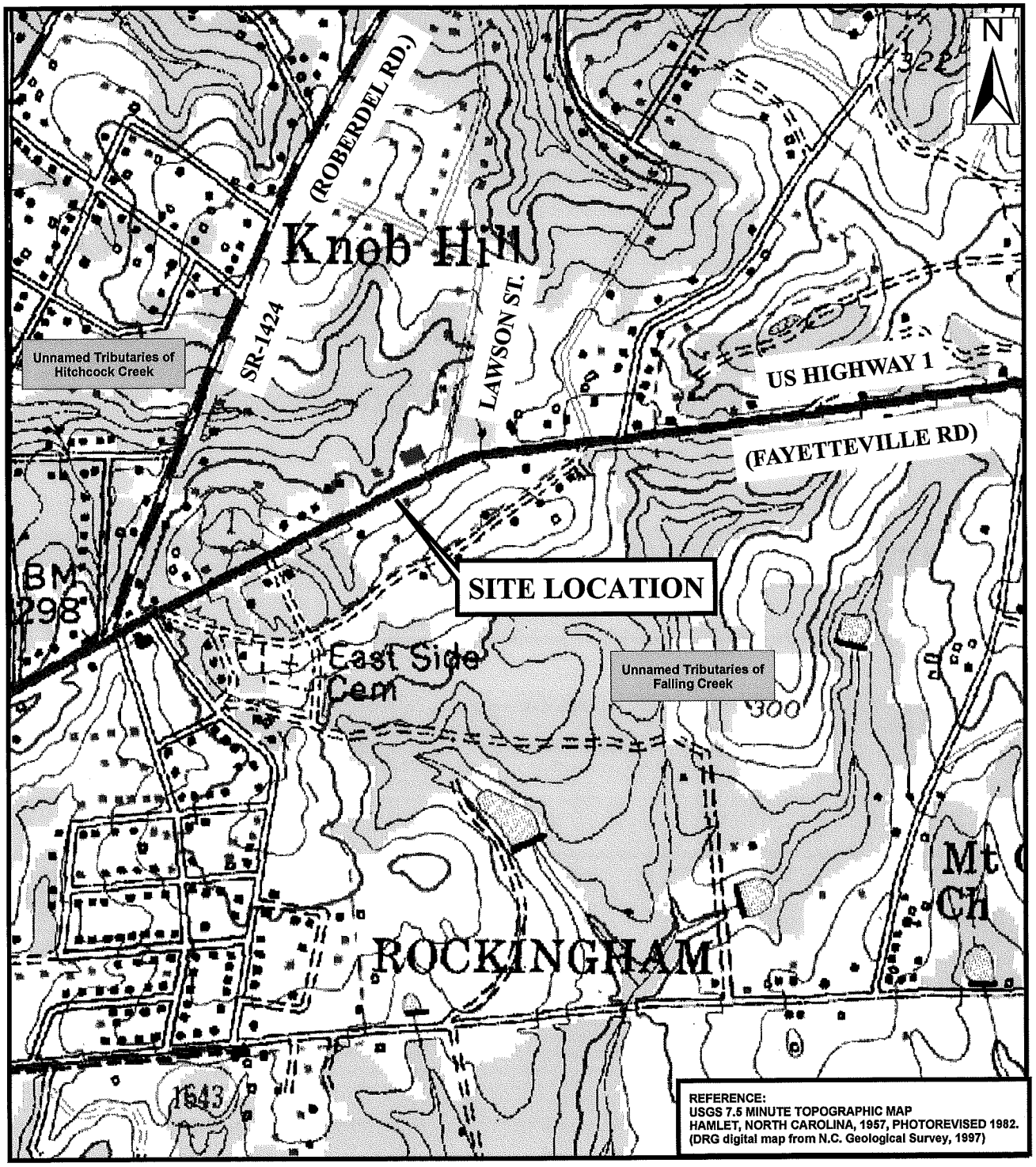
**TABLE 2**
**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 042 - Wesley Denham Property**
**2132 Fayetteville Road (US Highway 1)**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**December 6, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 42-2 | 4-6 | <4.3 | <5.7 |
| 42-3 | 6-8 | <4.4 | <5.9 |
| TPH Action Levels | | 10 | 10 |

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons

# FIGURES



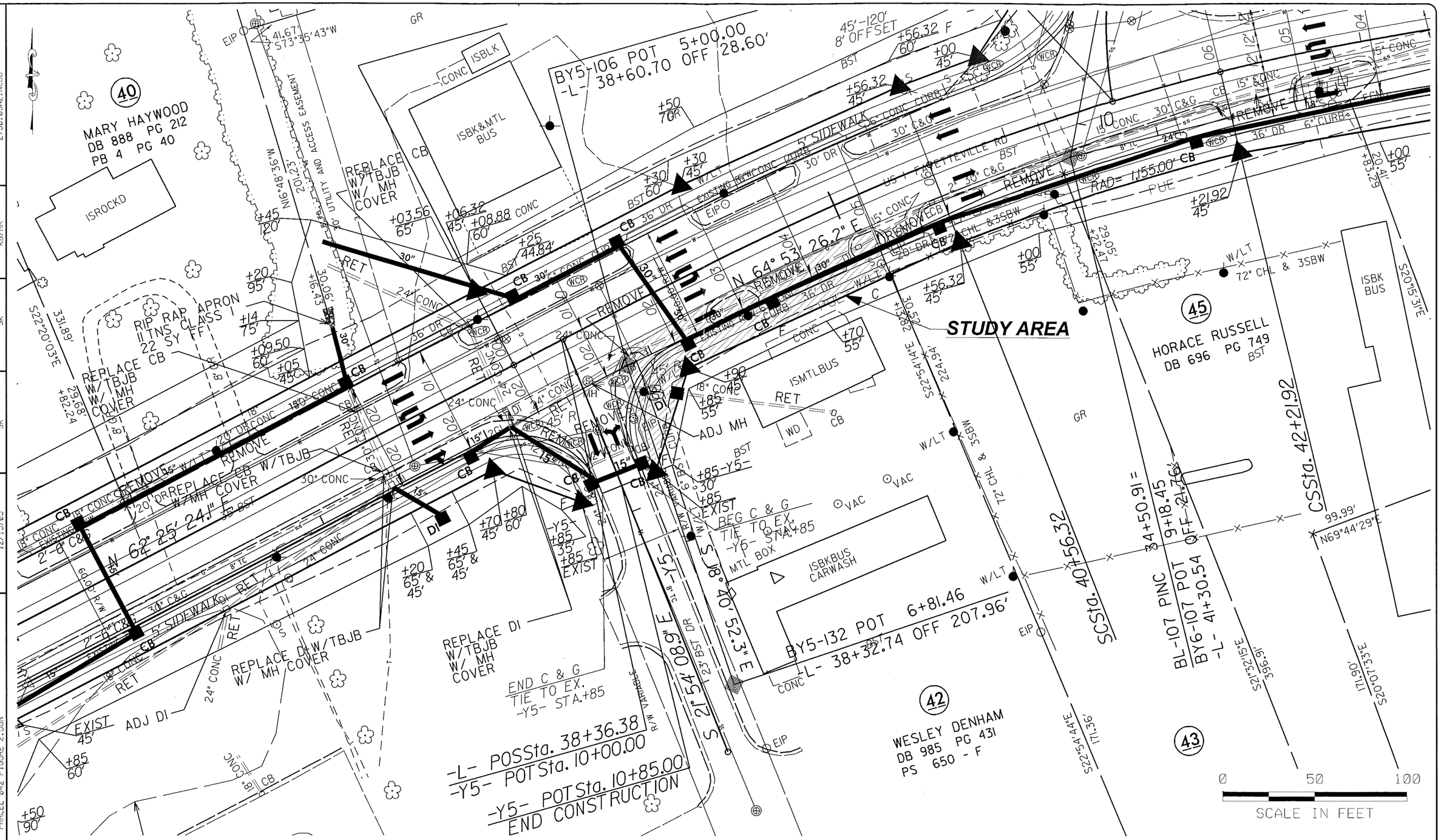

1:10,000

SITE LOCATION MAP
PARCEL 042 - WESLEY DENHAM PROPERTY
2132 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1(NCDOT PROJECT: U-3456)

Solutions
Industrial & Environmental Services

| | | | |
|---|---|---|---|
| 1101 Nowell Road, Raleigh, NC 27609<br>Phone (919) 873-1060, Fax (919) 873-1074 | | | |
| Created by: KBB<br>Checked by: BR<br>File: FIG1.mxd<br>Software: ESRI ArcMap 9.0 | | Project: 2730.05A2.NCDO<br>Date: 12/15/05 | |
| | | FIGURE | 1 |

PROJECT NUMBER 2730.05A2.NCDO | DRAFTER KB/HM | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 042 FIGURE 2.DGN





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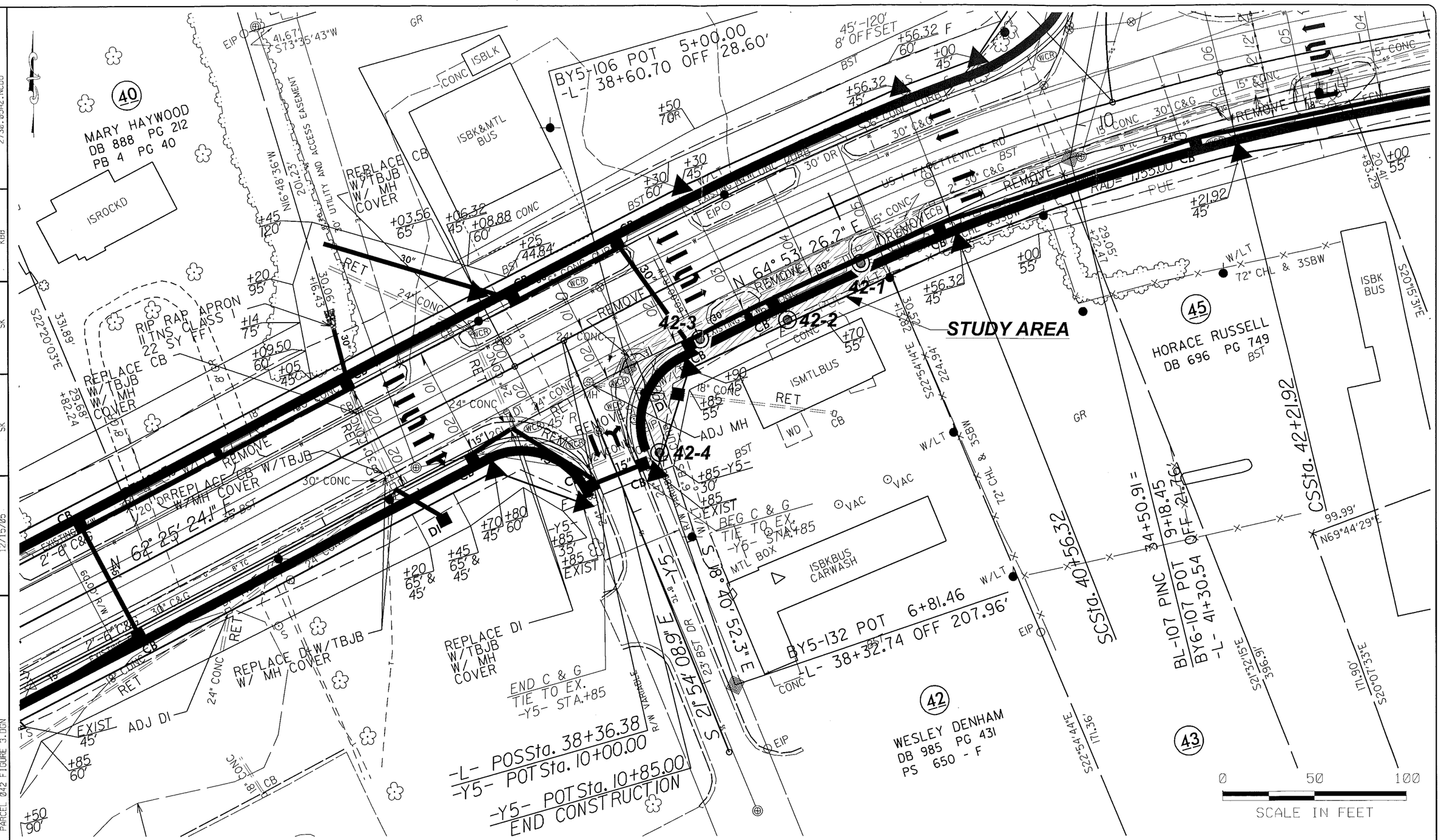
SITE MAP
PARCEL 042 - WESLEY DENHAM PROPERTY
2132 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 2




PROJECT NUMBER 2730.05A2.NCDO | DRAFTER KBB | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 042 FIGURE 3.DGN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BORING LOCATIONS
PARCEL 042 WESLEY DENHAM PROPERTY
2132 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 3

# APPENDIX A

# PHOTOGRAPHS

**Photograph 1** – View from west to east along Fayetteville Road. Study Area in foreground along northern boundary of site. Geoprobe in operation installing boring 42-1.

**Photograph 2** – View from east to west along Fayetteville Road. Study Area in foreground along northern boundary of site.

# APPENDIX B

# GEOPHYSICAL DATA

Pyramid Project # 2005292

# GEOPHYSICAL INVESTIGATION REPORT

*GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S*

## Rockingham, US 1 (Fayetteville Road) Sites

**Rockingham, North Carolina**
**State Project Number U-3456**

**November 30, 2005**

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**GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S**
**Rockingham, US 1 (Fayetteville Road) Sites**
**State Project Number U-3456**

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- 3.4 Parcel 17 – Harvey E. Melton Property
- 3.5 Parcel 41A – W. J. Barnhart Property
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FIGURES (continued)


| | |
|---|---|
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| Figure 17 | Parcel 80, McCain Property – Photos & GPR Image of UST Locations |
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## 1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions Industrial & Environmental Services, Inc. during the period of November 11-23, 2005, within the proposed Right-of-Way (ROW) areas at 13 sites in Rockingham, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3456 and WBS Element 34950.1.1. The sites are located along the north or south sides of US 1 (Fayetteville Road) from 0.25 miles west of SR-1424 (Roberdell Road) to 0.25 miles west of SR 1640 (Wiregrass Road). The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Mr. Walt Beckwith, PG provided maps during the week of November 1, 2005 that outlined the geophysical survey areas of each site. Solutions IES representatives, Ms. Sheri Knox, PE and Mr. Daniel Hirth, PG provided guidance during the geophysical investigations. Geophysical surveys were conducted at the following 13 sites:

| Property Owner | Parcel | Present Use of Property |
|---|---|---|
| W. J. Barnhart Property | (Parcel 4) | Used Car Lot & Auto Repair Garage |
| Julia M. Ratliff Property | (Parcel 7) | Vacant Lot |
| Samuel D. Tanner Property | (Parcel 15) | Vacant Building & Lot |
| Harvey E. Melton Property | (Parcel 17) | BP Gas Station |
| Samuel D. Tanner Property | (Parcel 21) | Strip Mall |
| W. J. Barnhart Property | (Parcel 41A) | Vacant Building & Lot |
| Wesly Denham Property | (Parcel 42) | Havoline Carolina Quick Lube |
| William Ussery Property | (Parcel 57) | Vacant Building & Lot |
| Walter McCain Property | (Parcel 80) | Vacant Buildings & Lot |
| Leon Wall Property | (Parcel 99) | Vacant Building & Lot |
| James Porter Property | (Parcel 117) | Vacant Building & Lot |
| John Evans Property | (Parcel 126) | Custom Monument Company |
| Henry Ussery Property | (Parcel 140) | Bo Henry's Pawn Shop |

Photos of the above sites are presented in **Figure 1**.

## 2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot survey grid was established across the proposed ROW areas of the 13 sites using water-based marking paint. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the manufacture's specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST's and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 24 scans per second. A 110 MHz high pass filter and an 800 MHz low pass filter were used during data

acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately seven feet, based on an estimated two-way travel time of 7 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint software. The locations of GPR survey areas or individual GPR survey lines are shown as dashed, purple rectangles or solid purple lines, respectively on the EM61 differential contour plots. Photos of the EM61 and GPR instruments are shown in **Figure 2**. The approximate perimeters of probable or possible UST's , based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags when possible. The approximate locations of probable or possible UST's are shown on the EM61 contour plots as magenta-shaded rectangles.

During the weeks of November 14 and November 23, 2005, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox and Mr. Hirth.

## 3.0 DISCUSSION OF RESULTS

### 3.1 Parcel 4 - W. J. Barnhart Property

Parcel 4 is located on the southern side of Fayetteville Road and contains an active used car lot and auto repair garage. The western portion of the ROW area consists of asphalt with a concrete pad and the eastern portion of the ROW area consists of a sandy surface.

The bottom coil results and the differential results are presented in **Figure 3**. The linear anomaly intersecting grid coordinates X=50 Y=26, is probably in response to a buried utility line or conduit. The high amplitude anomaly centered near the former pump island area is probably in response to the steel-reinforced concrete pad. GPR surveys conducted across the steel-reinforced concrete pad did not detect any large metal objects. The geophysical results suggest that the ROW area at Parcel 4 does not contain metallic UST's.

### 3.2 Parcel 7 - Julia M. Ratliff Property

The Ratliff property is located northwest of the Fayetteville Road and Roberdell Road intersection. The parcel consists of an open, asphalt and grass-covered lot. The EM61 bottom coil results and the differential results are presented in **Figure 4**. The linear bottom coil, EM61 anomalies, such as the ones intersecting grid coordinates X=100 Y=60, X=110 Y=74, and X=130 Y=104, are probably in response to utility lines or conduits. GPR surveys conducted across a portion of the EM anomaly centered near grid coordinates X=65 Y=35, suggest the presence of at least one UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide.

A large water puddle was present across the western portion of the EM anomaly when the GPR surveys were conducted that prevented GPR data to be collected across the entire anomaly. However, based on the location of the probable UST, the size of the EM61 anomaly suggests that a second UST may be centered near grid coordinates X=64 Y=32. Concrete was encountered approximately three inches below surface across this area, which prevented probing with a steel rod to determine whether a second UST exists. A photo showing the approximate location of the probable and possible UST's along with a GPR image obtained along survey line Y=35 are presented in **Figure 5**.

The geophysical results suggest that the remaining portion of the proposed ROW area at Parcel 7 does not contain metallic UST's.

### 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties

Parcels 15 and 21 are located immediately southwest and southeast, respectively of the Fayetteville Road and Skyline Drive intersection. Parcel 15 consists primarily of grass and gravel surfaces, whereas the front portion of Parcel 21 consists of an asphalt-covered parking area. The EM61 bottom coil results and the differential results are presented in **Figures 6 and 7**, respectively.

GPR surveys across the EM61 anomaly centered near grid coordinates X=188 Y=135, (on Parcel 15) suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below

surface. The surveys also suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

At Parcel 21, GPR surveys acquired across the EM anomaly centered near grid coordinates X=269 Y=173, suggest the presence of a UST buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide. Photos showing the approximate locations of the probable UST's at Parcels 15 and 21, along with corresponding GPR images are presented in Figures **8 and 9**, respectively.

### 3.4 Harvey E. Melton Property (Parcel 17)

The Melton property is an active BP gas station and store located northeast of the Fayetteville Road and Roberdell Road intersection. The pump island area consists of a steel-reinforced concrete surface that overlies the known and active UST's, whereas the parking area adjacent to the store consists of asphalt pavement. A grass yard surrounds the back portion of the site.

The EM61 bottom coil results and the differential results are presented in Figures **10 and 11**, respectively. The linear bottom coil, EM anomalies are probably in response to utility lines or conduits. The majority of non-linear anomalies are probably in response to cultural features such as storm drains, signs, utility-related objects, buildings, metal fence, and steel-reinforced concrete.

GPR surveys were conducted across the concrete pavement and across the area containing the active UST's. The surveys delineated the footprint of the three and possibly four active UST's that are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. A GPR image obtained across the UST area is presented in **Figure 12** and suggests that the tanks lie approximately 3.5 to 3.9 feet below surface.

GPR data acquired across the EM61 anomaly centered near X=155 Y=144, delineated the footprint of the kerosene tank that is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide. A photo showing the location of the

tank is presented in Figure 12. The geophysical results suggest that the remainder of the surveyed area at Parcel 17 does not contain UST's.

### 3.5 W. J. Barnhart Property (Parcel 41A)

Parcel 41A is a former gas station site located on the north side of Fayetteville Road approximately 300 feet west of Lawson Street. The geophysical survey area consists of asphalt and grass-covered surfaces with a concrete pad located around a former pump island. The EM61 bottom coil results and the differential results are presented in **Figure 13**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=40 Y=50, X=45 Y=95, and X=70 Y=40, are probably in response to utility lines or conduits.

GPR surveys conducted across a portion of the linear anomaly centered at X=37 Y=22, suggest the probable presence of a wide-diameter (more than 2.5 feet wide) conduit or possibly a UST that is approximately 15 to 17 feet long and buried approximately 4.5 feet below surface. This probable wide-diameter conduit (centered near X=38 Y=25) is located parallel and contingent with the probable utility line identified by the EM61 survey, suggesting that the probable conduit is a utility-related object. However, the footprint of this probable utility-related conduit or possible UST was marked in the field with spray paint and pin flags.

GPR surveys conducted across the concrete pad adjacent to the pump island suggest that the EM61 anomalies recorded in this area are probable in response to steel-reinforcement in the concrete. With the exception of the probable utility-related feature found at X=38 Y=25, the geophysical findings obtained within the survey area at Parcel 41A suggest that the ROW area does not contain metallic UST's.

### 3.6 Wesly Denham Property (Parcel 42)

The Havoline Carolina Kwik Lube garage operates at Parcel 42, which is located on the south side of Fayetteville Road. Asphalt and grass surfaces cover much of the proposed ROW area with a small concrete pad located in front of the building. The EM61 bottom coil results and the differential

results are presented in **Figure 14**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=60 Y=58, and X=80 Y=85, are probably in response to utility lines or conduits. The high amplitude anomaly centered near grid coordinates X=40 Y=40, is in response to a vehicle that could not be moved for the geophysical investigations. The anomalies centered near X=40 Y=12, and X=120 Y=55, are in response to a nearby vehicle and steel-reinforced concrete, respectively.

The geophysical results obtained within the surveyed portion of Parcel 42 suggest that the proposed ROW area does not contain metallic UST's.

### 3.7 William Ussery Property (Parcel 57)

Parcel 57 is located on the north side of Fayetteville Road approximately 0.2 miles east of Old Aberdeen Road. The EM61 bottom coil results and the differential results are presented in **Figure 15**. A series of small, bottom coil anomalies were recorded along survey line Y=25 from grid coordinate X=5 to X=115, which may be in response to an east-west trending, buried utility line or conduit. Several other bottom coil anomalies were recorded across the survey area that are probably in response to miscellaneous metal debris.

All of the differential anomalies are probably in response to known cultural features or buried debris, suggesting that the proposed ROW area at Parcel 57 does not contain metallic UST's.

### 3.8 Walter McCain Property (Parcel 80)

Parcel 80 is located immediately northwest of the Fayetteville Road and Philadelphia Road intersection and consists of two vacant buildings surrounded by sandy or grass surfaces. A former pump island pad is located south of the eastern-most building. The EM61 bottom coil results and the differential results are presented in **Figure 16**.

GPR surveys conducted across the EM61anomalies centered near grid coordinates X=170 Y=35, and X=194 Y=32, suggest the presence of two metallic UST's. The probable UST centered near X=170

Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32 appears to be10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by the former pump island pad. Photos of the UST locations along with an image of GPR survey line X=167.5 are presented in **Figure 17**.

Based upon the geophysical results, the remaining portion of the proposed ROW area does not appear to contain metallic UST's.

### 3.9 Leon Wall Property (Parcel 99)

Parcel 99 is located immediately southwest of the Fayetteville Road and Patterson Road intersection and consists mostly of a grass yard surrounding a vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 18** in which a bottom coil, linear anomaly is recorded along survey line Y=230. This linear anomaly is probably in response to a utility line. GPR surveys conducted across the differential EM61 anomaly centered near X=92 Y=165, is probably in response to a water line adjoining the vacant building. GPR surveys were also conducted between the building and the former pump island pad that is centered near coordinates X=84 Y=222. The surveys suggest that the EM anomalies recorded in this portion of the survey area are probably in response to miscellaneous metal debris.

Based upon the geophysical results, the proposed ROW area at Parcel 99 does not appear to contain metallic UST's.

### 3.10 James Porter Property (Parcel 117)

Parcel 117 is a former gas station site located on the south side of Fayetteville Road approximately 0.25 miles west of Locklear Drive. The site consists primarily of grass and asphalt surfaces with a former pump island pad located in front of the vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 19**. The linear, bottom coil anomaly intersecting grid coordinates X=130 Y=54, is probably in response to a buried utility line or conduit. The linear

anomaly intersecting X=40 Y=74, is probably in response to a metal fence. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation across the survey area of Parcel 117 suggests that the proposed ROW area does not appear to contain metallic UST's.

### 3.11 John Evans Property (Parcel 126)

The active Custom Monument Company operates on Parcel 126, which is located immediately northeast of the Fayetteville Road and LockLear Drive intersection. The geophysical survey area consists of grass and asphalt surfaces and the EM61 bottom coil results and the differential results are presented in **Figure 20**. All of the EM61 anomalies recorded across the surveyed portion of the site are probably in response to known cultural features, suggesting that the proposed ROW area does not contain metallic UST's.

### 3.12 Henry Ussery Property (Parcel 140)

Parcel 140 is a former gas station site, which is presently occupied by Bo Henry's Pawn Shop. The property is located immediately southeast of the Fayetteville Road and Port Street intersection. Much of the proposed ROW area consists of sandy or grass-covered surfaces. A concrete pad surrounds the north and west sides of the building. The EM61 bottom coil results and the differential results are presented in **Figure 21**. The linear bottom coil anomaly intersecting grid coordinates X=80 Y=80, is probably in response to a buried utility line.

GPR surveys conducted across the differential anomalies centered near coordinates X=90 Y=60, and X=107 Y=59, suggest the presence of two UST's buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide. Probing with a steel rod across this area suggest the presence of a concrete slab buried approximately 0.3 feet below surface and overlying the UST's. A photo showing the locations of the probable UST along with GPR images are presented in **Figure 22**.

## 4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 13 sites along Fayetteville Road (US 1) in Rockingham, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic UST's within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 13 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results did not detect the presence of unknown metallic UST's within the surveyed portions of the proposed ROW areas at the following sites:

| | |
|---|---|
| W. J. Barnhart Property | (Parcel 4) |
| W. J. Barnhart Property | (Parcel 41A) |
| Wesly Denham Property | (Parcel 42) |
| William Ussery Property | (Parcel 57) |
| Leon Wall Property | (Parcel 99) |
| James Porter Property | (Parcel 117) |
| John Evans Property | (Parcel 126) |

- Julia M. Ratliff Property (Parcel 7): Geophysical results suggest the presence of a UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide. A second UST may be present immediately west of this UST.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

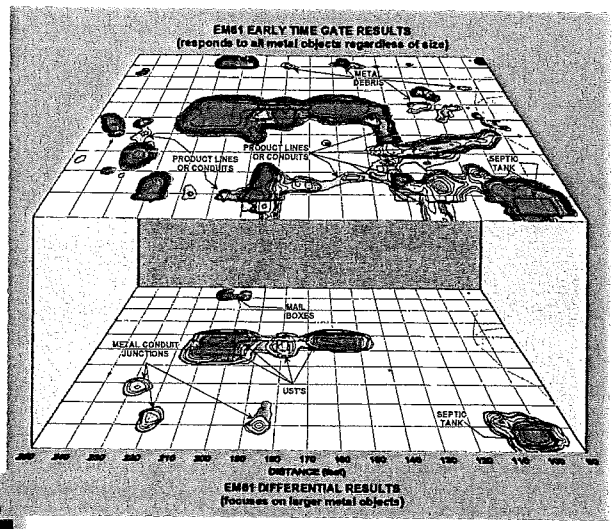
- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

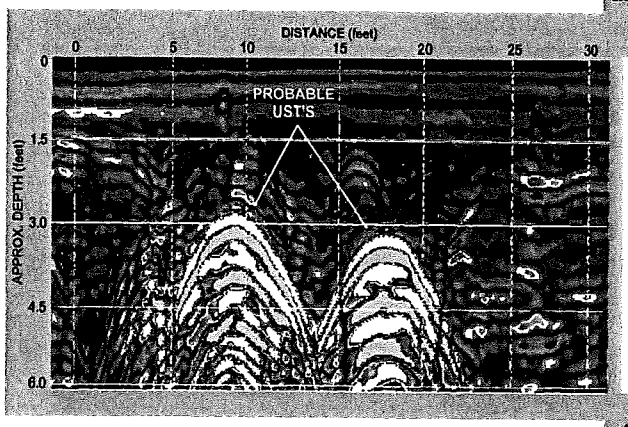
- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

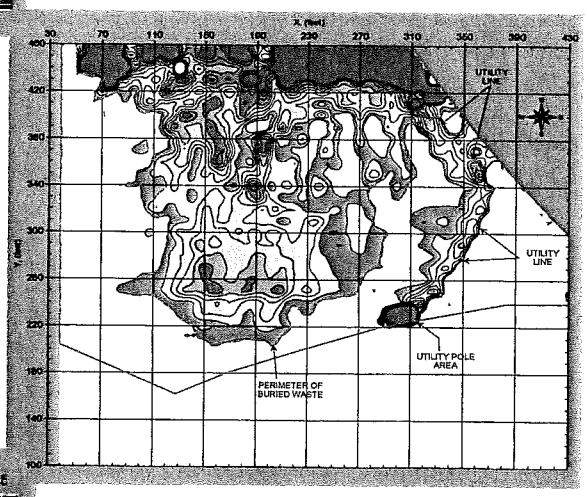
## 5.0 LIMITATIONS

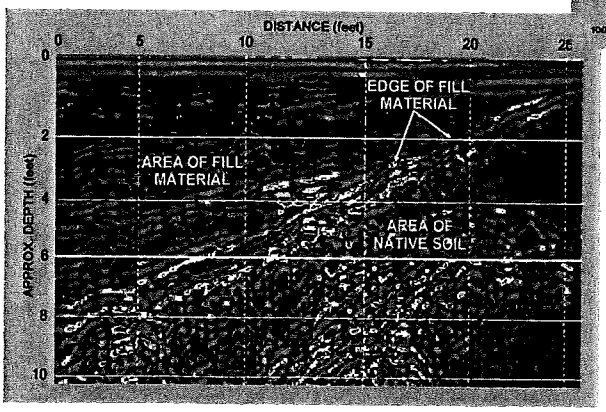
EM61 and GPR surveys have been performed and this report prepared for Solutions Industrial & Environmental Services, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic UST's but only suggest where some of the metallic UST's may be present. The EM61 and GPR anomalies, interpreted as possible UST's or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EM61 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANK
DISTANCE (feet)
EM61 DIFFERENTIAL RESULTS
(focuses on larger metal objects)


DISTANCE (feet)
0
5
10
15
20
25
30
PROBABLE UST'S
APPROX. DEPTH (feet)
0
1.5
3.0
4.5
6.0

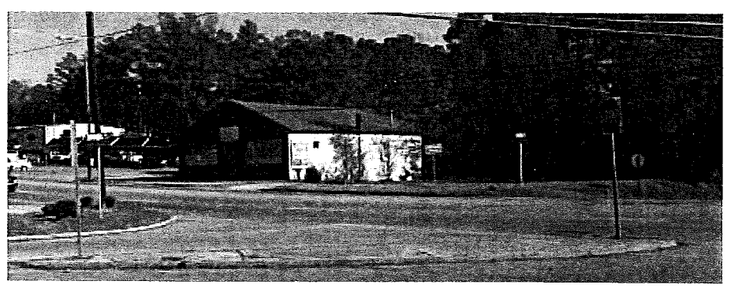
# FIGURES


X, (feet)
Y, (feet)
UTILITY LINE
UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE

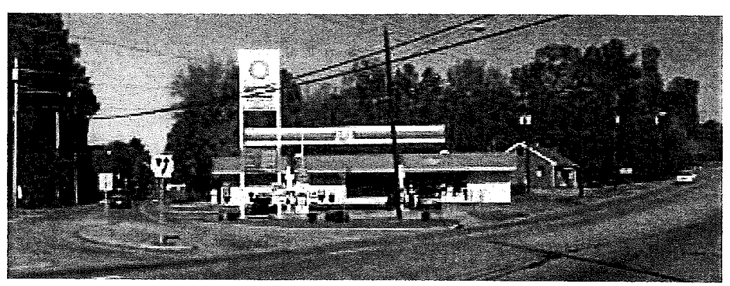

DISTANCE (feet)
0
5
10
15
20
25
EDGE OF FILL MATERIAL
AREA OF FILL MATERIAL
AREA OF NATIVE SOIL
APPROX. DEPTH (feet)
0
2
4
6
8
10

Parcel 4 - W. J. Barnhart Property

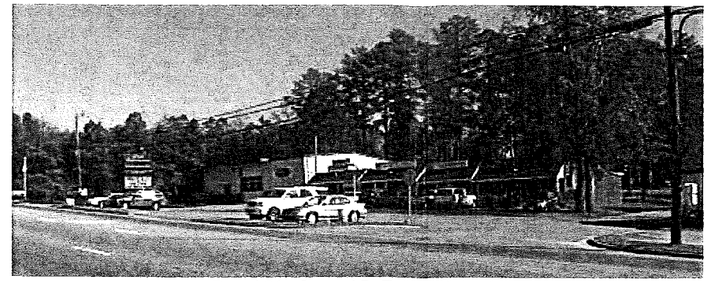
Parcel 7 - Julia M. Ratliff Property



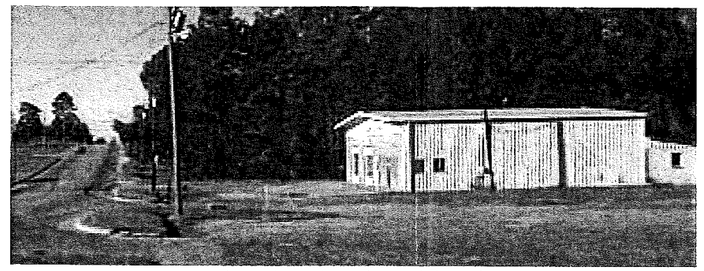
Parcel 15 - Samuel D. Tanner Property



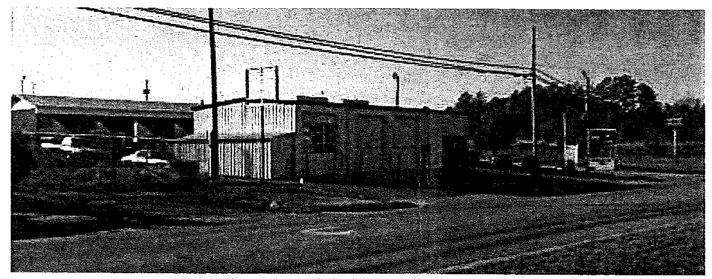
Parcel 17 - Harvey E. Melton Property



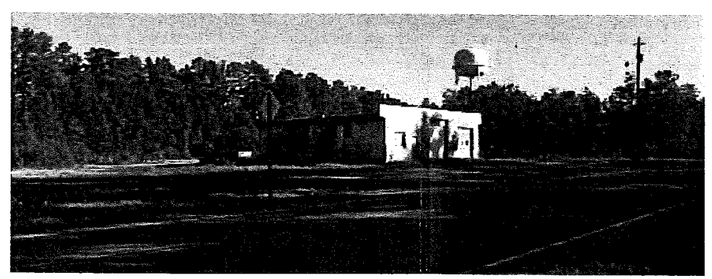
Parcel 21 - Samuel D. Tanner Property



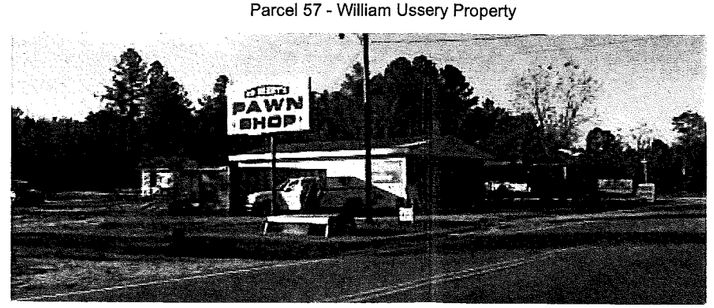
Parcel 41A - W. J. Barnhart Property



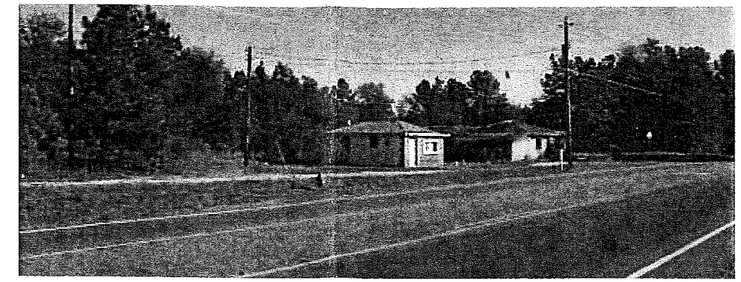
Parcel 42 - Wesly Denham Property



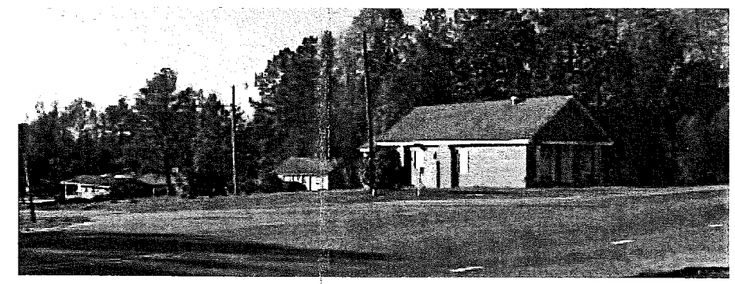
Parcel 57 - William Ussery Property



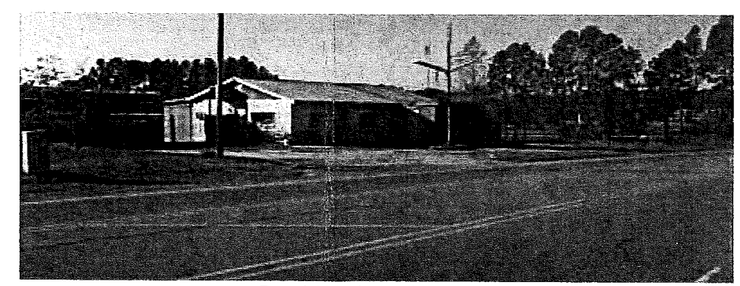

Parcel 140 - Henry Ussery Property



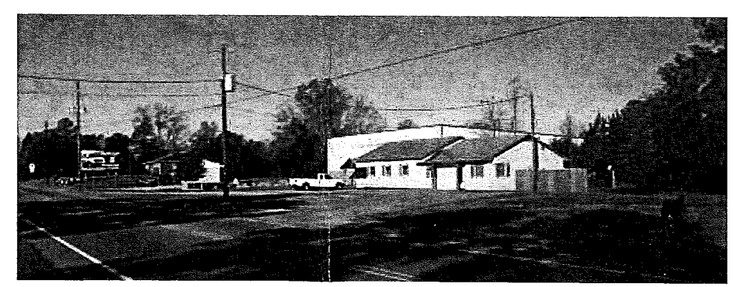
Parcel 80 - Walter McCain Property



Parcel 99 - Leon Wall Property



Parcel 117 - James Porter Property



Parcel 126 - John Evans Property

FIGURE 1

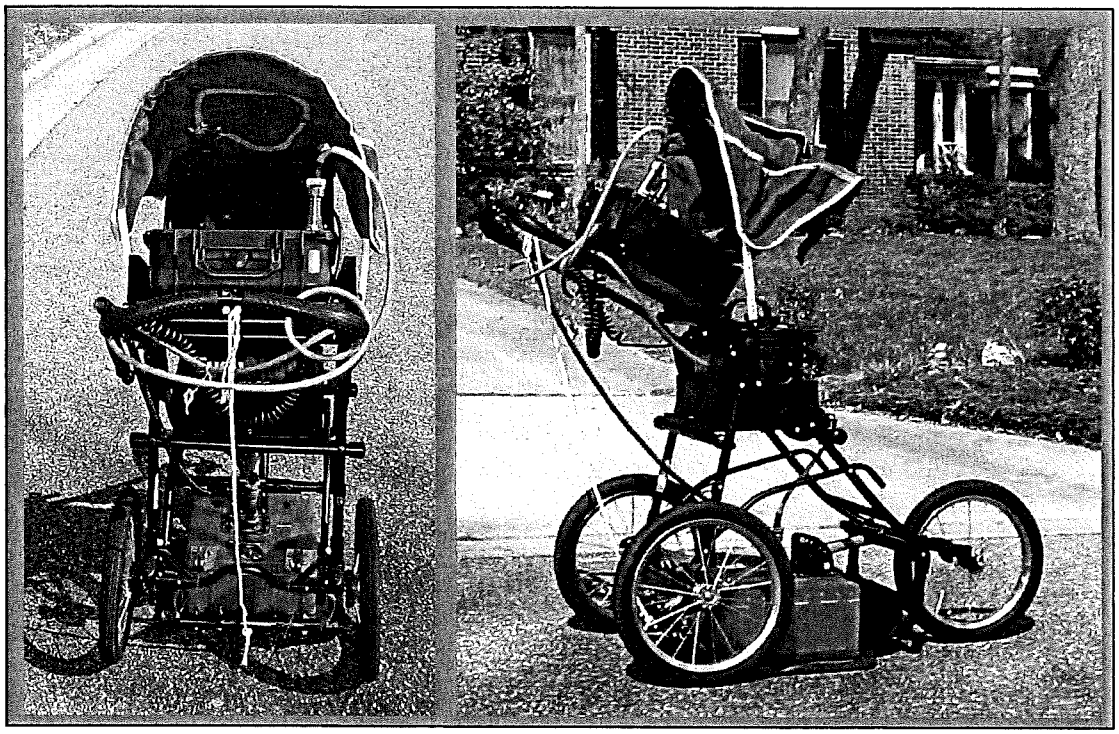
SITE PHOTOS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/28/05 |
| SITE | ROCKINGHAM SITES | DRWN | MJD |
| CITY | ROCKINGHAM | CHKD | |
| STATE | NORTH CAROLINA | DWG | |
| TITLE | GEOPHYSICAL RESULTS | J.NO. | 2005-292 |
| | | FIGURE | |

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

The Geonics EM61 metal detector was used to conduct the metal detection surveys at the Rockingham sites in November 2005.

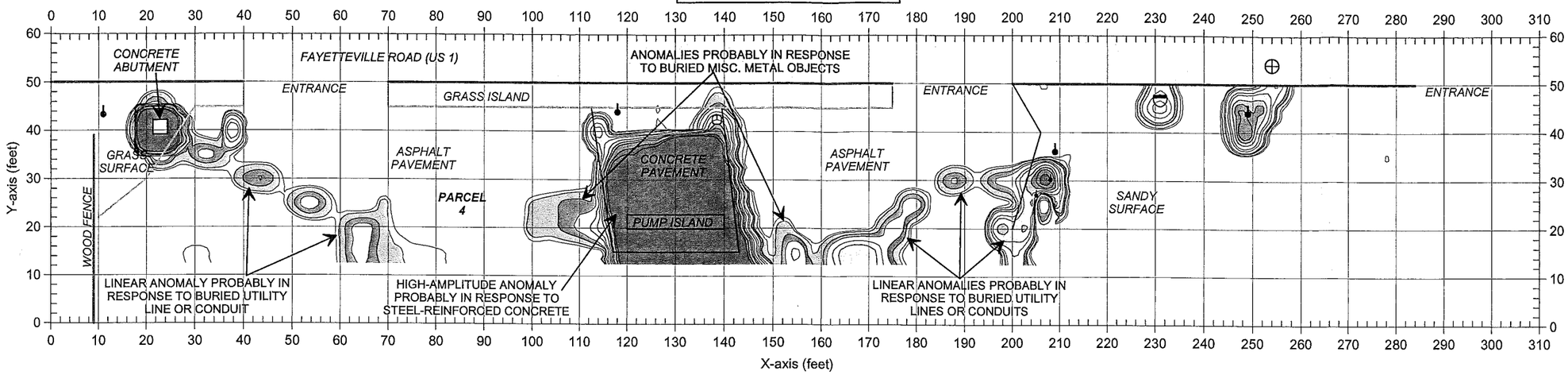


The SIR-2000 GPR system equipped with a 400 MHz antenna that was used at the Rockingham sites in November 2005.

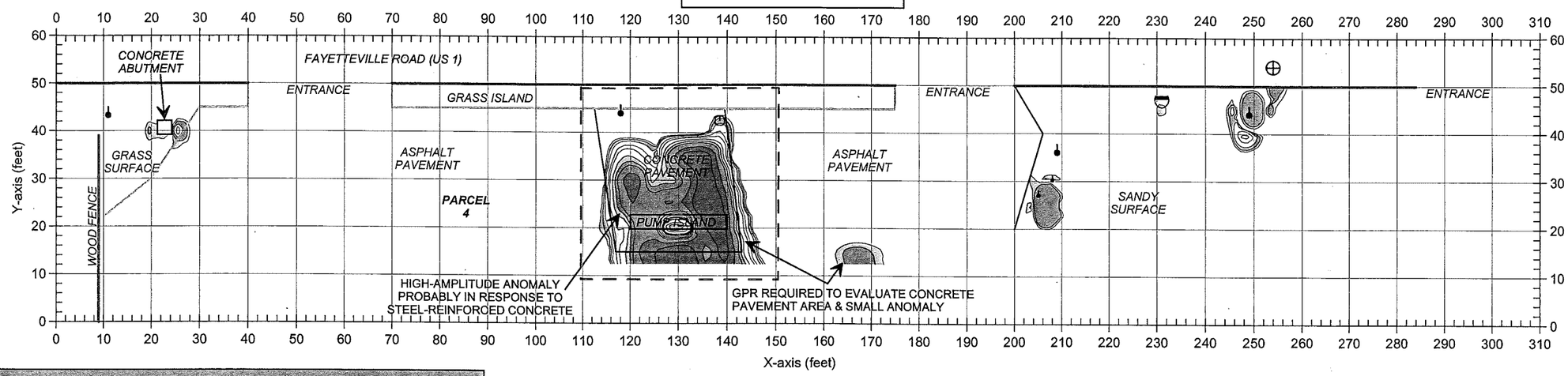
| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE 11/28/05 | DRWN | GEOPHYSICAL EQUIPMENT |
| | SITE | ROCKINGHAM SITES | LAY | CHKD | |
| | CITY | ROCKINGHAM — STATE NORTH CAROLINA | DWG | | |
| | TITLE | GEOPHYSICAL RESULTS | JOB NO. 2005-292 | FIGURE | FIGURE 2 |

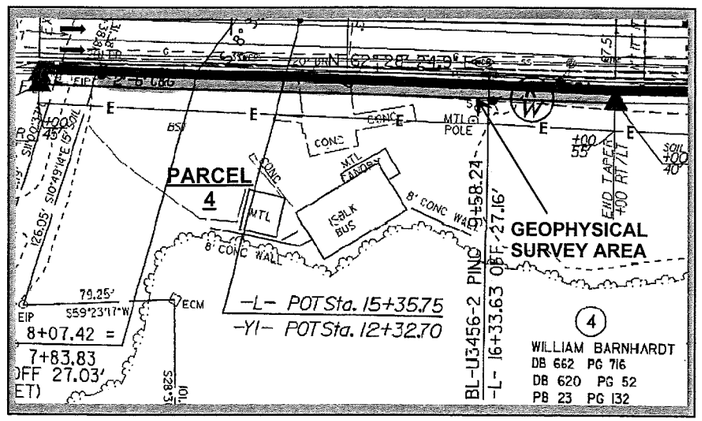
GRAPHIC SCALE IN METERS

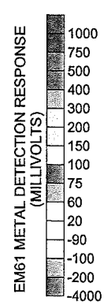
## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE OR LIGHT POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY AREA

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 3

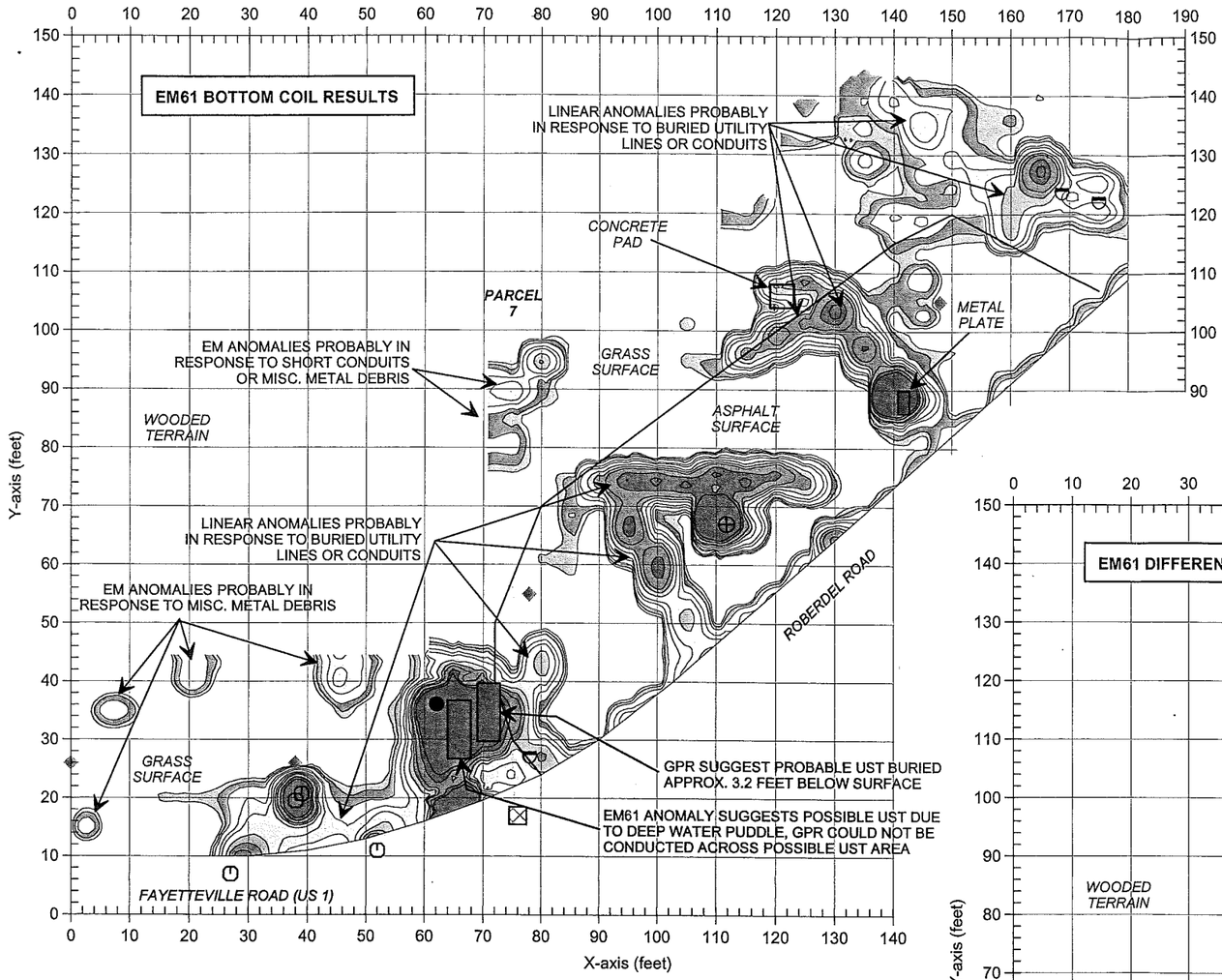
EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/26/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: W. J. BARNHART PROPERTY (PARCEL 4)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

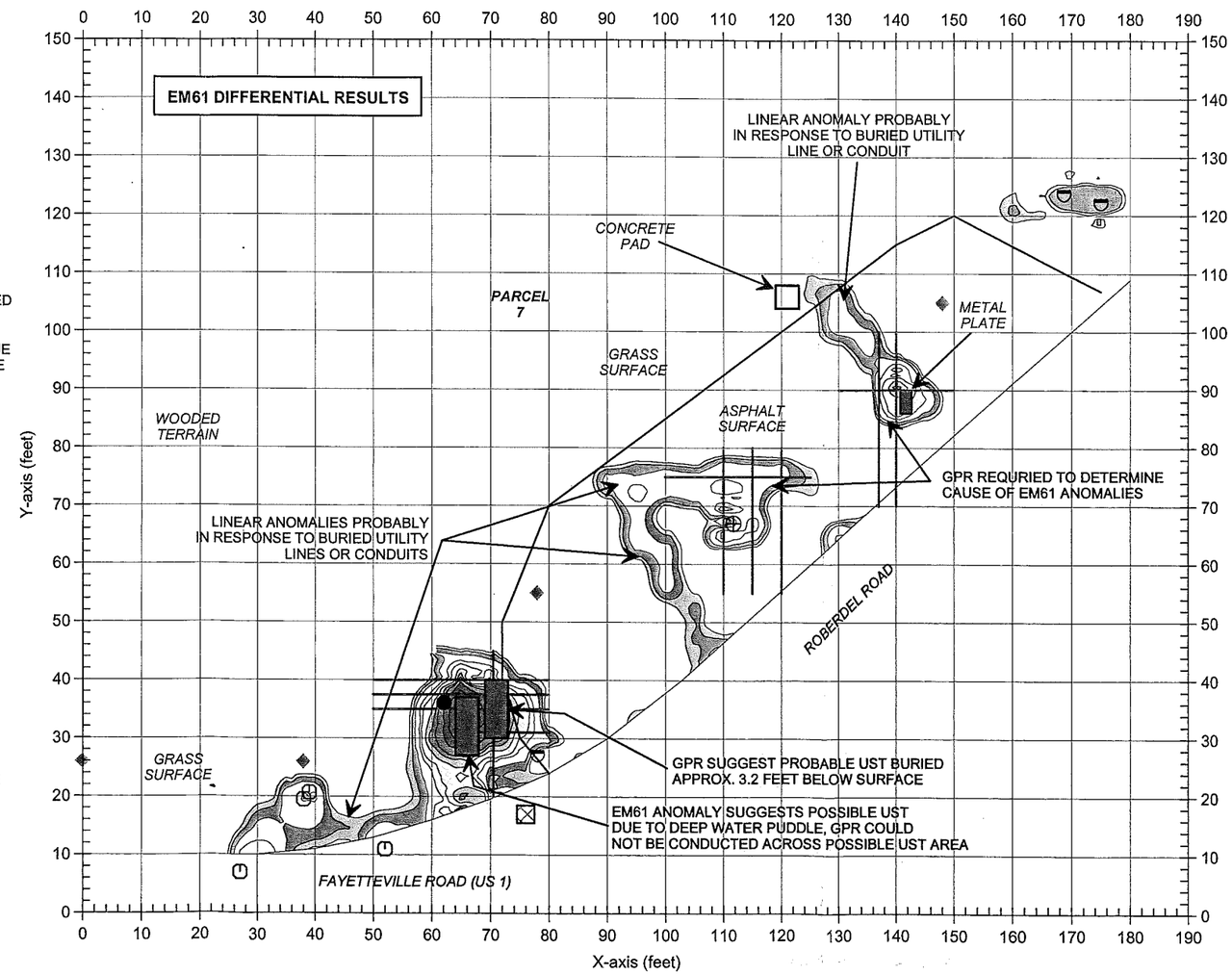
- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH & EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

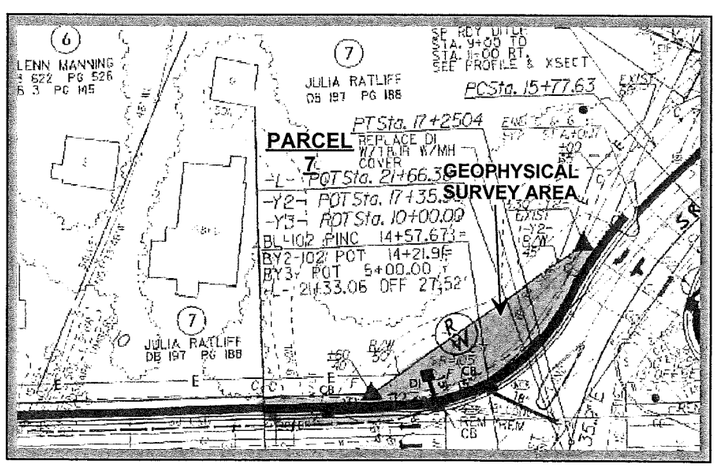
Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -50 50 60 75 100 150 200 300 400 500 750 1000



APPROXIMATE NORTH

FIGURE 4

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DATE | 11/25/05 |
| DRWN | MJD |
| CHKD | |
| LAY | |
| DWG | |
| FIGURE | |
| JOB NO. | 2005-292 |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

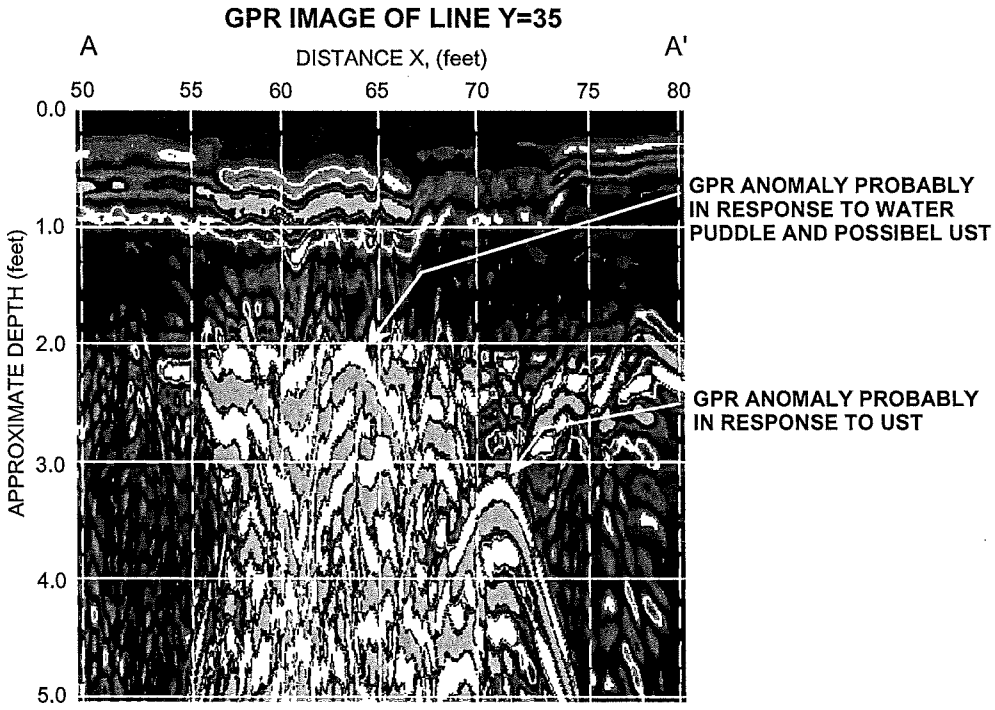
JULIA M. RATLIFF PROPERTY (PARCEL 7)

ROCKINGHAM — NORTH CAROLINA

GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

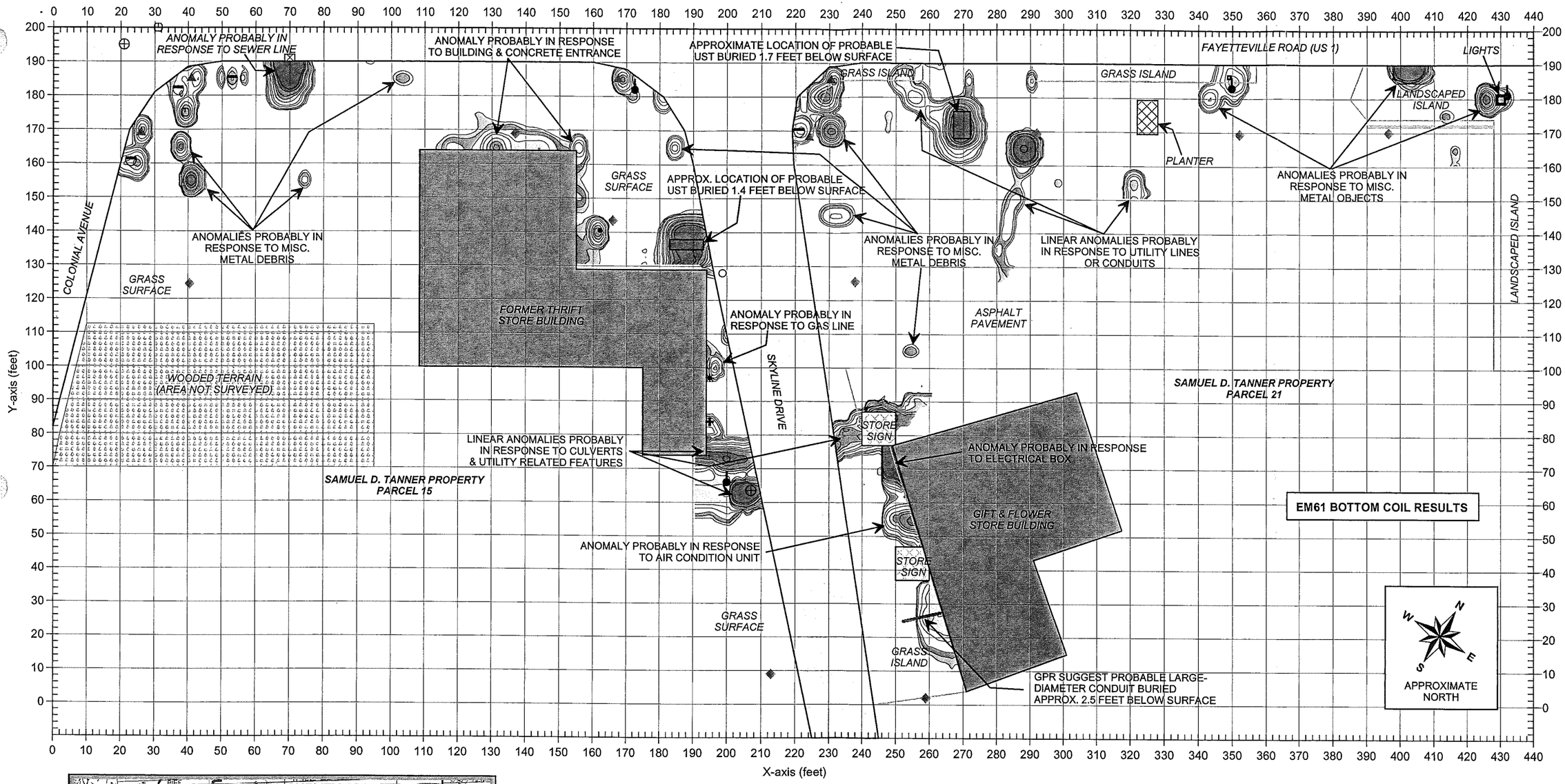
The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

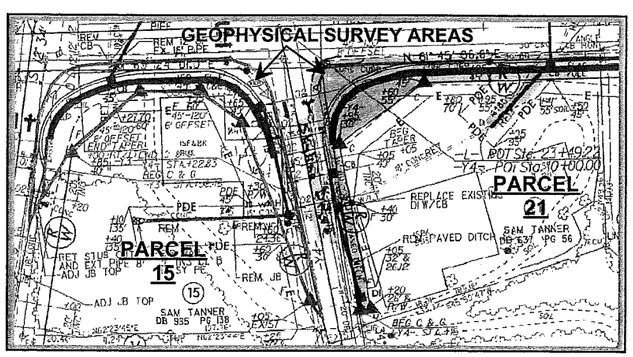


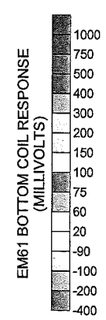

The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | SWO: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 5 |

GRAPHIC SCALE IN METERS




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 6

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |

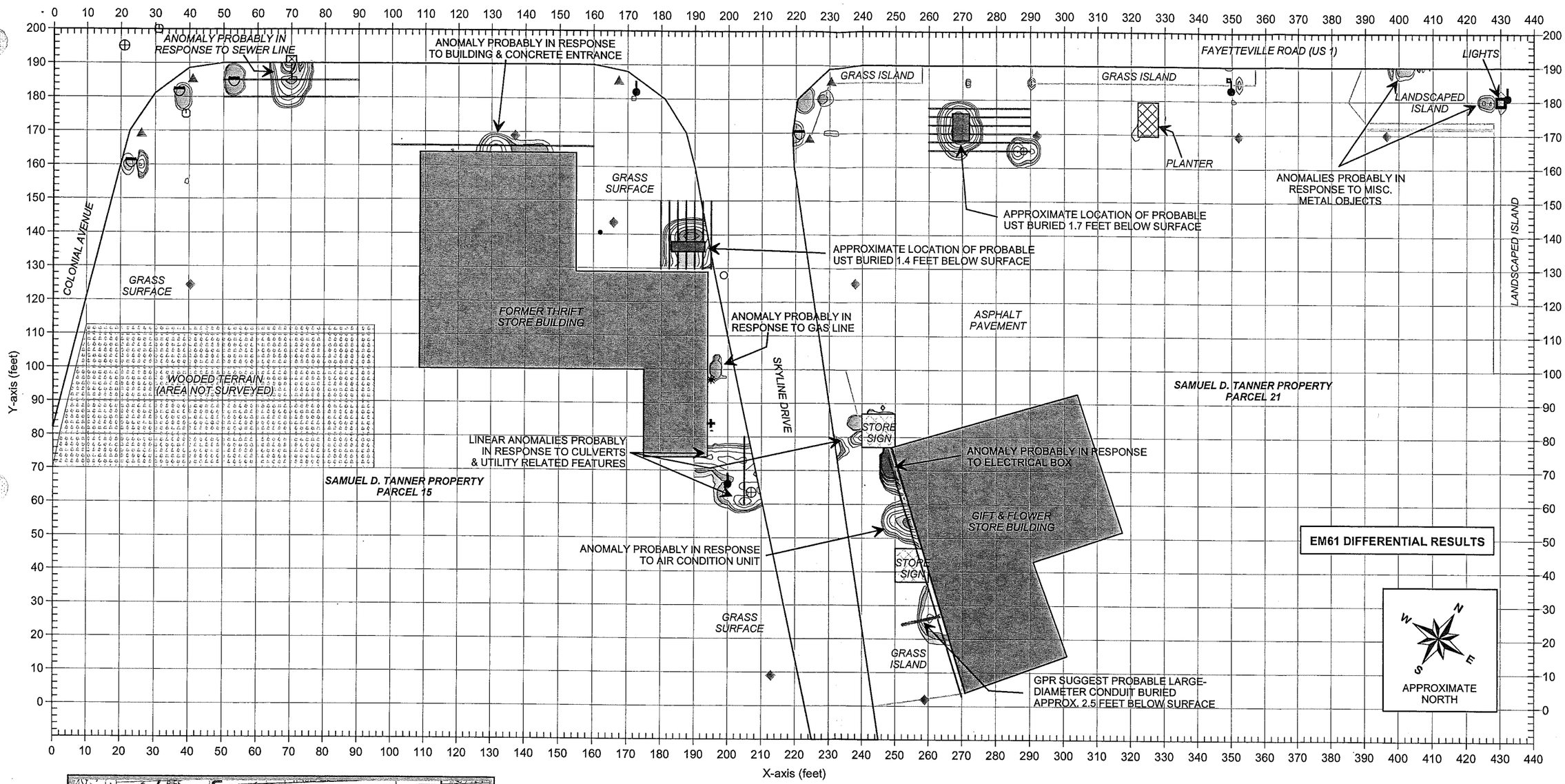
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

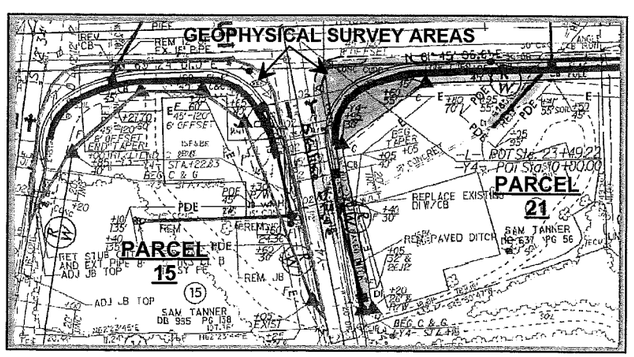
SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

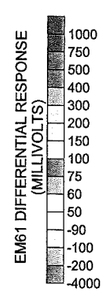
CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 7

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| JOB NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

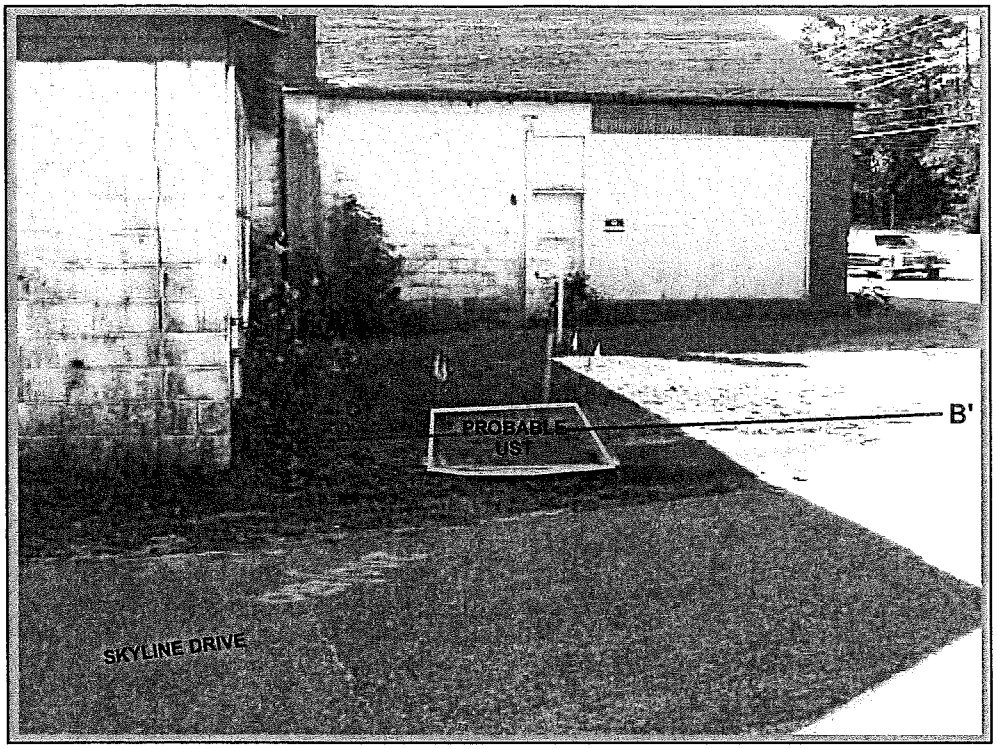
SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

CITY: ROCKINGHAM

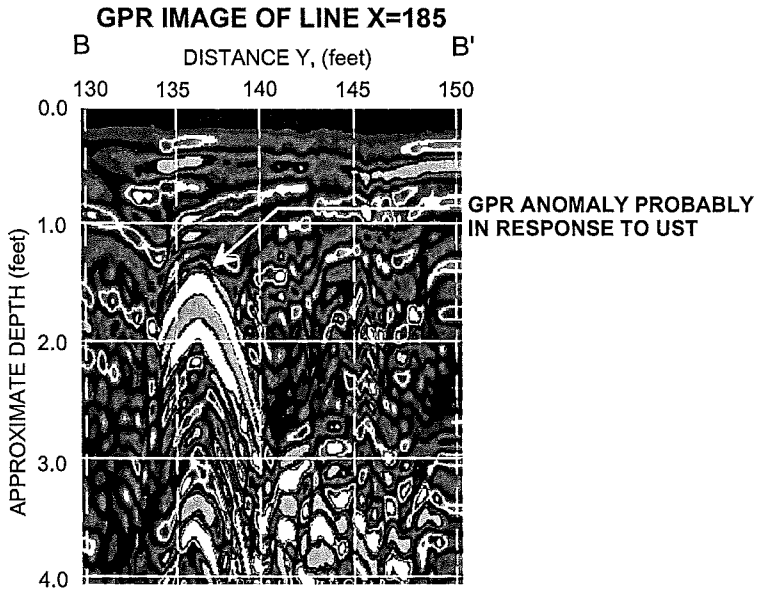
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



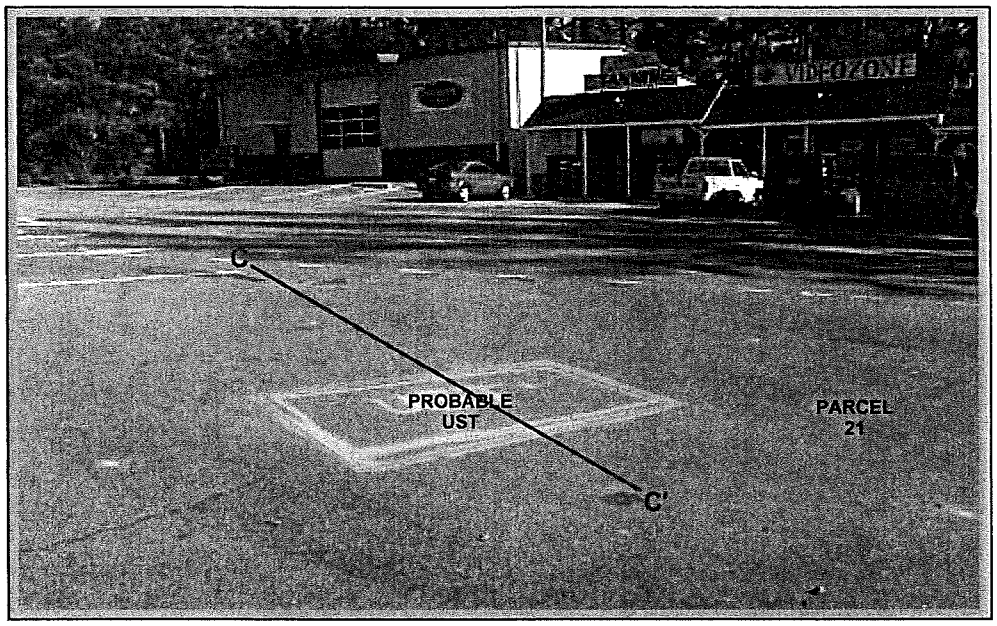

The photo shows the location of the probable UST, as suggested by the geophysical results at Parcel 15.



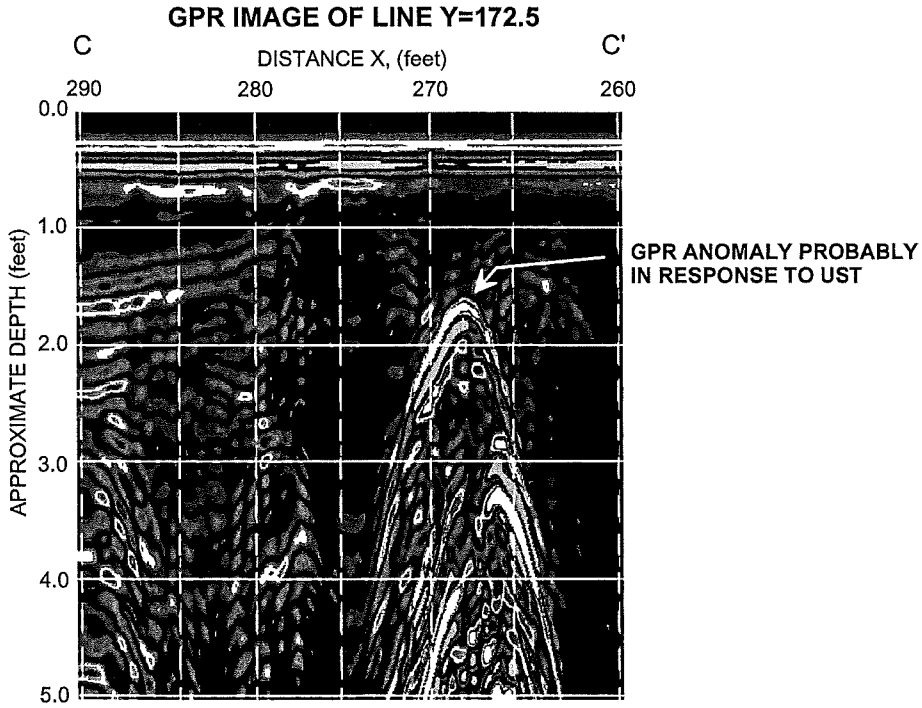

The GPR image obtained along a portion of survey line X=185 shows the anomaly that is probably in response to a UST near Y=137 and buried approximately 1.4 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 15) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J.NO.: 2005-292 | FIGURE: | FIGURE 8 |

GRAPHIC SCALE IN METERS



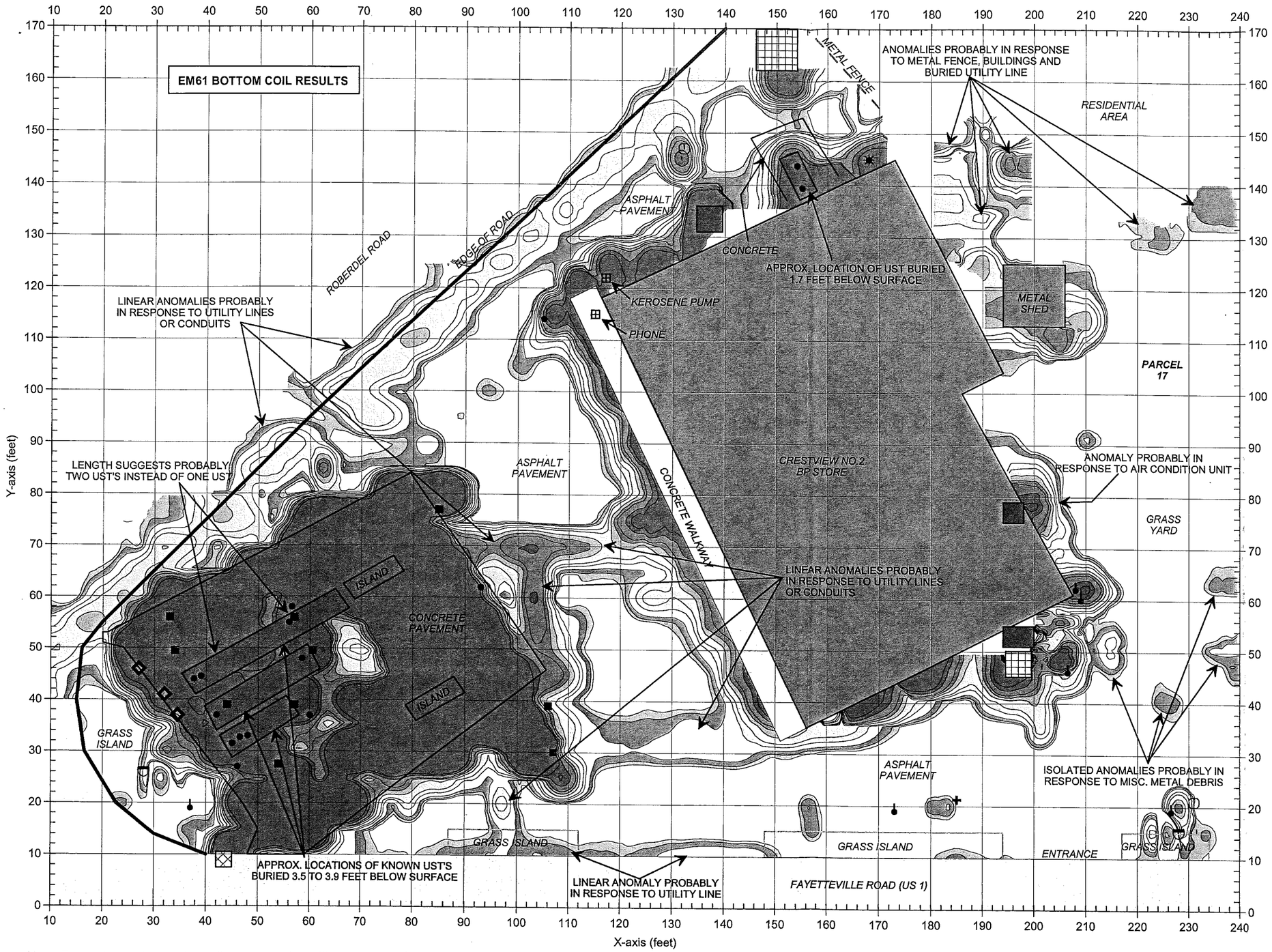

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 21.




The GPR image obtained along a portion of survey line Y=172.5 shows the anomaly that is probably in response to a UST near X=268 and buried approximately 1.7 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 21) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 9 |

GRAPHIC SCALE IN METERS




Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 10

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CH'KD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

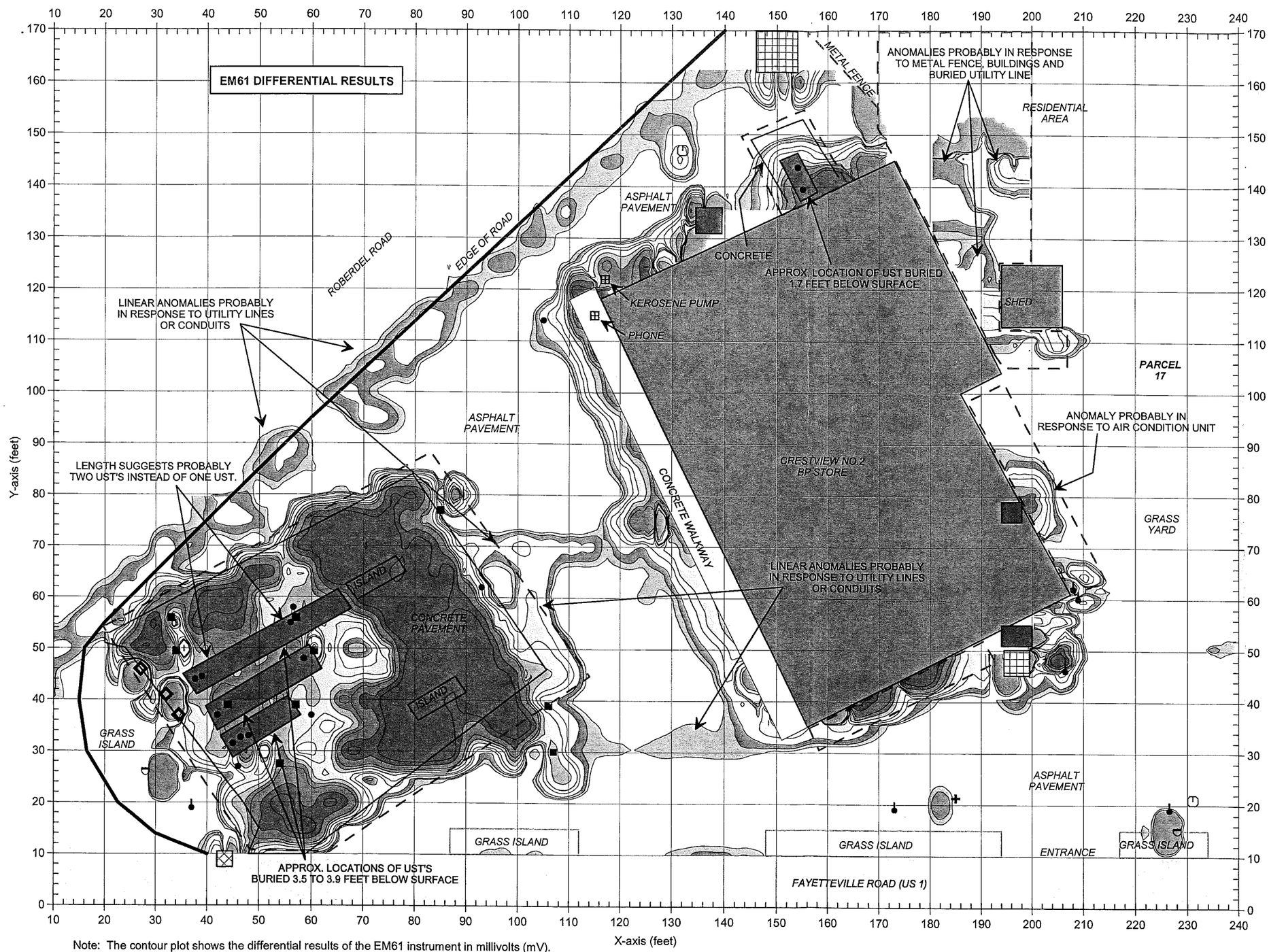
SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

HARVEY E. MELTON PROPERTY (PARCEL 17)

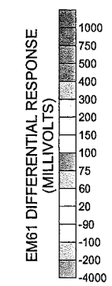
ROCKINGHAM — NORTH CAROLINA

GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- UST COVERS
- WATER METER OR VALVE COVER
- GUY WIRE
- METAL SIGN POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVERS
- GAS METER
- AIR CONDITION UNIT
- DUMPSTER
- GPR SURVEY AREA
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 11

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/25/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

HARVEY E. MELTON PROPERTY (PARCEL 17)

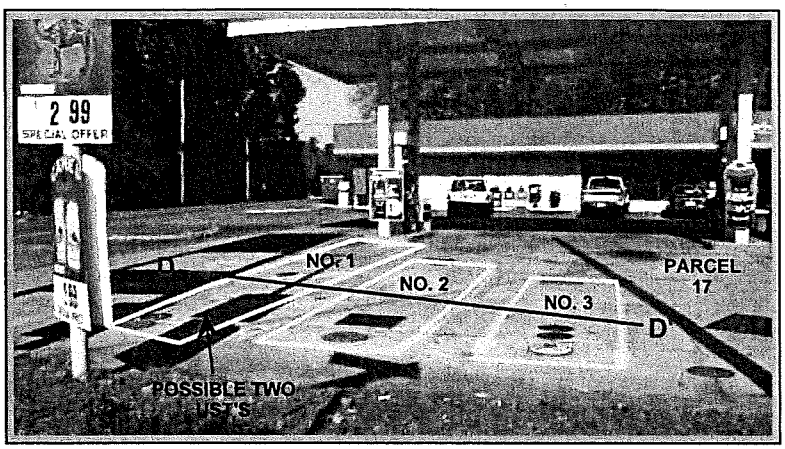
| | |
|---|---|
| STATE | NORTH CAROLINA |
| CITY | ROCKINGHAM |

TITLE: GEOPHYSICAL RESULTS

SITE

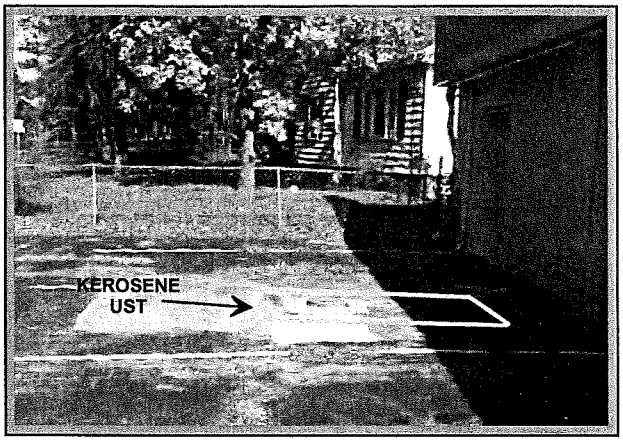
CLIENT

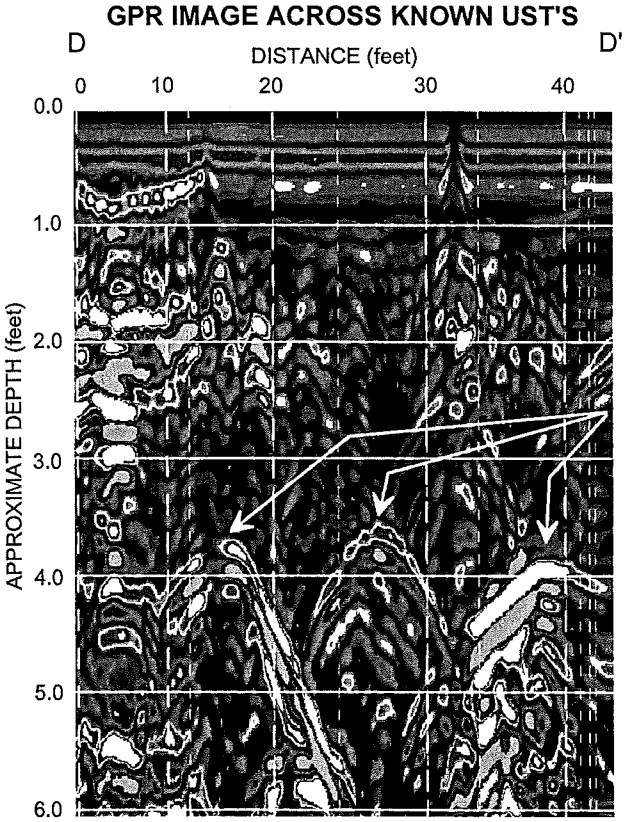
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approxiamte location of the three or four known and active UST's, as suggested by the geophysical results, at Parcel 17. The UST's appear to be approximately 3.5 to 3.9 feet below surface.

The photo shows the approximate location of the kerosene UST, as suggested by the geophysical results, at Parcel 17. The UST is located along the northwest wall of the store and is buried approximately 2.4 feet below surface.




**GPR ANOMALIES PROBABLY IN RESPONSE TO THREE UST'S BURIED 3.5 TO 3.9 FEET BELOW SURFACE**

The GPR image is obtained along a traverse line oriented perpendicular to the axis of the UST's. The three GPR anomalies in response to the probable UST's suggest that the UST's are buried approximately 3.5 to 3.9 feet below surface.

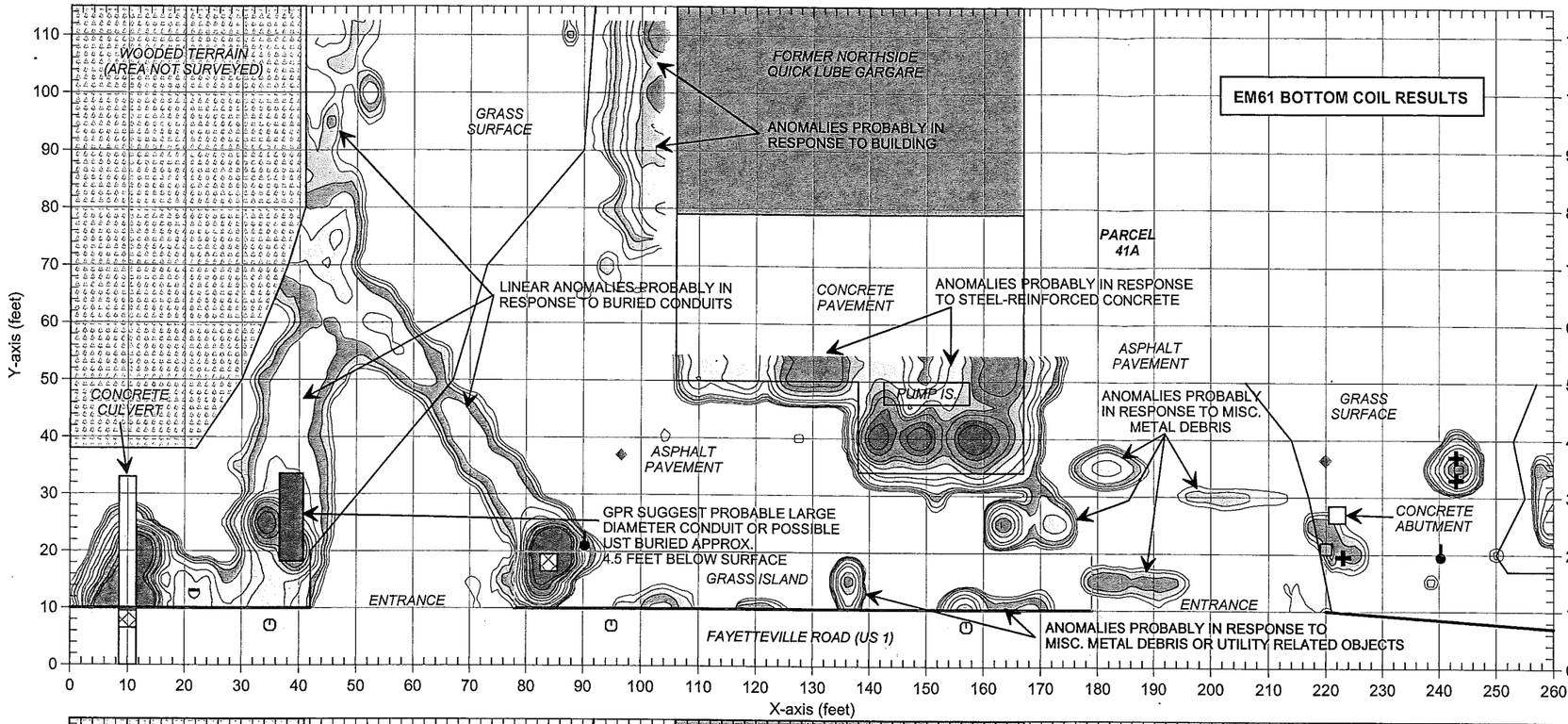
**PYRAMID**
ENVIRONMENTAL & ENGINEERING, P.C.

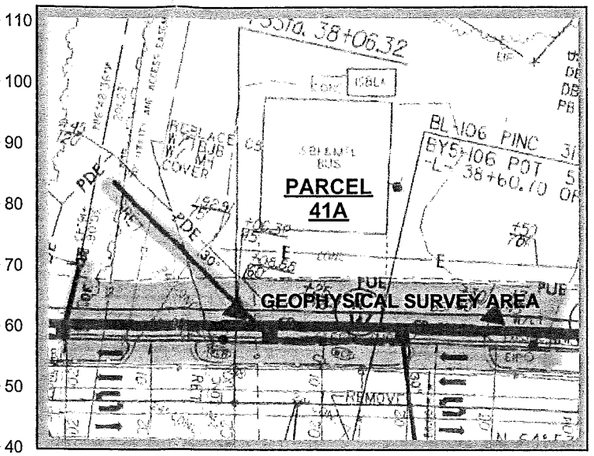
| | | | | | |
|---|---|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/28/05 | DRWN | |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | LAY | | CHKD | |
| CITY | ROCKINGHAM — STATE: NORTH CAROLINA | DWG | | | |
| TITLE | GEOPHYSICAL RESULTS | JOB NO. | 2005-292 | HOURS | |

GRAPHIC SCALE IN METERS

PHOTOS & GPR IMAGE OF UST LOCATIONS

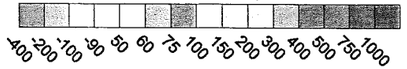
FIGURE 12

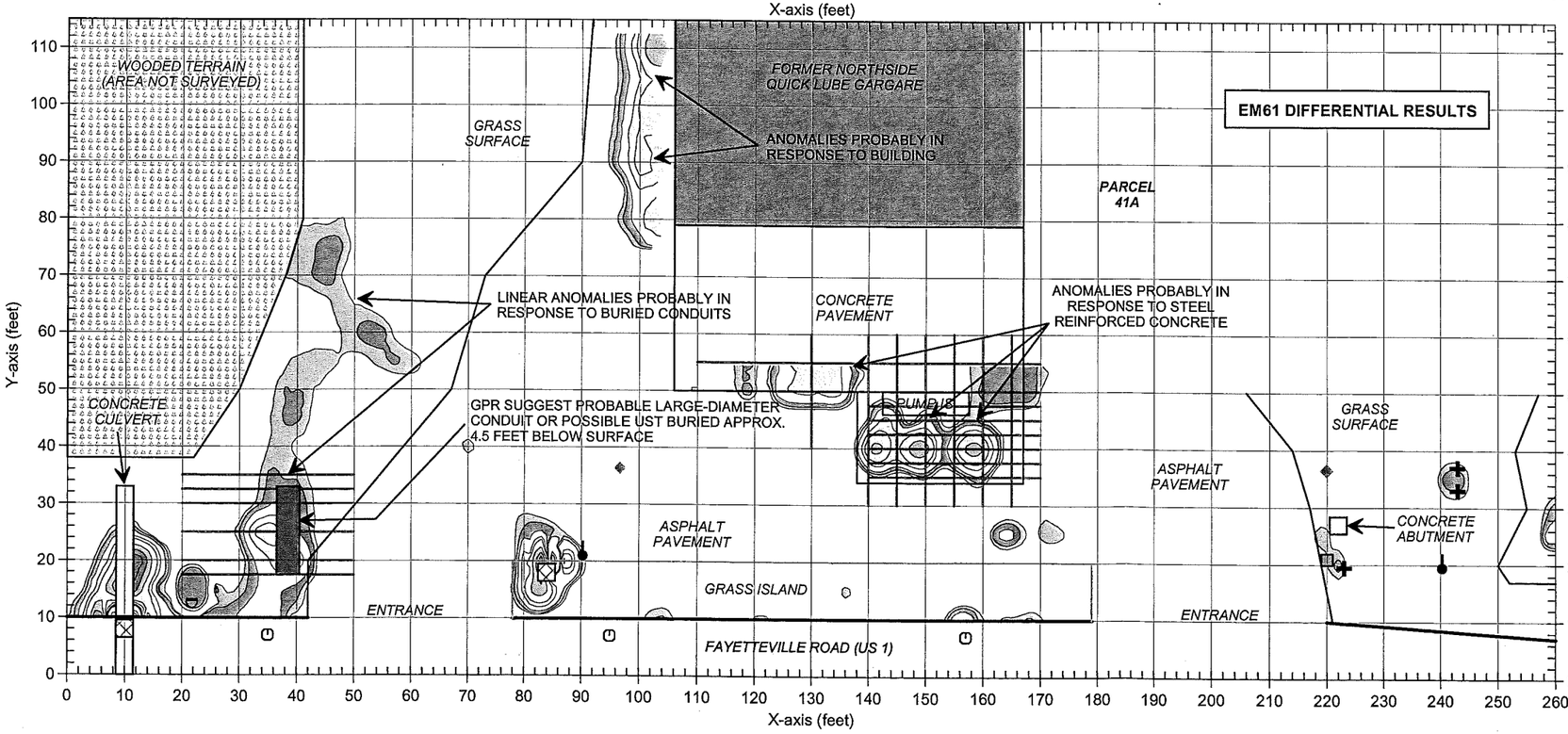


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MAIL BOX
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE LARGE DIAMETER CONDUIT OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 13

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

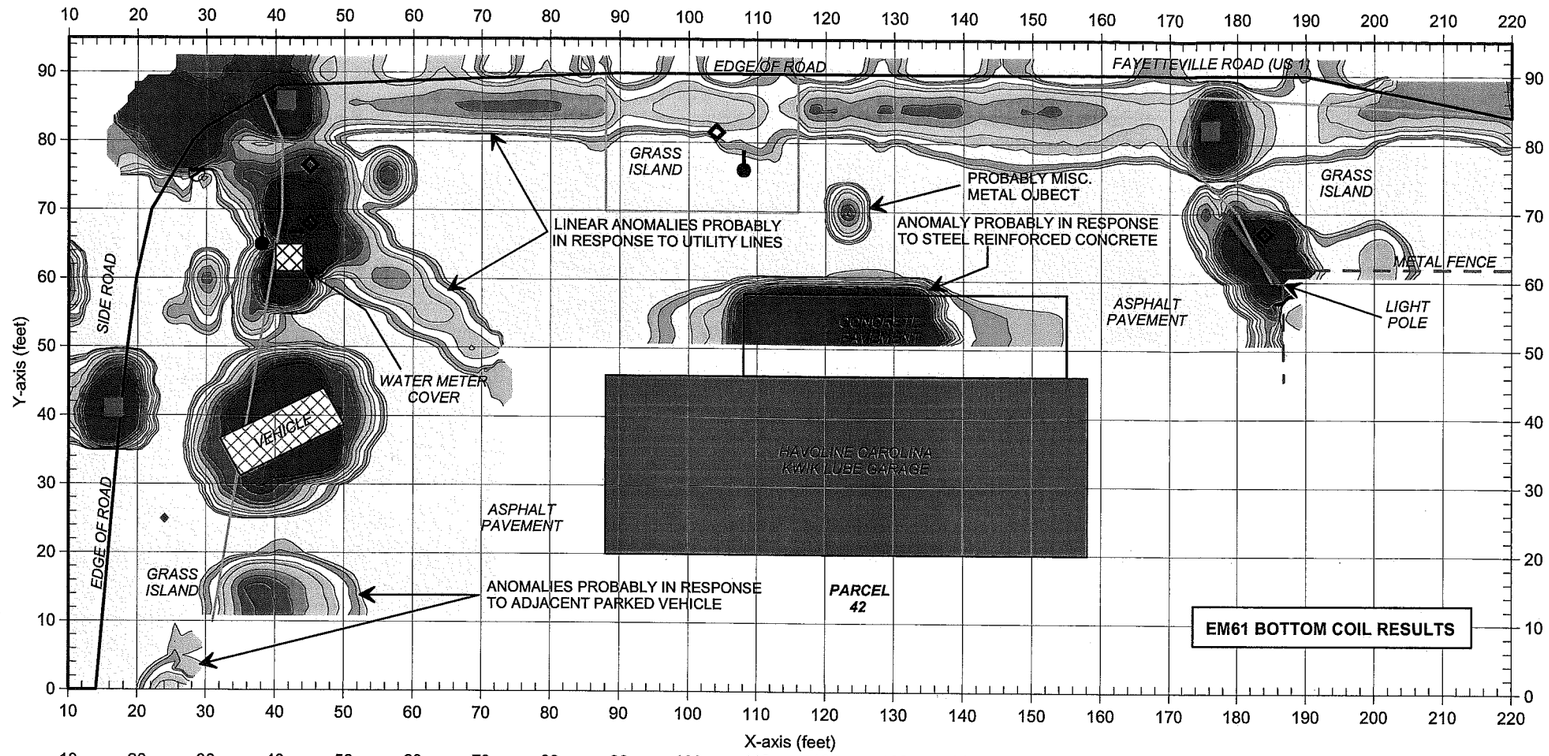
W.J. BARNHART PROPERTY (PARCEL 41A)

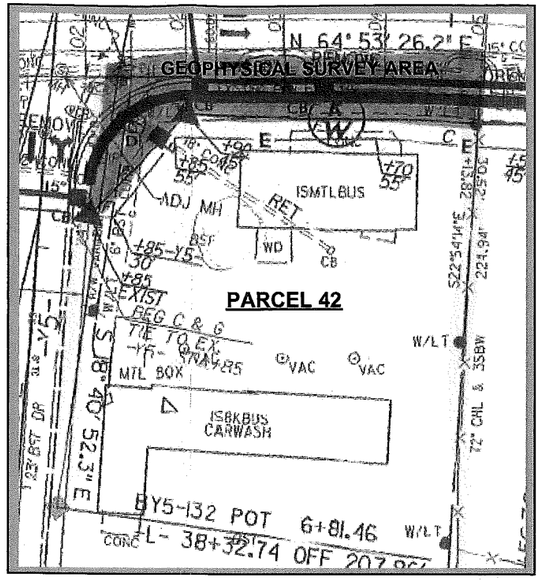
NORTH CAROLINA

ROCKINGHAM

GEOPHYSICAL RESULTS

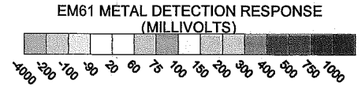
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- METAL SIGN POLE
- STORM SEWER GRATE
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 15, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 14

EM61
METAL DETECTION
RESULTS

| | |
|---|---|
| GRAPHIC SCALE IN METERS | |
| DRAWN | MJD |
| CHKD | |
| DWG | |
| LAY | |
| DATE | 11/26/05 |
| J.NO. | 2005-292 |
| FIGURE | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

WESLEY DENHAM PROPERTY (PARCEL 42)

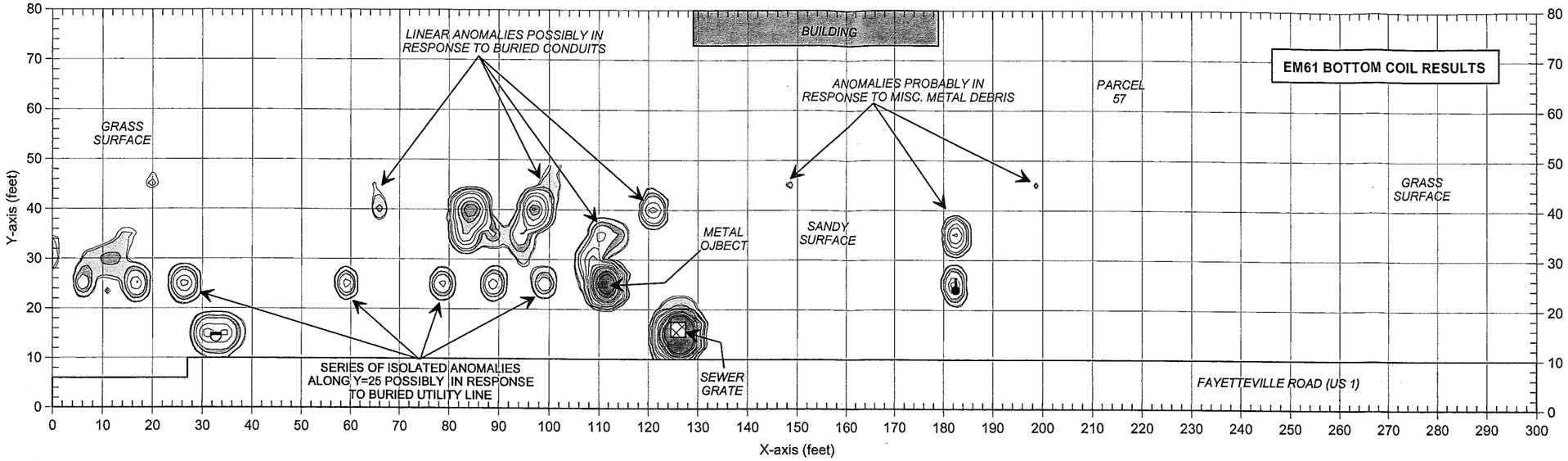
NORTH CAROLINA

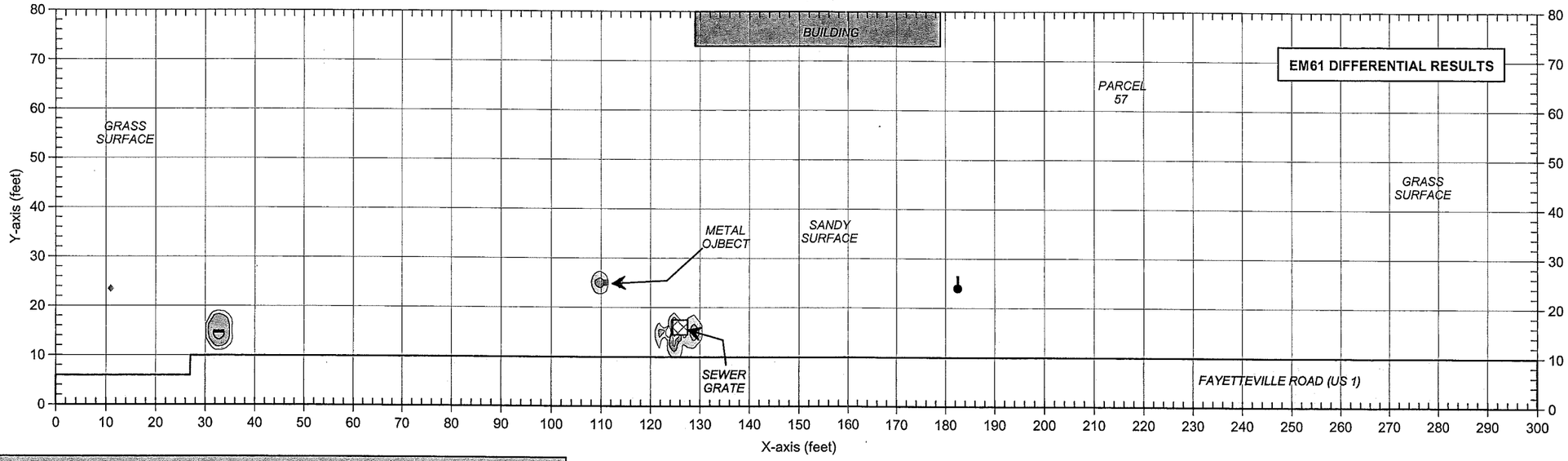
ROCKINGHAM

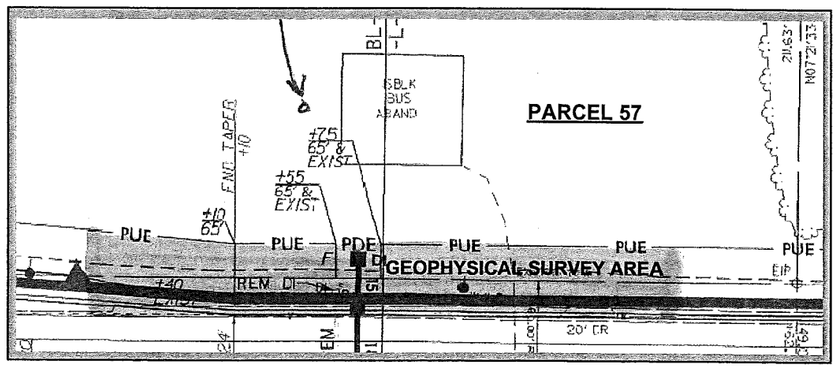
GEOPHYSICAL RESULTS

SILENT | SITE | CITY | STATE | TITLE

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-1000 -200 -100 -50 -25 -50 -75 -100 -150 -200 -300 -400 -500 -750 -1000

N W E S

APPROXIMATE NORTH

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) surveys were not conducted at this site.

FIGURE 15

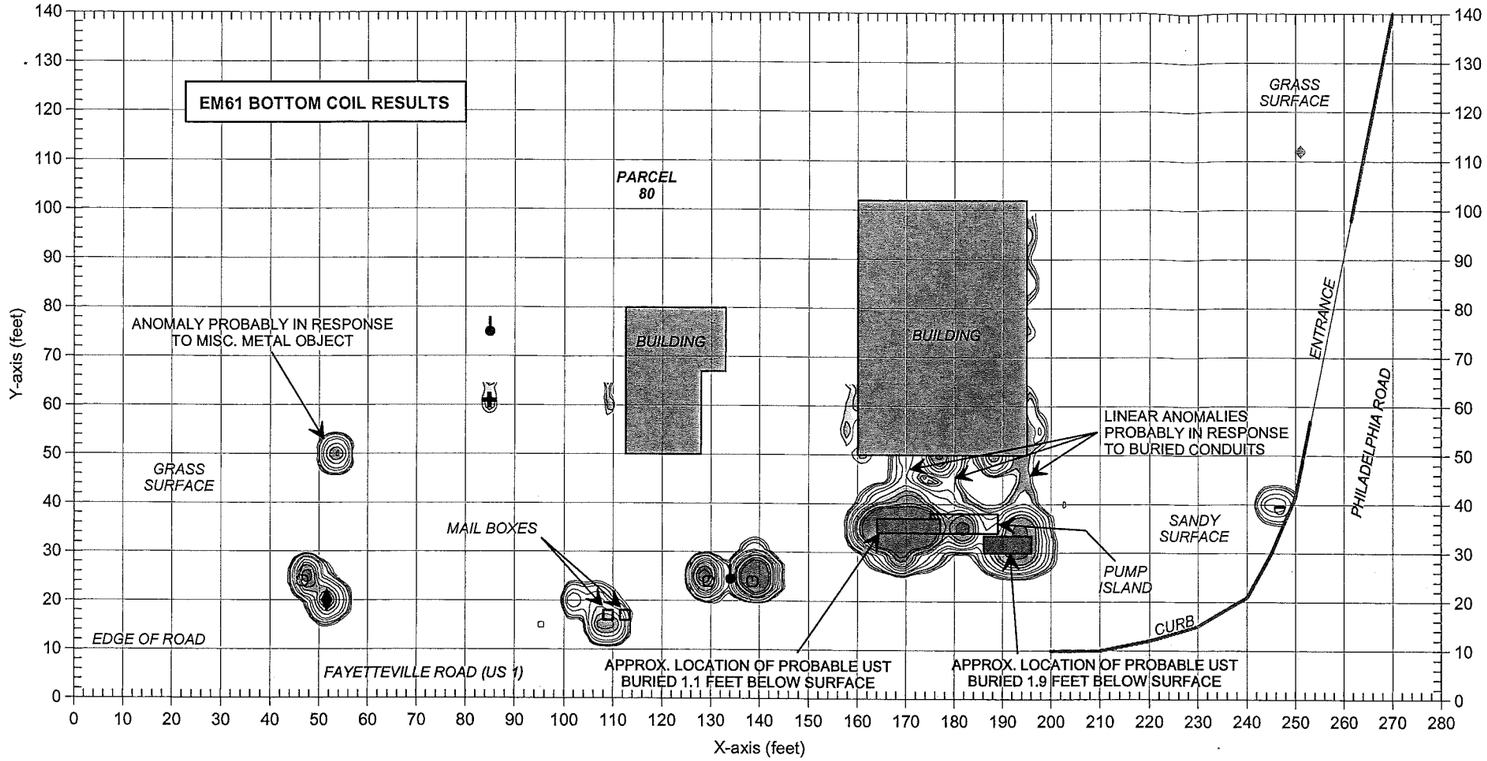
EM61
METAL DETECTION
RESULTS

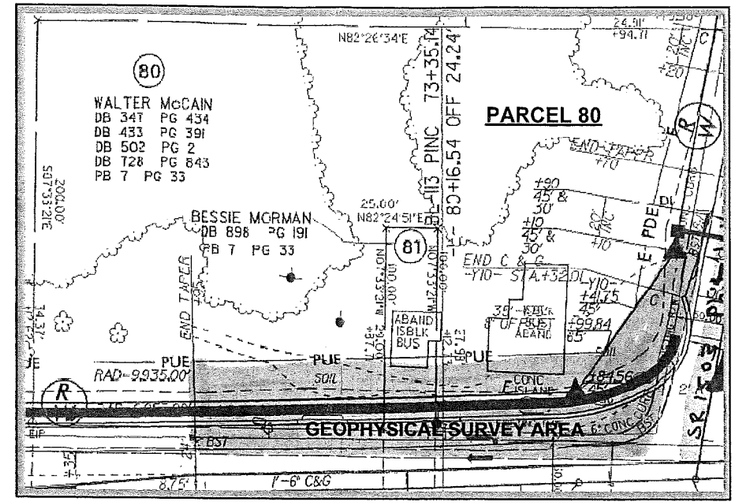
GRAPHIC SCALE IN METERS

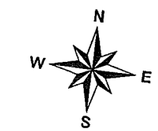
| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| LAY | |
| DWG | |
| DATE | 11/18/05 |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WILLIAM USSERY PROPERTY (PARCEL 57)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

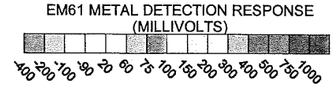


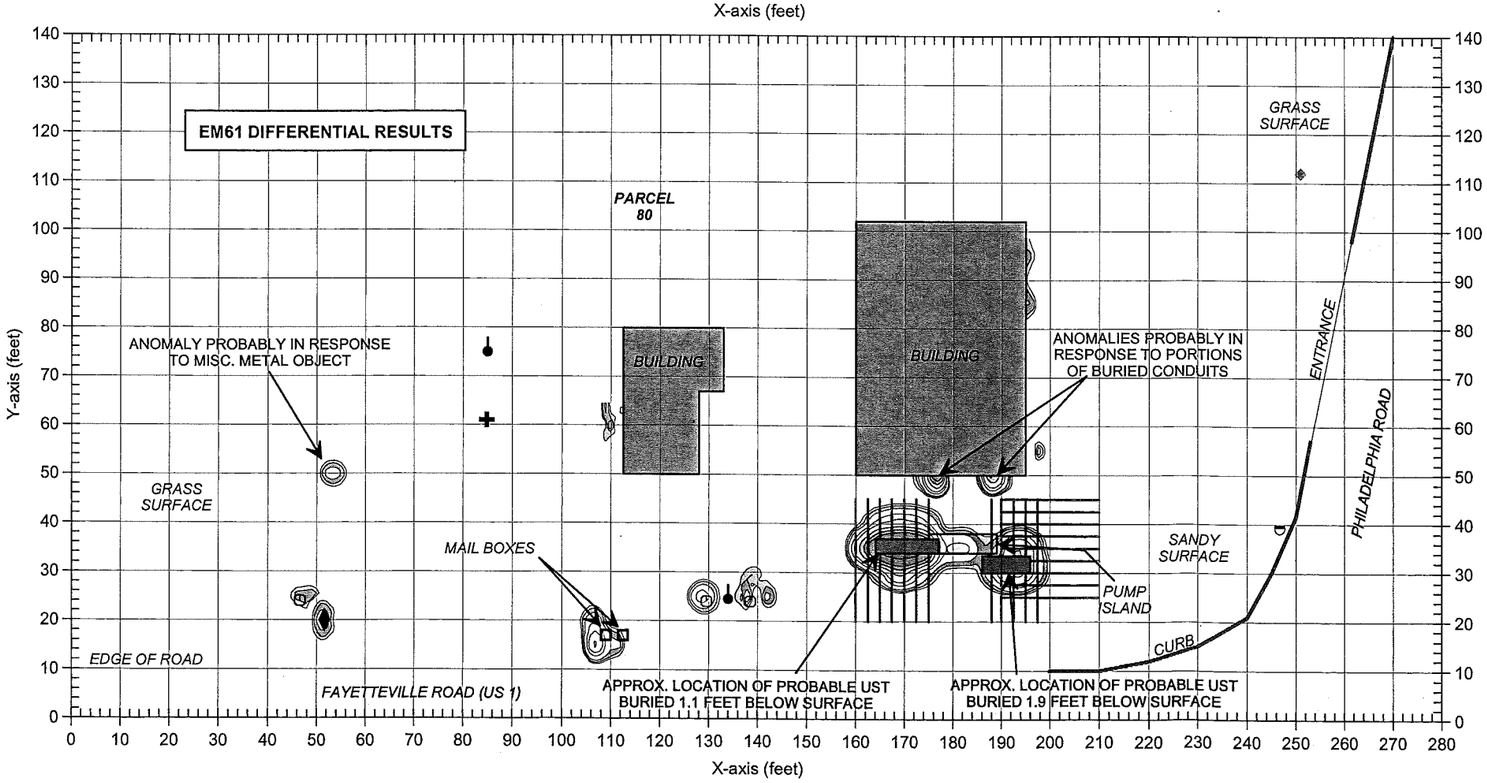




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- FIRE HYDRANT
- TRAFFIC SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

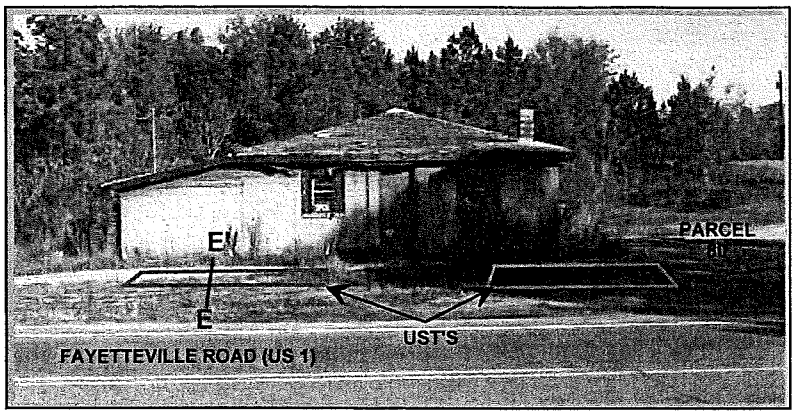
FIGURE 16

EM61
METAL DETECTION
RESULTS

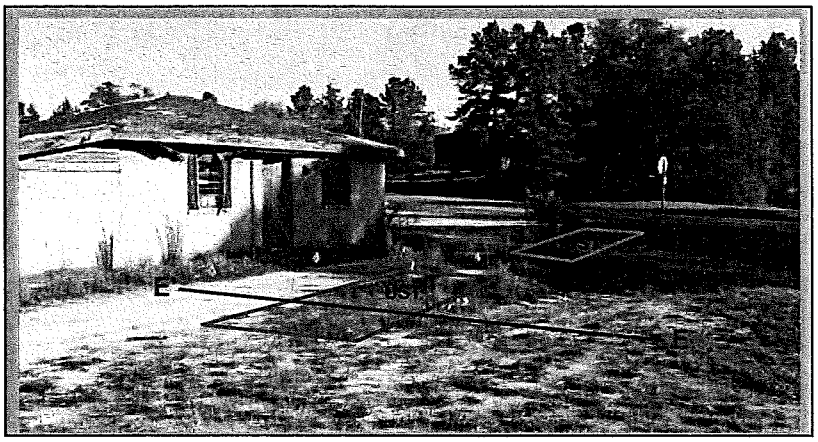
| | |
|---|---|
| GRAPHIC SCALE IN METERS | |
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

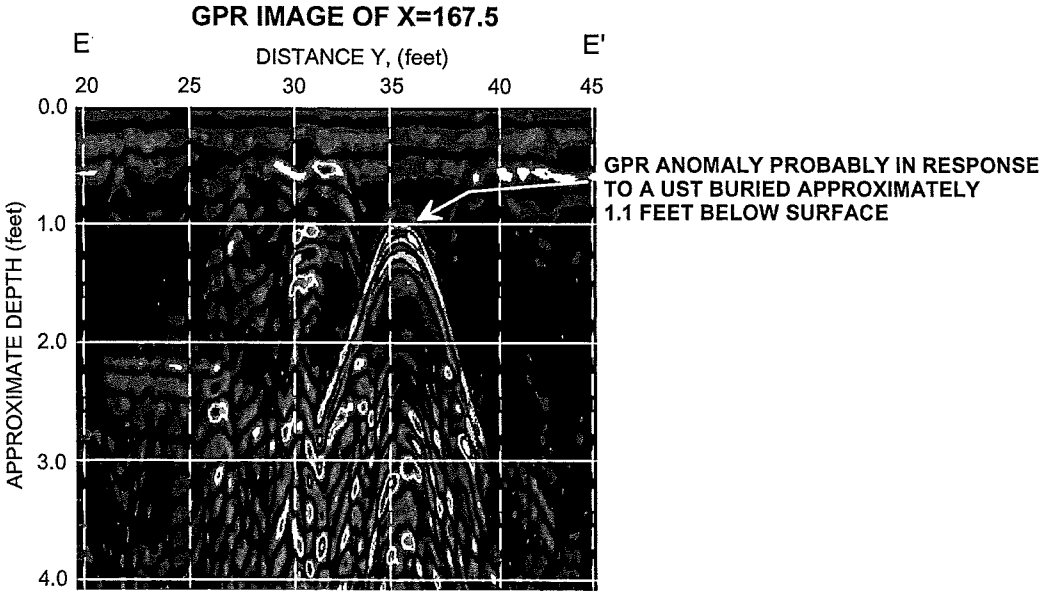
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WALTER McCAIN PROPERTY (PARCEL 80)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




The two photos show the approximate locations of the two probable UST's at Parcel 80, as suggested by the geophysical results. The UST's appear to be buried approximately 1 to 2 feet below surface. A former pump island lies between the two probable UST's.

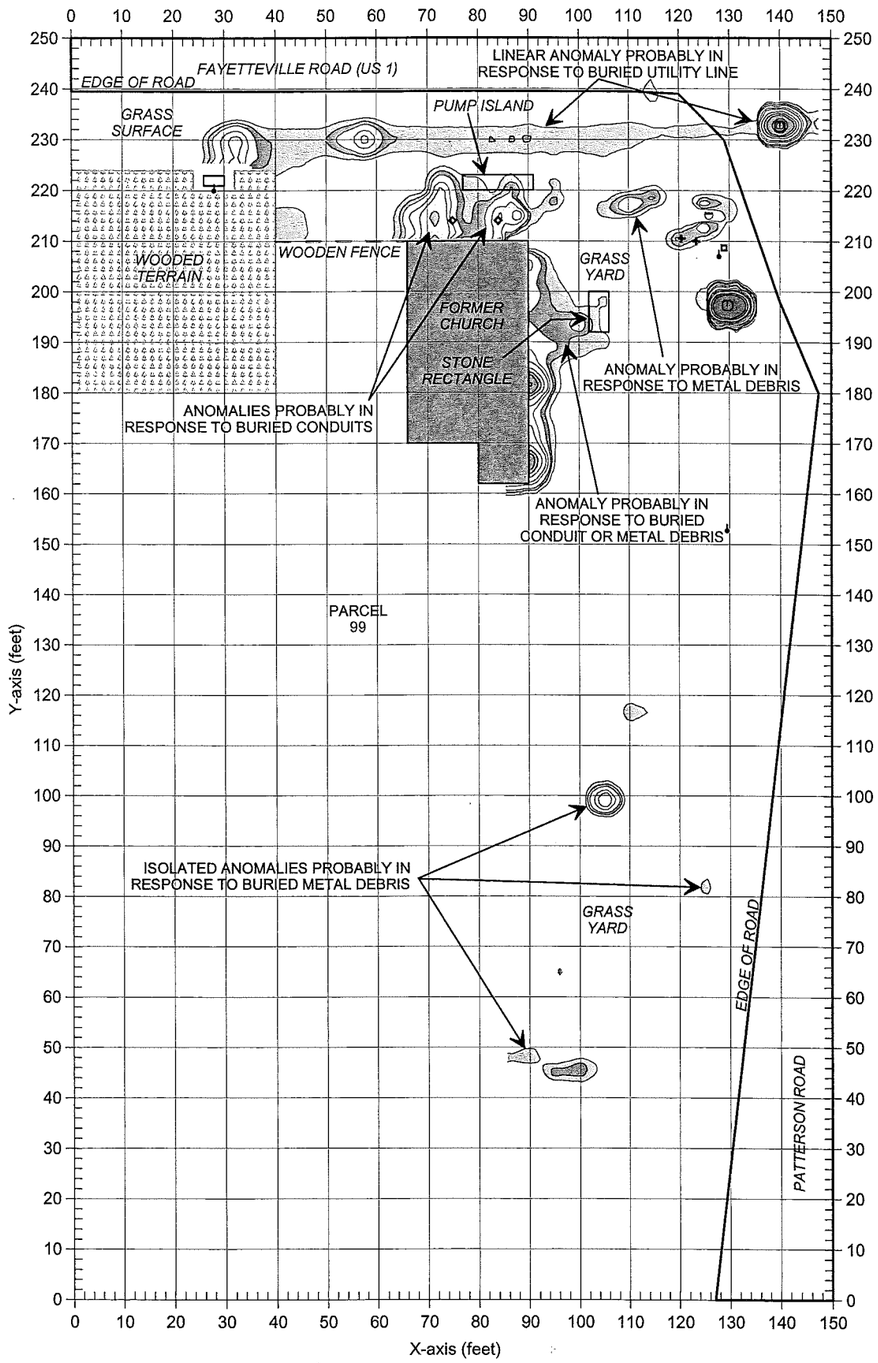


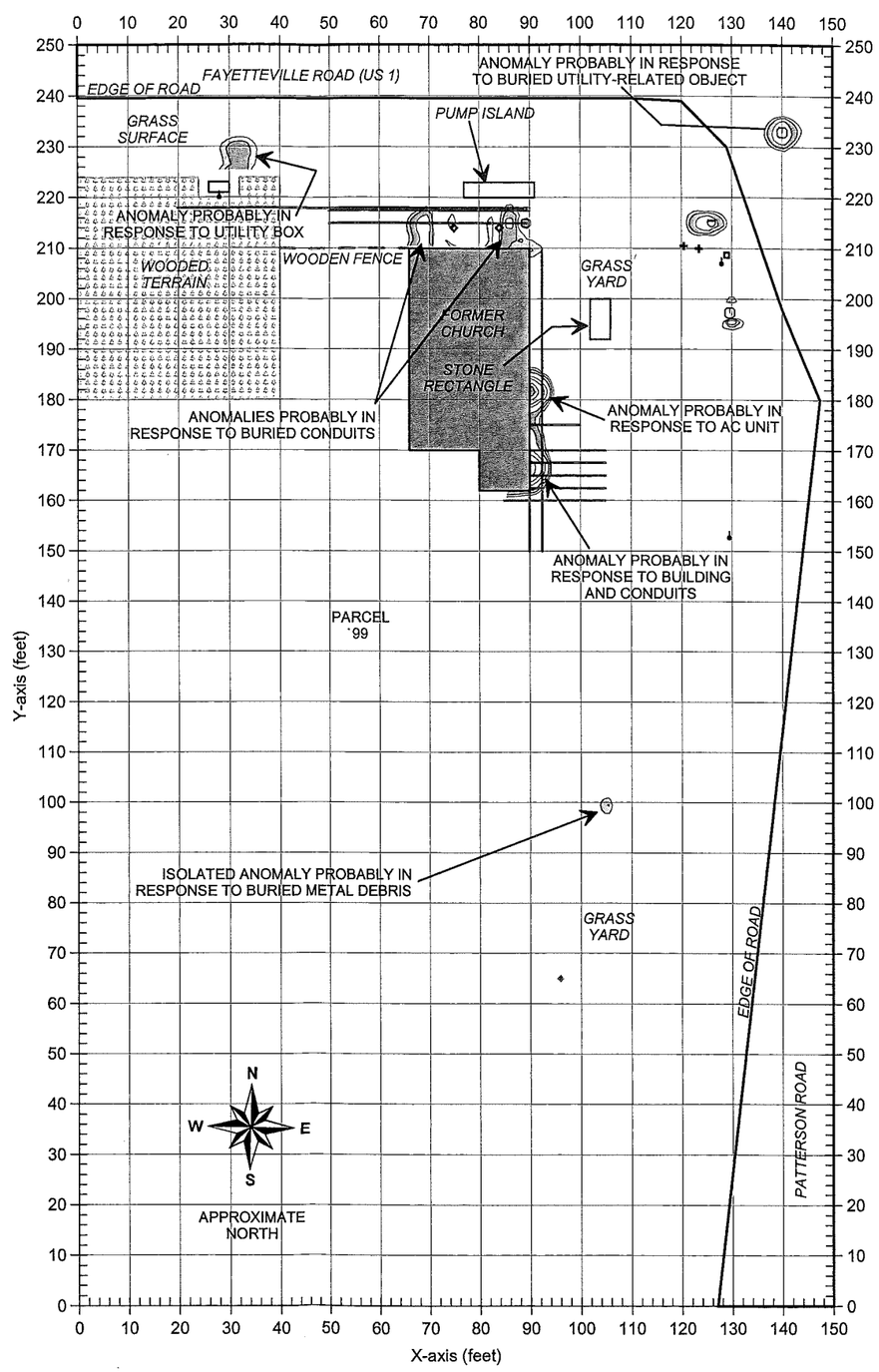

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTOS & GPR IMAGE OF UST LOCATIONS |
| | SITE: WALTER McCAIN PROPERTY (PARCEL 80) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J.NO.: 2005-292 | FIGURE: | FIGURE 17 |

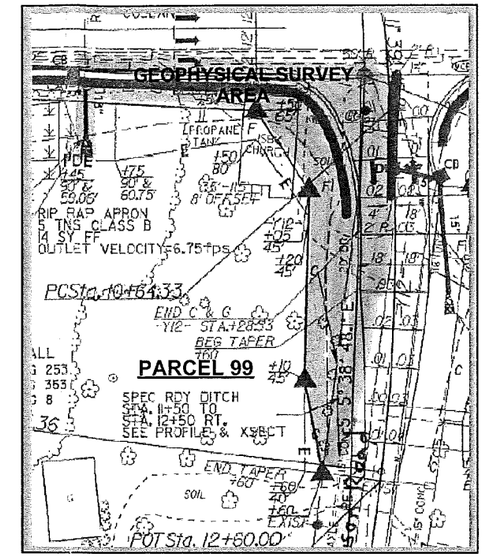
GRAPHIC SCALE IN METERS

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -20 20 50 75 100 150 200 300 400 500 750 1000

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CANOPY POLE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 18

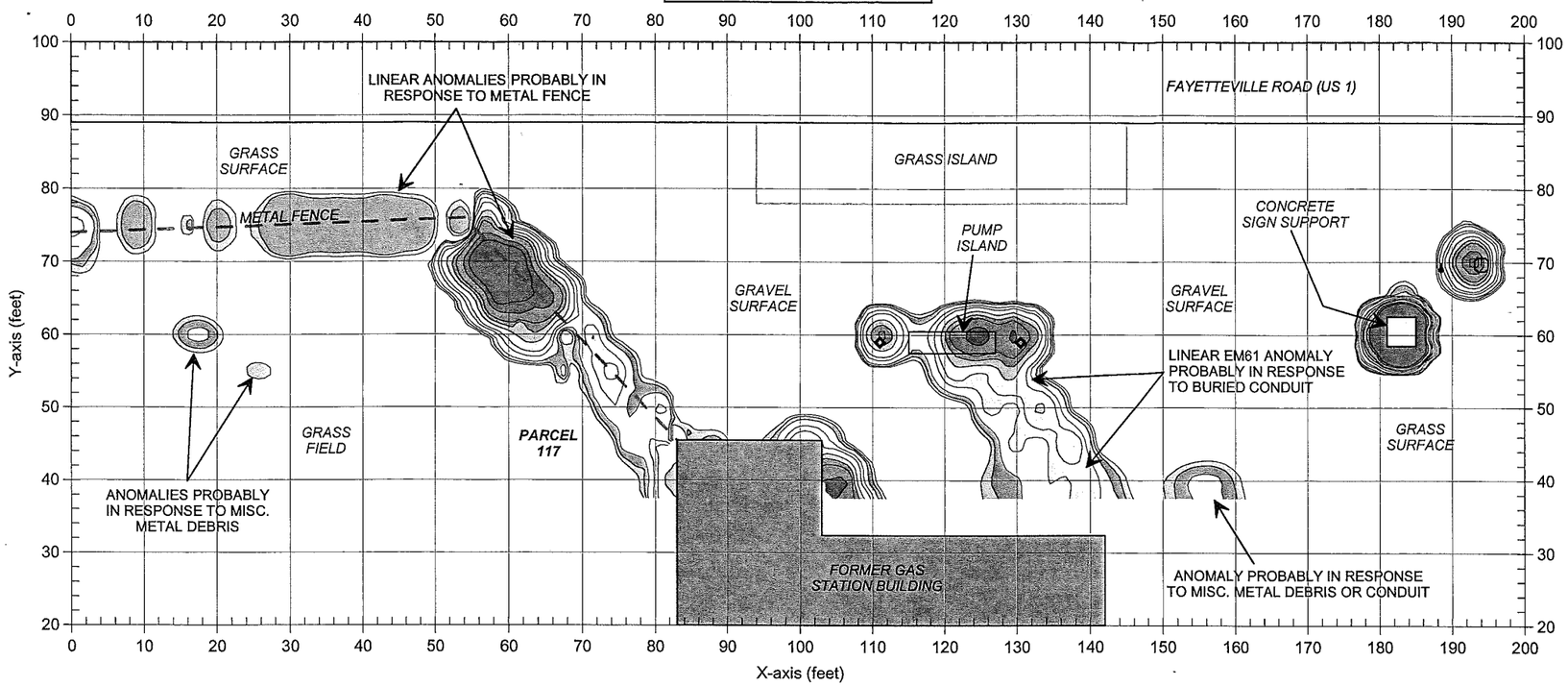
EM61
METAL DETECTION
RESULTS

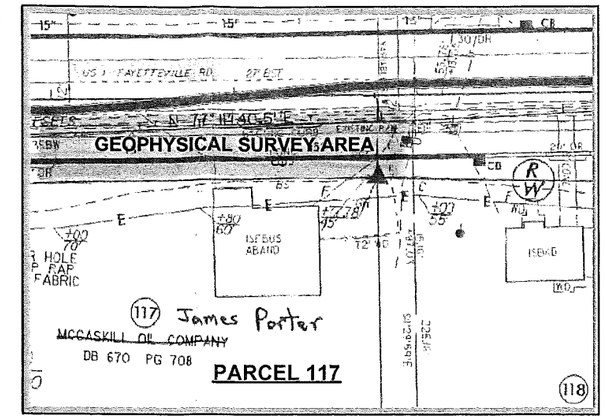
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | LEON WALL PROPERTY (PARCEL 99) |
| CITY | NORTH CAROLINA |
| STATE | ROCKINGHAM |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/26/05 |
| DRWN | MJD |
| LAY | |
| CHKD | |
| DWG | |
| FIGURE | 2005-292 |
| J-NO. | |

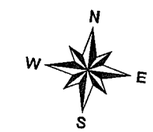
GRAPHIC SCALE IN METERS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

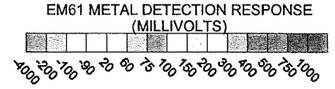


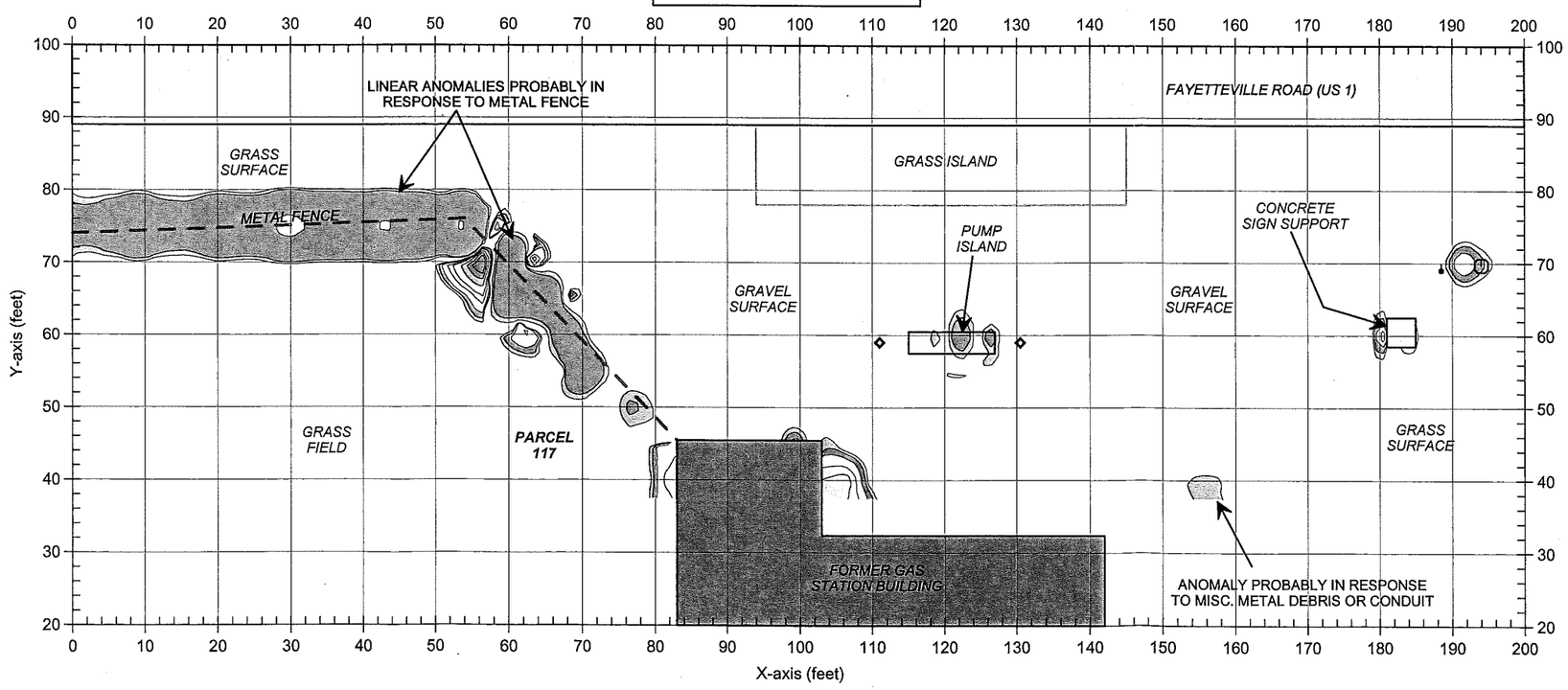




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SUPPORT POLE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar surveys were not conducted at this site.

FIGURE 19

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

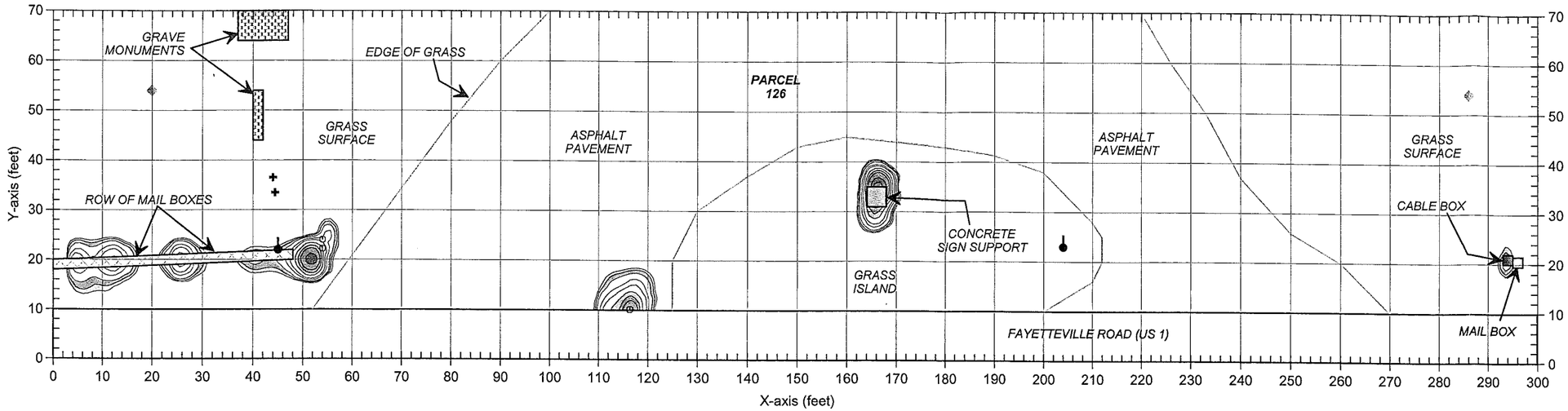
SITE: JAMES PORTER PROPERTY (PARCEL 117)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

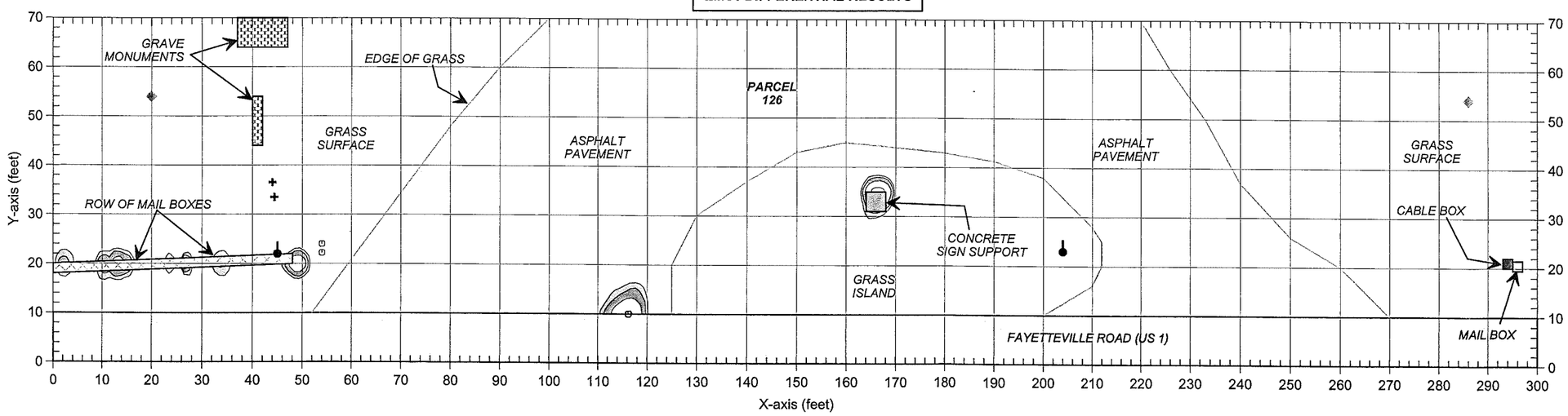
TITLE: GEOPHYSICAL RESULTS

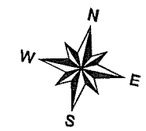
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

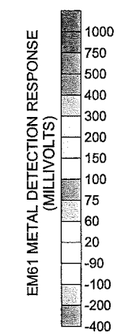


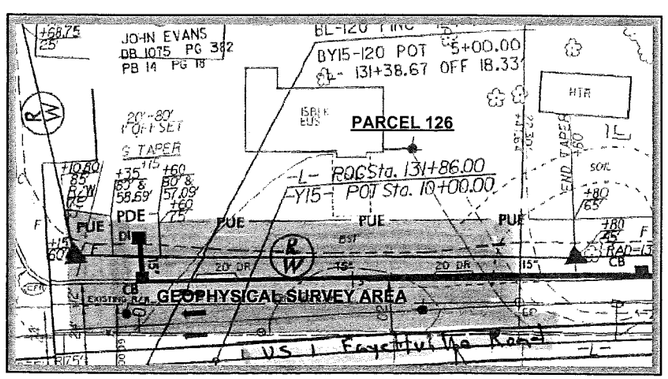

## EM61 DIFFERENTIAL RESULTS




APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- UTILITY POLE
- WATER METER OR VALVE COVER
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- GUY WIRE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data surveys were not conducted at this site

FIGURE 20

EM61
METAL DETECTION
RESULTS

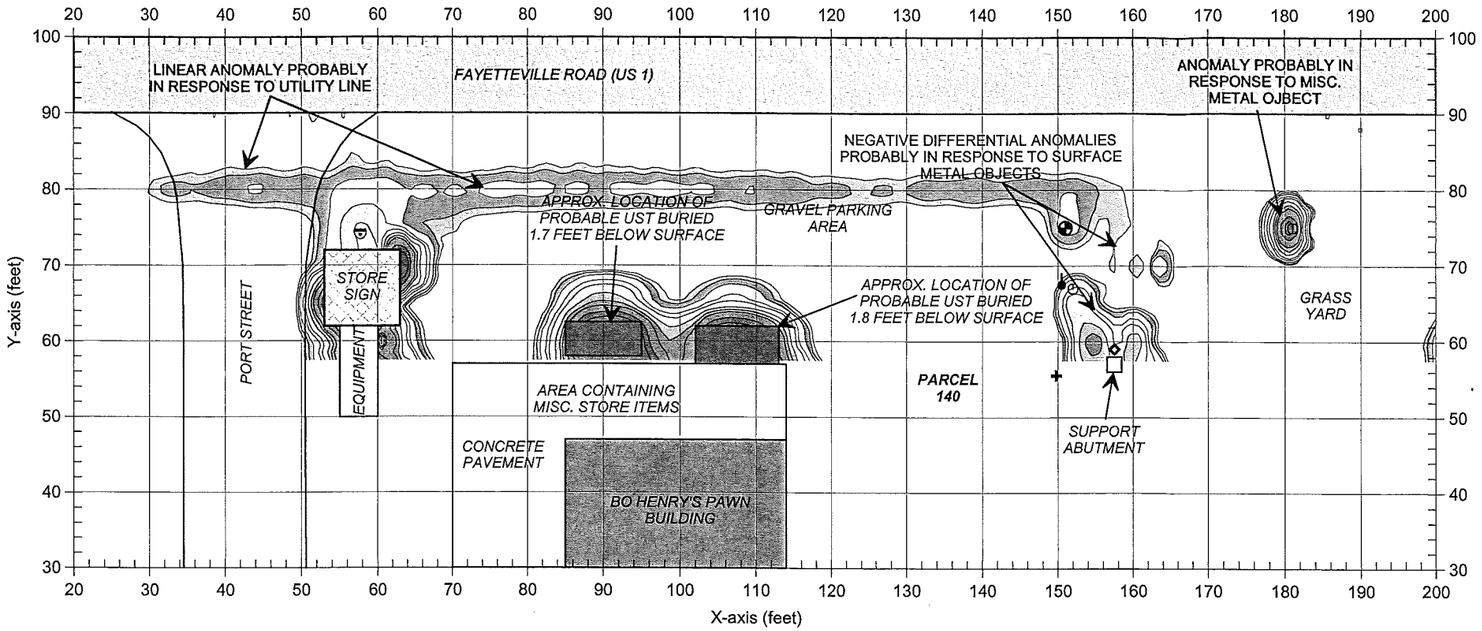
GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/26/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

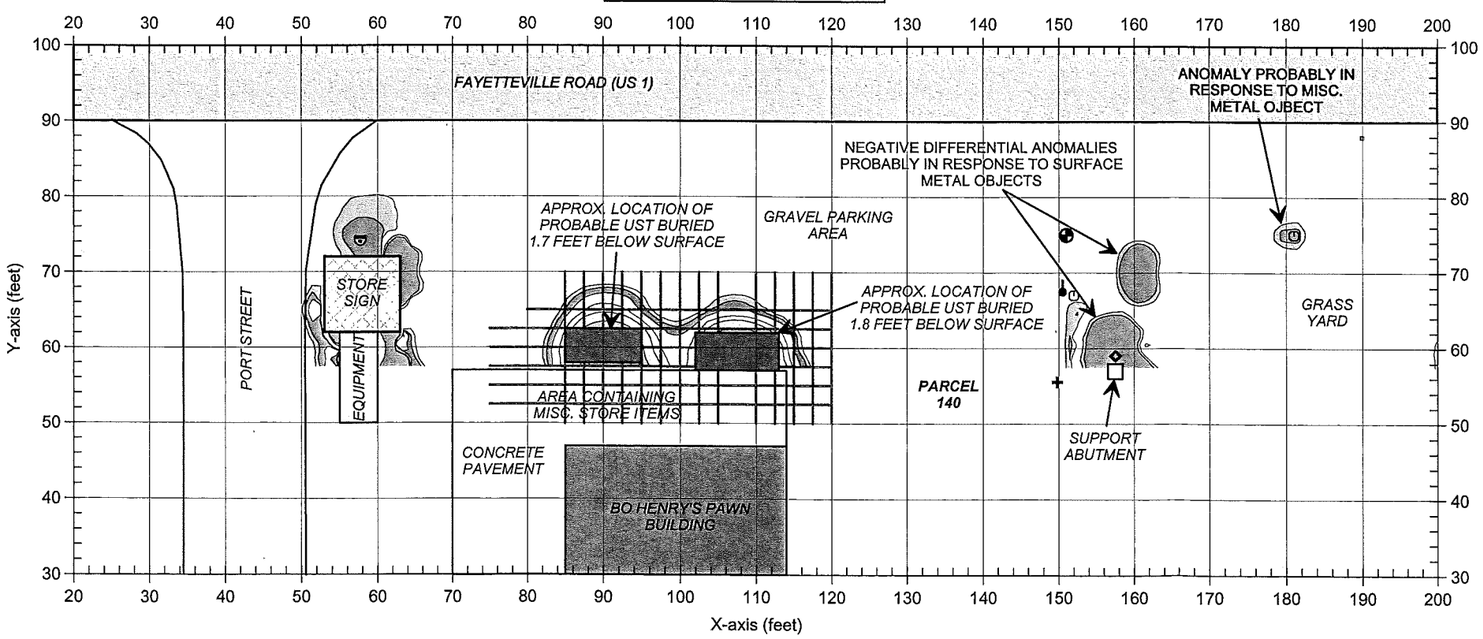
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: JOHN EVANS PROPERTY (PARCEL 126)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

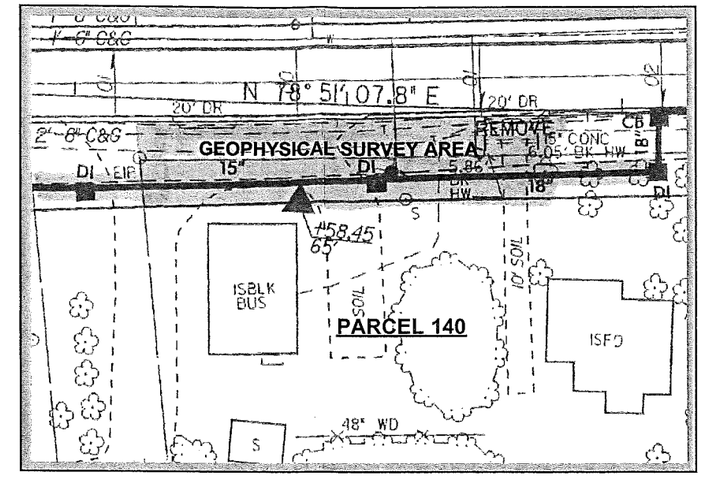
PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -60 20 60 75 100 150 200 300 400 500 750 1000

APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- FIBER OPTIC LINE SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 21

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/25/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

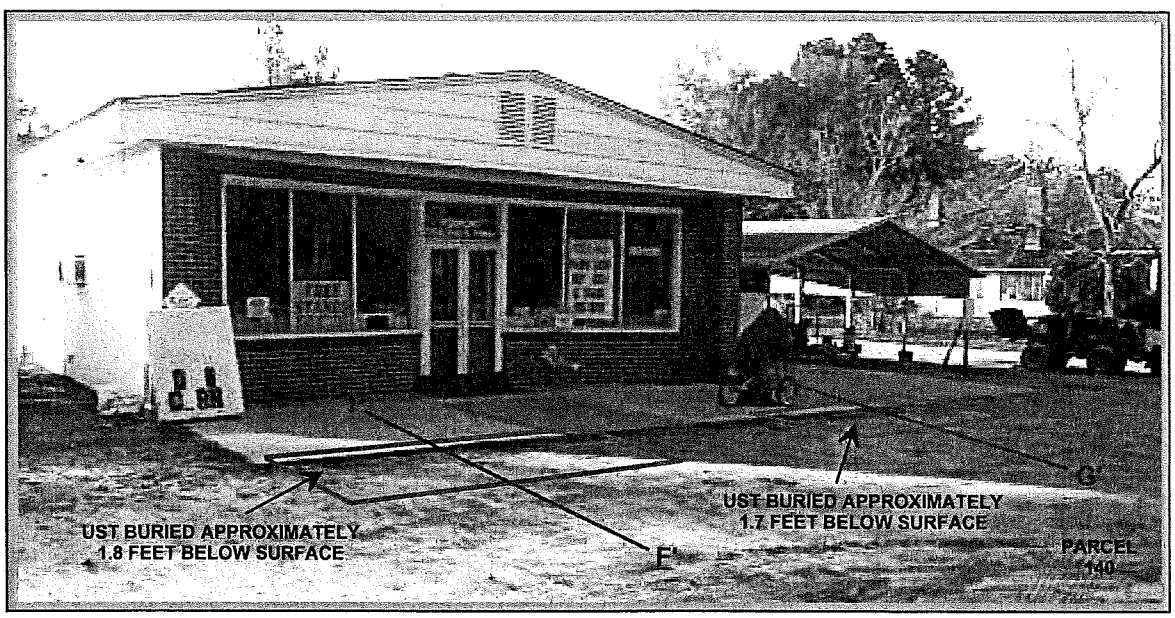
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: HENRY USSERY PROPERTY (PARCEL 140)

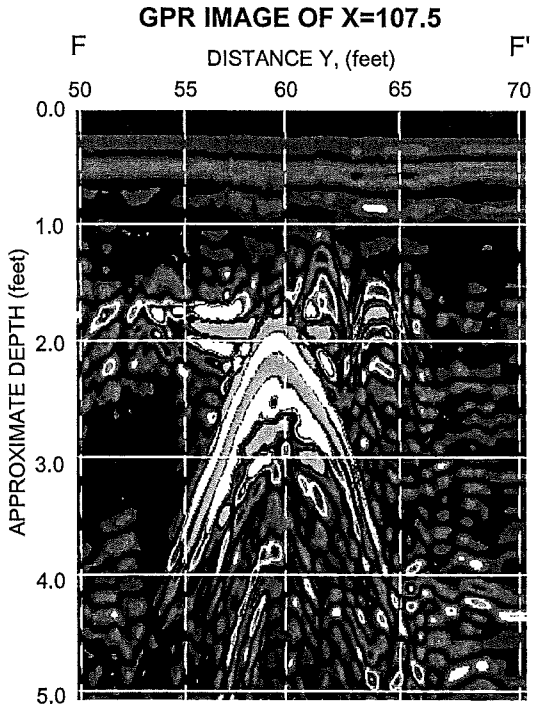
CITY: ROCKINGHAM STATE: NORTH CAROLINA

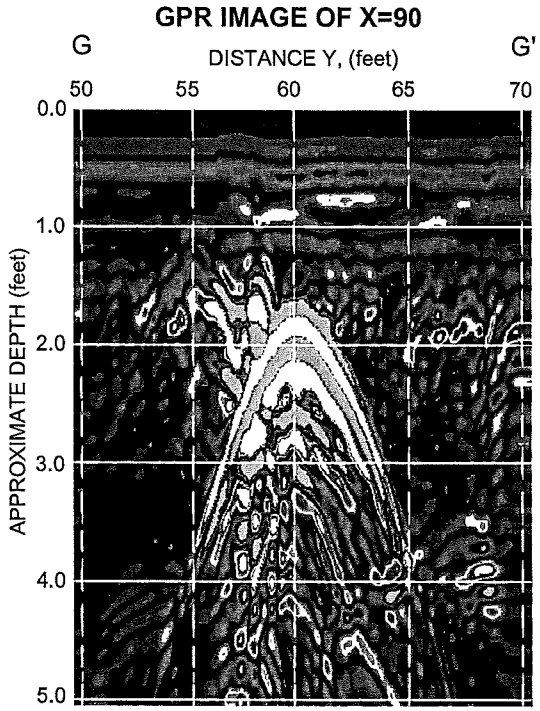
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approximate locations of the two UST's, as suggested by the geophysical results at Parcel 140. The UST's appear to be approximately 1.8 and 1.7 feet below surface.




The GPR images obtained along survey lines X=107.5 and X=90 show the anomalies that are probably in response to the two UST's buried at Parcel 140. The GPR data suggest the UST's are buried approximately 1.8 feet and 1.7 feet below surface, respectively.

PYRAMID
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| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE 11/28/05 | DRWN |
| SITE | HENRY USSERY PROPERTY (PARCEL 140) | LAY | CHKD |
| CITY / STATE | ROCKINGHAM / NORTH CAROLINA | DWG | |
| TITLE | GEOPHYSICAL RESULTS | J.NO. 2005-292 | FIGURE |

GRAPHIC SCALE IN METERS

PHOTO & GPR IMAGES OF UST LOCATIONS

FIGURE 22

# APPENDIX C

# BORING LOGS

# Log of Soil Boring 42-1

*Project:* Rockingham Sites (Parcel 042) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 42-1
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/06/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH/SW *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| | | ***Asphalt*** | | | | | | |
| 1 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 1 | | |
| 2 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 3 (1 m) | | | | | | | | |
| 4 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 1 | | |
| 5 | | | | | | | | |
| 6 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 7 (2 m) | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 (3 m) | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 (4 m) | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

**Solutions-IES, Inc.**
**1101 Nowell Road**
**Raleigh, NC 27607**
**(919) 873-1060**

Solutions-IES
Industrial & Environmental Services

# Log of Soil Boring 42-2

*Project:* Rockingham Sites (Parcel 042) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 42-2
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/06/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH/SUK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) | FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | | |
| | | ***Asphalt*** | | | | | | | |
| 1 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | | 0 | | |
| 2 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | | 0 | | |
| 3 / 1 | | | | | | | | | |
| 4 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | | 0 | | |
| 5 | | | | | | | | | |
| 6 / 2 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | | 0 | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | Boring terminated at 8 feet. | | | | | | | |
| 10 / 3 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 / 4 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

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**Raleigh, NC 27607**
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# Log of Soil Boring 42-3

*Project:* Rockingham Sites (Parcel 042) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 42-3
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/06/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH/SUK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) | FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | | |
| | | ***Asphalt*** | | | | | | | |
| 1 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | | |
| 2 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | | |
| 3 (1 m) | | | | | | | | | |
| 4 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | | |
| 5 | | | | | | | | | |
| 6 | | ***SC*** Damp, tan, clayey medium sand | | MC | 100 | 0 | | | |
| 7 (2 m) | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | Boring terminated at 8 feet. | | | | | | | |
| 10 (3 m) | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 (4 m) | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

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**1101 Nowell Road**
**Raleigh, NC 27607**
**(919) 873-1060**

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Industrial & Environmental Services

# Log of Soil Boring 42-4

*Project:* Rockingham Sites (Parcel 042) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 42-4
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/06/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 3 | | |
| 6–8 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

**Solutions-IES, Inc.**
**1101 Nowell Road**
**Raleigh, NC 27607**
**(919) 873-1060**

Solutions-IES
Industrial & Environmental Services

# APPENDIX D

# LABORATORY ANALYTICAL REPORTS

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

December 20, 2005

Ms. Sheri Knox
Solutions-IES
1101 Nowell Road
Raleigh, NC 27607

RE: Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

Dear Ms. Knox:

Enclosed are the analytical results for sample(s) received by the laboratory on December 7, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

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**Pace Analytical Services, Inc.**
*2225 Riverside Drive*
*Asheville, NC 28804*
*Phone: 828.254.7176*
*Fax: 828.252.4618*

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

Solid results are reported on a dry weight basis

Lab Sample No: 926419722 | Project Sample Number: 92108995-001 | Date Collected: 12/06/05 16:30
Client Sample ID: 42-3(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 14.6 | % | | 12/07/05 20:31 | KDF | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.9 | 12/19/05 11:40 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 60 | % | | 12/19/05 11:40 | KBS | 629-99-2 | | |
| Date Extracted | 12/14/05 | | | 12/14/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.4 | 12/10/05 04:23 | DHW | | | |
| 4-Bromofluorobenzene (S) | 75 | % | | 12/10/05 04:23 | DHW | 460-00-4 | | |



Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC 99030
FL NELAP E87648

**REPORT OF LABORATORY ANALYSIS**

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Charlotte Certification IDs
NC Wastewater 12
NC Drinking Water 37706
SC 99006
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2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

Lab Sample No: 926419730 | Project Sample Number: 92108995-002 | Date Collected: 12/06/05 16:30
Client Sample ID: 42-2(4-6) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 12.0 | % | | 12/07/05 20:32 | KDF | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.7 | 12/16/05 20:50 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 65 | % | | 12/16/05 20:50 | KBS | 629-99-2 | | |
| Date Extracted | 12/14/05 | | | 12/14/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.3 | 12/10/05 05:03 | DHW | | | |
| 4-Bromofluorobenzene (S) | 75 | % | | 12/10/05 05:03 | DHW | 460-00-4 | | |



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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

## PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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# QUALITY CONTROL DATA

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

QC Batch: 145042 Analysis Method: EPA 8015
QC Batch Method: EPA 3545 Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926419722 926419730

METHOD BLANK: 926446337
Associated Lab Samples: 926419722 926419730

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 62 | | |

LABORATORY CONTROL SAMPLE: 926446345

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 97.66 | 59 | |
| n-Pentacosane (S) | | | | 91 | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

QC Batch: 144703 Analysis Method: EPA 8015
QC Batch Method: EPA 8015 Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926419722 926419730

METHOD BLANK: 926430570
Associated Lab Samples: 926419722 926419730

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 66 | | |

LABORATORY CONTROL SAMPLE: 926430588

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 29.83 | 119 | |
| 4-Bromofluorobenzene (S) | | | | 76 | |

MATRIX SPIKE: 926430596

| Parameter | Units | 926416801 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 0.2624 | 26.82 | 34.47 | 128 | |
| 4-Bromofluorobenzene (S) | | | | | 77 | |

SAMPLE DUPLICATE: 926430604

| Parameter | Units | 926416827 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | ND | ND | NC | |
| 4-Bromofluorobenzene (S) | % | 78 | 77 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

QC Batch: 144515 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926419722 926419730

SAMPLE DUPLICATE: 926421264

| Parameter | Units | 926417098 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 13.80 | 14.00 | 2 | |



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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108995
Client Project ID: NCDOT 34950.1.1 Parcel 42

## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |



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# CHAIN-OF-CUSTODY / Analytical Request Document

**The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.**

Pace Analytical®

Page: 1 of 1

897904

## Section A
**Required** Client Information:

| | |
|---|---|
| Company | Solutions-IES |
| Address | 1101 Nowell Rd |
| | Raleigh, NC |
| Email To: | skrox@solutions-ies.com |
| Phone | 919 873 1060 |
| Fax | 919 873 1074 |
| Requested Due Date/TAT: | standard |

## Section B
**Required** Project Information:

| | |
|---|---|
| Report To: | Sheri Knox |
| Copy To: | |
| | |
| Purchase Order No.: | WBS 34950.1.1 |
| Project Name: | NCDOT Parcel 42 |
| Project Number: | 850.05A2.NDOT |

## Section C
Invoice Information:

| | |
|---|---|
| Attention: | |
| Company Name: | |
| Address: | |
| Pace Quote Reference: | |
| Pace Project Manager: | BKM |
| Pace Profile #: | 33369-6 |

**REGULATORY AGENCY**

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☒ UST ☐ RCRA ☐ Other_____

**SITE LOCATION** ☐GA ☐IL ☐IN ☐MI ☐MN ☒NC ☐OH ☐SC ☐WI ☐OTHER _____

## Section D
**Required** Client Information

**SAMPLE ID**

One Character per box. (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes

| MATRIX | CODE |
|---|---|
| DRINKING WATER | DW |
| WATER | WT |
| WASTE WATER | WW |
| PRODUCT | P |
| SOIL/SOLID | SL |
| OIL | OL |
| WIPE | WP |
| AIR | AR |
| OTHER | OT |
| TISSUE | TS |

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE G=GRAB C=COMP | COMPOSITE START DATE (2005 COLLECTED) | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | Analysis: GRO 5030/8015 DRO 3550/8015 | Filtered (Y/N) | Residual Chlorine (Y/N) | Pace Project Number Lab I.D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 42-3(6-8) | SL | G | 12/6 | 1630 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 92641972 2 |
| 2 | 42-2(4-6) | SL | G | 12/6 | 1630 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 9730 |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

**Additional Comments:**

sample containers, mis-labeled
45-3 (6-8)
and
45-[illegible] (6-8)

| RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME |
|---|---|---|---|---|---|
| D. [illegible] / Solutions-IES | 12/7 | 1200 | [illegible] | 12-7-05 | 1200 |
| [illegible] | 12-7-05 | 1530 | [illegible] | [illegible] | [illegible] |
| | | | | | |
| | | | | | |

**SAMPLE CONDITION**

| | | | |
|---|---|---|---|
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| Temp in °C | Received on Ice | Custody Sealed Cooler | Samples Intact |

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: Dan [illegible]

SIGNATURE of SAMPLER: [illegible]

DATE Signed (MM / DD / YY) 12/7/05

SEE REVERSE SIDE FOR INSTRUCTIONS

ALL0020rev.2 31Mar05

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Phone: 828.254.7176
Fax: 828.252.4618

December 20, 2005

Ms. Sheri Knox
Solutions-IES
1101 Nowell Road
Raleigh, NC 27607

RE: Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Dear Ms. Knox:

Enclosed are the analytical results for sample(s) received by the laboratory on December 7, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

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2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Solid results are reported on a dry weight basis

Lab Sample No: 926419938 Project Sample Number: 92108998-001 Date Collected: 12/07/05 11:30
Client Sample ID: 4-3(6-8) Matrix: Soil Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 14.3 | % | | 12/08/05 12:09 | KDF | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.8 | 12/16/05 23:09 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 62 | % | | 12/16/05 23:09 | KBS | 629-99-2 | | |
| Date Extracted | 12/14/05 | | | 12/14/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.7 | 12/12/05 18:31 | DHW | | | |
| 4-Bromofluorobenzene (S) | 100 | % | | 12/12/05 18:31 | DHW | 460-00-4 | | |



Asheville Certification IDs
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SC 99030
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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419946 | Project Sample Number: 92108998-002 | Date Collected: 12/07/05 11:30
Client Sample ID: 4-5(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 15.5 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.9 | 12/19/05 13:58 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 82 | % | | 12/19/05 13:58 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.5 | 12/10/05 19:38 | DHW | | | |
| 4-Bromofluorobenzene (S) | 95 | % | | 12/10/05 19:38 | DHW | 460-00-4 | | |



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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419953 | Project Sample Number: 92108998-003 | Date Collected: 12/07/05 11:35
Client Sample ID: 4-6(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 12.1 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.7 | 12/19/05 14:33 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 78 | % | | 12/19/05 14:33 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.1 | 12/10/05 20:22 | DHW | | | |
| 4-Bromofluorobenzene (S) | 82 | % | | 12/10/05 20:22 | DHW | 460-00-4 | | |



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*Phone: 828.254.7176*
*Fax: 828.252.4618*

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419961 | Project Sample Number: 92108998-004 | Date Collected: 12/07/05 11:35
Client Sample ID: 4-7(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 15.0 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.9 | 12/19/05 15:08 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 78 | % | | 12/19/05 15:08 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.4 | 12/10/05 20:57 | DHW | | | |
| 4-Bromofluorobenzene (S) | 78 | % | | 12/10/05 20:57 | DHW | 460-00-4 | | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

## PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 145042 Analysis Method: EPA 8015
QC Batch Method: EPA 3545 Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926419938

METHOD BLANK: 926446337
Associated Lab Samples: 926419938

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 62 | | |

LABORATORY CONTROL SAMPLE: 926446345

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 97.66 | 59 | |
| n-Pentacosane (S) | | | | 91 | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 145256 — Analysis Method: EPA 8015
QC Batch Method: EPA 3545 — Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926419946 926419953 926419961

METHOD BLANK: 926454893
Associated Lab Samples: 926419946 926419953 926419961

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 89 | | |

LABORATORY CONTROL SAMPLE: 926454901

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 137.2 | 82 | |
| n-Pentacosane (S) | | | | 98 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926454919 926454927

| Parameter | Units | 926440710 Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | RPD | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 7.728 | 219.50 | 181.9 | 165.2 | 79 | 72 | 10 | |
| n-Pentacosane (S) | | | | | | 101 | 92 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144711 Analysis Method: EPA 8015
QC Batch Method: EPA 8015 Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926419938 926419946 926419953 926419961

METHOD BLANK: 926431222
Associated Lab Samples: 926419938 926419946 926419953 926419961

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 70 | | |

LABORATORY CONTROL SAMPLE: 926431230

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 27.78 | 111 | |
| 4-Bromofluorobenzene (S) | | | | 75 | |

MATRIX SPIKE: 926431248

| Parameter | Units | 926419839 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 0.03725 | 20.55 | 24.16 | 117 | |
| 4-Bromofluorobenzene (S) | | | | | 76 | |

SAMPLE DUPLICATE: 926431255

| Parameter | Units | 926419854 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 5.000 | 5.300 | 6 | |
| 4-Bromofluorobenzene (S) | % | 96 | 88 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144560 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926419938

SAMPLE DUPLICATE: 926422742

| Parameter | Units | 926422221 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 24.30 | 24.50 | 1 | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144771 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926419946 926419953 926419961

SAMPLE DUPLICATE: 926435561

| Parameter | Units | 926432873 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 16.20 | 20.90 | 25 | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |



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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

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Page: 1 of 1

897939

| Section A Required Client Information: | Section B Required Project Information: | Section C Invoice Information: |
|---|---|---|
| Company: Solutions-IES | Report To: Sheri Knox | Attention: |
| Address: 1101 Nowell Rd, Raleigh, NC 27607 | Copy To: | Company Name: |
| | | Address: |
| Email To: sknox@solutions-ies.com | Purchase Order No.: WBS 34950.1.1 | Pace Quote Reference: |
| Phone: 919 873 1060 Fax: 919 873 1074 | Project Name: NCDOT Parcel 4 | Pace Project Manager: PKM |
| Requested Due Date/TAT: standard | Project Number: 2730.05A2 NDOT | Pace Profile #: 3869-6 |

**REGULATORY AGENCY**

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☒ UST ☐ RCRA ☐ Other_____

**SITE LOCATION**: ☐GA ☐IL ☐IN ☐MI ☐MN ☒NC ☐OH ☐SC ☐WI ☐OTHER_____

**Section D** Required Client Information

SAMPLE ID

One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes

| MATRIX | CODE |
|---|---|
| DRINKING WATER | DW |
| WATER | WT |
| WASTE WATER | WW |
| PRODUCT | P |
| SOIL/SOLID | SL |
| OIL | OL |
| WIPE | WP |
| AIR | AR |
| OTHER | OT |
| TISSUE | TS |

2005 COLLECTED

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE G=GRAB C=COMP | COMPOSITE START DATE | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | GRO | DRO | Residual Chlorine (Y/N) | Pace Project Number / Lab I.D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4-3(6-8) | SL | G | 12/7 | 1130 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 92 6419533 |
| 2 | 4-5(6-8) | ↓ | ↓ | ↓ | 1130 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 9946 |
| 3 | 4-6(6-8) | ↓ | ↓ | ↓ | 1135 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 9953 |
| 4 | 4-7(6-8) | ↓ | ↓ | ↓ | 1135 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 9961 |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

Filtered (Y/N)

Requested Analysis: GRO 5030/8015, DRO 3550/8015

Additional Comments:

| RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME |
|---|---|---|---|---|---|
| [illegible] | 12/7 | [illegible] | [illegible] | [illegible] | [illegible] |
| [signature] | 12-7-05 | 1530 | | | |
| | | | | | |
| | | | | | |

**SAMPLE CONDITION**

| Temp in °C | Received on | Custody Sealed Cooler | Samples Intact |
|---|---|---|---|
| | Y/N | Y/N | Y/N |
| 1.1 | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: [illegible]

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY): 12/07/05

SEE REVERSE SIDE FOR INSTRUCTIONS

ALL0020rev2 21May05

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# PRELIMINARY SITE ASSESSMENT
# PARCEL 004, WILLIAM BARNHARDT PROPERTY
# 1820 FAYETTEVILLE ROAD (US HIGHWAY 1)
# ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
# NCDOT PROJECT: U-3456
# WBS ELEMENT: 34950.1.1

**Prepared for:**
**NC Department of Transportation**
**Geotechnical Engineering Unit**
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

**Prepared by:**
**Solutions-IES**
1101 Nowell Road
Raleigh, North Carolina 27607

**Solutions-IES Project No. 2730.05A2.NDOT**

NORTH CAROLINA LICENSED SEAL 1540 GEOLOGIST DANIEL K. HIRTH

Daniel K. Hirth, P.G.
Hydrogeologist

Sheri L. Knox
Project Manager

**January 18, 2006**

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2.0 BACKGROUND AND SITE DESCRIPTION ..... 1

3.0 FIELD ACTIVITIES ..... 1

4.0 LABORATORY RESULTS ..... 3

5.0 DISCUSSION AND CONCLUSIONS ..... 3

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TABLE 1 – SUMMARY OF FIELD SCREENING RESULTS FOR SOIL

TABLE 2 – SUMMARY OF SOIL ANALYTICAL RESULTS

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FIGURE 1 – SITE LOCATION MAP

FIGURE 2 – SITE MAP

FIGURE 3 – BORING LOCATIONS & ESTIMATED EXTENT OF SOIL CONTAMINATION

**APPENDICES**

APPENDIX A – PHOTOGRAPHS

APPENDIX B – GEOPHYSICAL DATA

APPENDIX C – BORING LOGS

APPENDIX D – LABORATORY ANALYTICAL REPORT

## 1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening Fayetteville Road (US-1) in Rockingham, Richmond County, North Carolina. The project may require the NCDOT to acquire additional property for new roadway construction. On November 3, 2005, Solutions-IES submitted a proposal to conduct Preliminary Site Assessments (PSAs) for 14 parcels of land that contain or reportedly contained underground storage tanks (USTs) or are areas of interest identified by NCDOT. This report summarizes the results of field and laboratory activities conducted during the PSA of a portion of the William Barnhardt property (Parcel 004) located at 1820 Fayetteville Road just south of the Deweese Avenue and Fayetteville Road intersection. The location of the parcel is shown on Figures 1 and 2. The scope of work was performed as outlined in Solutions-IES proposal NC05449P, and initiated based on a Notice to Proceed issued by NCDOT dated November 7, 2005 under contract 7000005553, dated May 9, 2005.

## 2.0 BACKGROUND AND SITE DESCRIPTION

Parcel 004 is bordered by Fayetteville Road to the north. According to NCDOT, the NCDENR UST registry shows that five USTs were removed from Parcel 004 in 1989. Reportedly, the USTs were located on either side of the dispenser island, and approximately 50 feet from the center line of Fayetteville Road. Minor contamination (Incident # 6485) was identified during closure work.

Based on our field observations, the parcel is currently developed with a building that is unoccupied, and was most recently occupied by a used car dealer (Clarke, Inc.). The former dispenser island (Figures 2 and 3) is located in front of the building. The fuel pumps have been removed and the island is planted with vegetation. Indications of USTs were not clearly visible, but a gravel patch may indicate where the tanks were/are located. The gravel patch is located northwest of the former car dealership, and outside of the Study Area. Photographs of the site are included in Appendix A.

## 3.0 FIELD ACTIVITIES

Prior to beginning subsurface sampling, Solutions-IES contacted the North Carolina One Call Center to locate underground utilities at the site. Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electromagnetic survey of the subsurface in the proposed right-of-way and drainage easement area. The electromagnetic survey was performed on November 12, 2005, and the

survey identified electromagnetic anomalies within the Study Area. The EM61 image is included as Figure 3 in Appendix B. The extent of detected anomalies was marked on the ground by Pyramid. Pyramid returned to Parcel 004 on November 22, 2005 to perform a ground penetrating radar (GPR) survey. According to the Geophysical Investigation Report, the Study Area does not likely contain metallic USTs.

After reviewing the geophysical report, Solutions-IES mobilized to the site on December 7, 2005 to collect soil samples from the proposed right-of-way. Eight soil borings were advanced at the site to a depth of 8 feet below ground surface (ft bgs) using a Geoprobe®. Six of the borings were spaced approximately 50 feet apart, close to the edge of the property line and within the proposed right-of-way (Figure 3). Borings 4-3 and 4-7 were placed closer to boring 4-5 in the proposed right-of-way to help delineate soil contamination.

A MacroCore® sampler fitted with a single-use, disposable polyvinyl chloride (PVC) liner was used to collect samples at 4-foot intervals. Each soil sample was split into two aliquots. Each aliquot was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the other bag was placed at ambient temperature for field screening with a flame ionization detector (FID). After approximately 20 minutes to allow accumulation of volatile organic compounds (VOCs) in the headspace of the latter bag, it was scanned with the FID. The FID readings were rounded to the nearest whole number and entered on the boring logs along with the soil description and any indications of petroleum staining or odor (Appendix C). Petroleum odors were noted in soil boring 4-3 from 2 to 8 ft bgs, and in soil boring 4-5 from 4 to 8 ft bgs.

The subsurface at the site consisted of approximately 8-feet of tan clayey fine sand (Unified Soil Classification SC). Groundwater was not encountered in the borings advanced within the Study Area.

VOCs were detected in the headspace of seven of eight soil samples screened with the FID (Table 1). The FID readings were most elevated in soil samples collected from borings 4-3 and 4-5 and increased with depth. The FID readings are shown on Table 1. Soil samples collected from soil borings 4-3, 4-5, 4-6, and 4-7 from 6 to 8 ft bgs, were placed in laboratory-supplied containers and stored on ice pending shipment to Pace Analytical Services, Inc. (Pace) in Huntersville, NC under chain-of-custody control. The samples were submitted for analysis of gasoline range organics (GRO) and diesel range organics (DRO) total petroleum hydrocarbons (TPH) by EPA Modified Method 8015 with preparation methods 5030 and 3545, respectively.

## 4.0 LABORATORY RESULTS

According to the laboratory analytical results, concentrations of TPH DRO and TPH GRO were not detected in soil above the method detection limits. The analytical results are summarized in Table 2, and the laboratory reports for the soil samples are included in Appendix D.

## 5.0 DISCUSSION AND CONCLUSIONS

Solutions-IES advanced eight soil borings at Parcel 004, within the Study Area. Field observations and FID readings indicated the presence of elevated VOCs in soil samples collected from borings 4-3 and 4-5. However, laboratory data do not confirm a release of petroleum hydrocarbons within the Study Area. Nonetheless, the petroleum impacted soil within the Study Area likely encompasses an elliptical area (20 ft by 40 ft) in the vicinity of borings 4-3 and 4-5 to a depth of at least 8 ft. The estimated volume of impacted soil is 5,026 cubic feet (186 cubic yards). Additional assessment may be required to verify the presence of degraded petroleum hydrocarbons in the proposed right-of-way and easements.

# TABLES

**TABLE 1**
**SUMMARY OF FIELD SCREENING RESULTS FOR SOIL**
**Parcel 004 – William Barnhardt Property**
**1820 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**December 7, 2005**

| Sample Depth Below Ground Surface | Soil Borings | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 4-1 | 4-2 | 4-3 | 4-4 | 4-5 | 4-6 | 4-7 | 4-8 |
| | FID Reading (ppm) | | | | | | | |
| 0 - 2 feet | 0.2 | 0.1 | 59 | ND | 27.6 | 0.1 | ND | ND |
| 2 - 4 feet | 0.3 | 0.2 | 145 | ND | 28.7 | 0.4 | ND | ND |
| 4 - 6 feet | 0.4 | 0.1 | 8.9 | ND | 85.2 | 0.5 | 1.5 | ND |
| 6 - 8 feet | 0.4 | 0.2 | 51.2 | 0.4 | 555 | 0.8 | 3.5 | ND |

Notes:

1. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
2. Samples denoted by shaded cells were submitted for laboratory analysis.
3. ND - Not detected

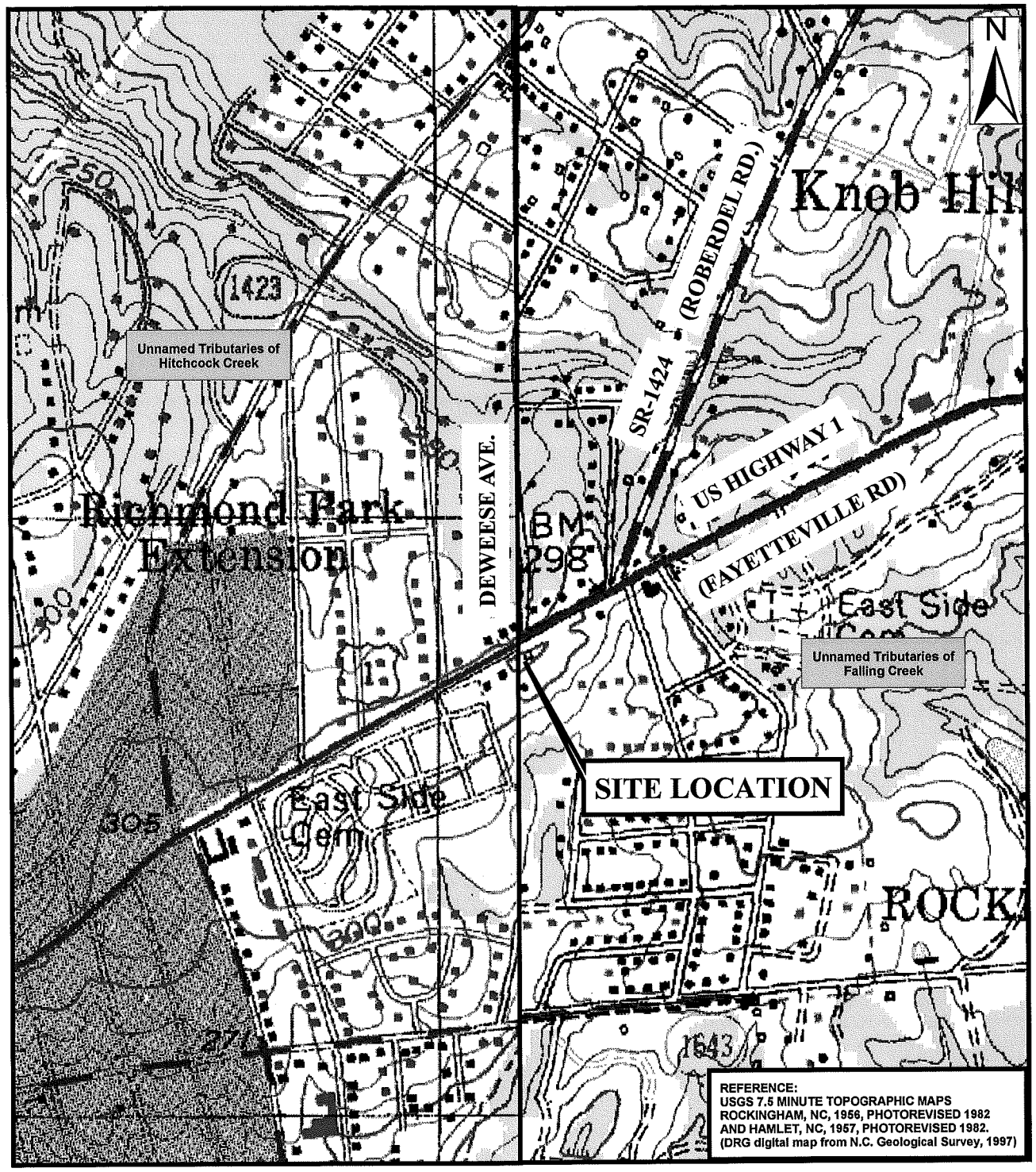
**TABLE 2**
**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 004 – William Barnhardt Property**
**1820 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**December 7, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 4-3 | 6-8 | <4.7 | <5.8 |
| 4-5 | 6-8 | <4.5 | <5.9 |
| 4-6 | 6-8 | <4.1 | <5.7 |
| 4-7 | 6-8 | <4.4 | <5.9 |

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons

# FIGURES

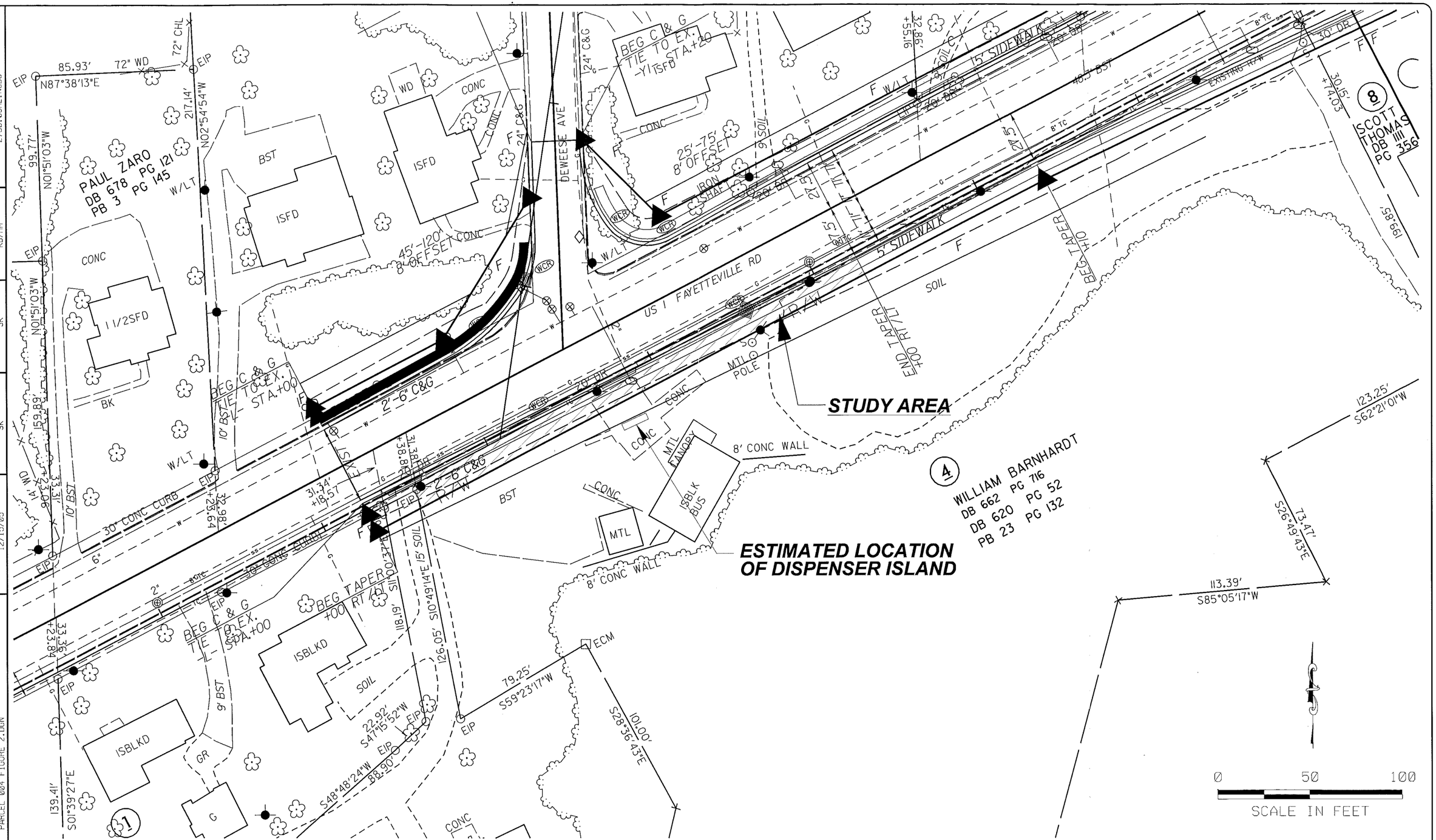



1:10,000

SITE LOCATION MAP
PARCEL 004 - WILLIAM BARNHARDT PROPERTY
1820 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1(NCDOT PROJECT: U-3456)

Solutions-IES
Industrial & Environmental Services
1101 Nowell Road, Raleigh, NC 27609
Phone (919) 873-1060, Fax (919) 873-1074

| | | | |
|---|---|---|---|
| Created by: KBB<br>Checked by: BR<br>File: FIG1.mxd<br>Software: ESRI ArcMap 9.0 | | Project: 2730.05A2.NCDO<br>Date: 12/15/05 | |
| | | FIGURE | 1 |




PROJECT NUMBER 2730.05A2.NC00 | DRAFTER KB/HM | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 004 FIGURE 2.DGN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Industrial & Environmental Services
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RALEIGH, NORTH CAROLINA 27607
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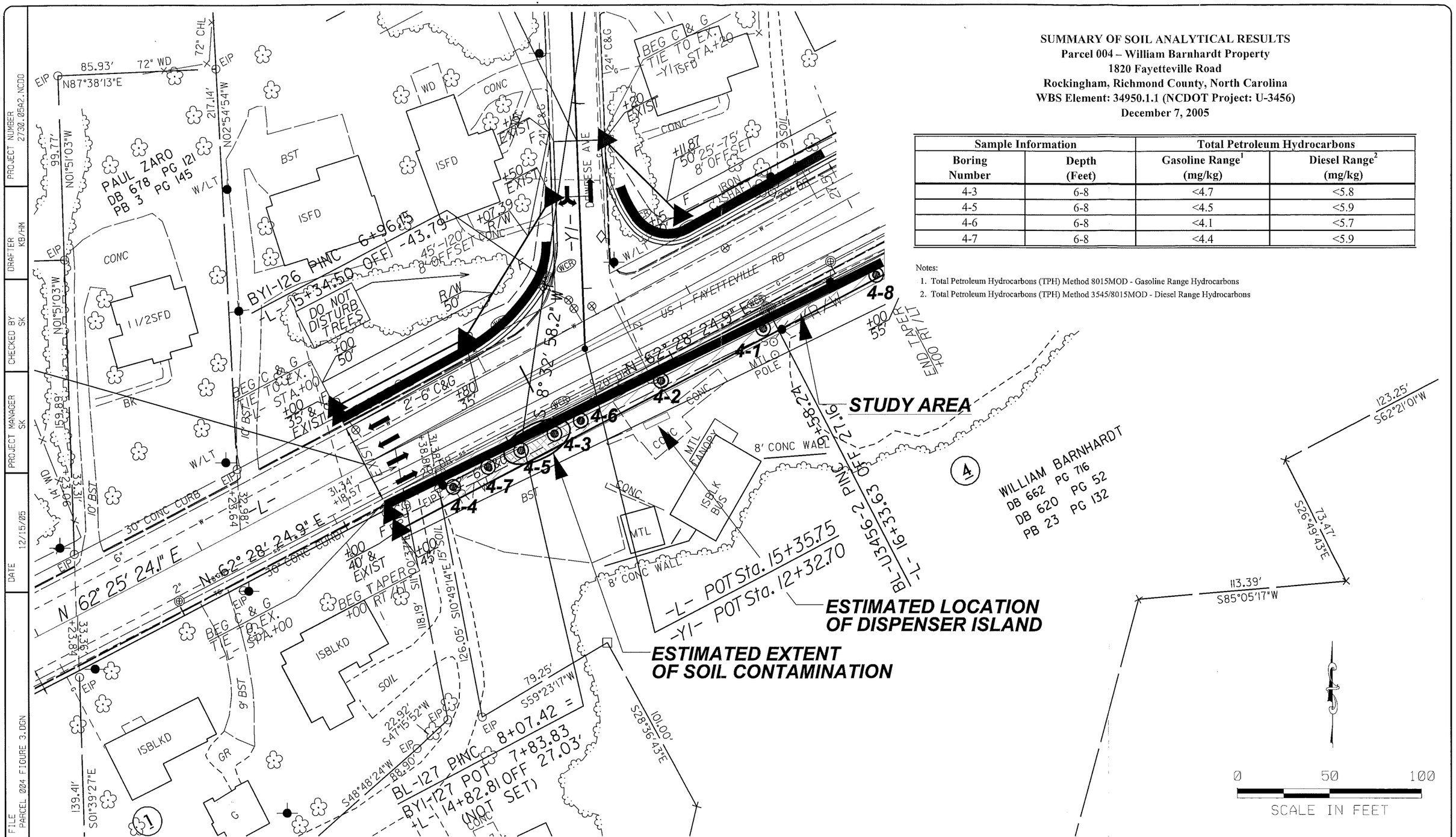
SITE MAP
PARCEL 004 - WILLIAM BARNHARDT PROPERTY
1820 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAOLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 2

**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 004 – William Barnhardt Property**
**1820 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**December 7, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 4-3 | 6-8 | <4.7 | <5.8 |
| 4-5 | 6-8 | <4.5 | <5.9 |
| 4-6 | 6-8 | <4.1 | <5.7 |
| 4-7 | 6-8 | <4.4 | <5.9 |

Notes:
1. Total Petroleum Hydrocarbons (TPH) Method 8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons





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BORING LOCATIONS & ESTIMATED EXTENT OF SOIL CONTAMINATION
PARCEL 004 - WILLIAM BARNHARDT PROPERTY
1820 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNT, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 3

PROJECT NUMBER 2730.05A2.NCDO | DRAFTER KB/HM | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 004 FIGURE 3.DGN

# APPENDIX A

# PHOTOGRAPHS

**Photograph 1** - Looking southwest at Parcel 004, near boring 4-8.

**Photograph 2** - Looking northeast at Parcel 004, near boring 4-7.

# APPENDIX B

# GEOPHYSICAL DATA

Pyramid Project # 2005292

# GEOPHYSICAL INVESTIGATION REPORT

*GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S*

## Rockingham, US 1 (Fayetteville Road) Sites

**Rockingham, North Carolina**
**State Project Number U-3456**

**November 30, 2005**

**Report prepared for:** Sheri Knox & Daniel Hirth
Solutions Industrial & Environmental Services Inc.
1101 Nowell Rd.
Raleigh, NC 27607


**Prepared by:** Doug Canavello
Douglas Canavello, PG

**Reviewed by:** Brett S. Higgins
Brett S. Higgins

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**Solutions Industrial & Environmental Services Inc.**
**GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S**
**Rockingham, US 1 (Fayetteville Road) Sites**
**State Project Number U-3456**

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FIGURES (continued)


| | |
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## 1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions Industrial & Environmental Services, Inc. during the period of November 11-23, 2005, within the proposed Right-of-Way (ROW) areas at 13 sites in Rockingham, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3456 and WBS Element 34950.1.1. The sites are located along the north or south sides of US 1 (Fayetteville Road) from 0.25 miles west of SR-1424 (Roberdell Road) to 0.25 miles west of SR 1640 (Wiregrass Road). The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Mr. Walt Beckwith, PG provided maps during the week of November 1, 2005 that outlined the geophysical survey areas of each site. Solutions IES representatives, Ms. Sheri Knox, PE and Mr. Daniel Hirth, PG provided guidance during the geophysical investigations. Geophysical surveys were conducted at the following 13 sites:

| Property Owner | Parcel | Present Use of Property |
|---|---|---|
| W. J. Barnhart Property | (Parcel 4) | Used Car Lot & Auto Repair Garage |
| Julia M. Ratliff Property | (Parcel 7) | Vacant Lot |
| Samuel D. Tanner Property | (Parcel 15) | Vacant Building & Lot |
| Harvey E. Melton Property | (Parcel 17) | BP Gas Station |
| Samuel D. Tanner Property | (Parcel 21) | Strip Mall |
| W. J. Barnhart Property | (Parcel 41A) | Vacant Building & Lot |
| Wesly Denham Property | (Parcel 42) | Havoline Carolina Quick Lube |
| William Ussery Property | (Parcel 57) | Vacant Building & Lot |
| Walter McCain Property | (Parcel 80) | Vacant Buildings & Lot |
| Leon Wall Property | (Parcel 99) | Vacant Building & Lot |
| James Porter Property | (Parcel 117) | Vacant Building & Lot |
| John Evans Property | (Parcel 126) | Custom Monument Company |
| Henry Ussery Property | (Parcel 140) | Bo Henry's Pawn Shop |

Photos of the above sites are presented in **Figure 1**.

## 2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot survey grid was established across the proposed ROW areas of the 13 sites using water-based marking paint. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the manufacture's specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST's and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 24 scans per second. A 110 MHz high pass filter and an 800 MHz low pass filter were used during data

acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately seven feet, based on an estimated two-way travel time of 7 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint software. The locations of GPR survey areas or individual GPR survey lines are shown as dashed, purple rectangles or solid purple lines, respectively on the EM61 differential contour plots. Photos of the EM61 and GPR instruments are shown in **Figure 2**. The approximate perimeters of probable or possible UST's , based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags when possible. The approximate locations of probable or possible UST's are shown on the EM61 contour plots as magenta-shaded rectangles.

During the weeks of November 14 and November 23, 2005, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox and Mr. Hirth.

## 3.0 DISCUSSION OF RESULTS

### 3.1 Parcel 4 - W. J. Barnhart Property

Parcel 4 is located on the southern side of Fayetteville Road and contains an active used car lot and auto repair garage. The western portion of the ROW area consists of asphalt with a concrete pad and the eastern portion of the ROW area consists of a sandy surface.

The bottom coil results and the differential results are presented in **Figure 3**. The linear anomaly intersecting grid coordinates X=50 Y=26, is probably in response to a buried utility line or conduit. The high amplitude anomaly centered near the former pump island area is probably in response to the steel-reinforced concrete pad. GPR surveys conducted across the steel-reinforced concrete pad did not detect any large metal objects. The geophysical results suggest that the ROW area at Parcel 4 does not contain metallic UST's.

### 3.2 Parcel 7 - Julia M. Ratliff Property

The Ratliff property is located northwest of the Fayetteville Road and Roberdell Road intersection. The parcel consists of an open, asphalt and grass-covered lot. The EM61 bottom coil results and the differential results are presented in **Figure 4**. The linear bottom coil, EM61 anomalies, such as the ones intersecting grid coordinates X=100 Y=60, X=110 Y=74, and X=130 Y=104, are probably in response to utility lines or conduits. GPR surveys conducted across a portion of the EM anomaly centered near grid coordinates X=65 Y=35, suggest the presence of at least one UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide.

A large water puddle was present across the western portion of the EM anomaly when the GPR surveys were conducted that prevented GPR data to be collected across the entire anomaly. However, based on the location of the probable UST, the size of the EM61 anomaly suggests that a second UST may be centered near grid coordinates X=64 Y=32. Concrete was encountered approximately three inches below surface across this area, which prevented probing with a steel rod to determine whether a second UST exists. A photo showing the approximate location of the probable and possible UST's along with a GPR image obtained along survey line Y=35 are presented in **Figure 5**.

The geophysical results suggest that the remaining portion of the proposed ROW area at Parcel 7 does not contain metallic UST's.

### 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties

Parcels 15 and 21 are located immediately southwest and southeast, respectively of the Fayetteville Road and Skyline Drive intersection. Parcel 15 consists primarily of grass and gravel surfaces, whereas the front portion of Parcel 21 consists of an asphalt-covered parking area. The EM61 bottom coil results and the differential results are presented in **Figures 6 and 7**, respectively.

GPR surveys across the EM61 anomaly centered near grid coordinates X=188 Y=135, (on Parcel 15) suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below

surface. The surveys also suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

At Parcel 21, GPR surveys acquired across the EM anomaly centered near grid coordinates X=269 Y=173, suggest the presence of a UST buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide. Photos showing the approximate locations of the probable UST's at Parcels 15 and 21, along with corresponding GPR images are presented in Figures **8 and 9**, respectively.

### 3.4 Harvey E. Melton Property (Parcel 17)

The Melton property is an active BP gas station and store located northeast of the Fayetteville Road and Roberdell Road intersection. The pump island area consists of a steel-reinforced concrete surface that overlies the known and active UST's, whereas the parking area adjacent to the store consists of asphalt pavement. A grass yard surrounds the back portion of the site.

The EM61 bottom coil results and the differential results are presented in Figures **10 and 11**, respectively. The linear bottom coil, EM anomalies are probably in response to utility lines or conduits. The majority of non-linear anomalies are probably in response to cultural features such as storm drains, signs, utility-related objects, buildings, metal fence, and steel-reinforced concrete.

GPR surveys were conducted across the concrete pavement and across the area containing the active UST's. The surveys delineated the footprint of the three and possibly four active UST's that are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. A GPR image obtained across the UST area is presented in **Figure 12** and suggests that the tanks lie approximately 3.5 to 3.9 feet below surface.

GPR data acquired across the EM61 anomaly centered near X=155 Y=144, delineated the footprint of the kerosene tank that is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide. A photo showing the location of the

tank is presented in Figure 12. The geophysical results suggest that the remainder of the surveyed area at Parcel 17 does not contain UST's.

### 3.5 W. J. Barnhart Property (Parcel 41A)

Parcel 41A is a former gas station site located on the north side of Fayetteville Road approximately 300 feet west of Lawson Street. The geophysical survey area consists of asphalt and grass-covered surfaces with a concrete pad located around a former pump island. The EM61 bottom coil results and the differential results are presented in **Figure 13**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=40 Y=50, X=45 Y=95, and X=70 Y=40, are probably in response to utility lines or conduits.

GPR surveys conducted across a portion of the linear anomaly centered at X=37 Y=22, suggest the probable presence of a wide-diameter (more than 2.5 feet wide) conduit or possibly a UST that is approximately 15 to 17 feet long and buried approximately 4.5 feet below surface. This probable wide-diameter conduit (centered near X=38 Y=25) is located parallel and contingent with the probable utility line identified by the EM61 survey, suggesting that the probable conduit is a utility-related object. However, the footprint of this probable utility-related conduit or possible UST was marked in the field with spray paint and pin flags.

GPR surveys conducted across the concrete pad adjacent to the pump island suggest that the EM61 anomalies recorded in this area are probable in response to steel-reinforcement in the concrete. With the exception of the probable utility-related feature found at X=38 Y=25, the geophysical findings obtained within the survey area at Parcel 41A suggest that the ROW area does not contain metallic UST's.

### 3.6 Wesly Denham Property (Parcel 42)

The Havoline Carolina Kwik Lube garage operates at Parcel 42, which is located on the south side of Fayetteville Road. Asphalt and grass surfaces cover much of the proposed ROW area with a small concrete pad located in front of the building. The EM61 bottom coil results and the differential

results are presented in **Figure 14**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=60 Y=58, and X=80 Y=85, are probably in response to utility lines or conduits. The high amplitude anomaly centered near grid coordinates X=40 Y=40, is in response to a vehicle that could not be moved for the geophysical investigations. The anomalies centered near X=40 Y=12, and X=120 Y=55, are in response to a nearby vehicle and steel-reinforced concrete, respectively.

The geophysical results obtained within the surveyed portion of Parcel 42 suggest that the proposed ROW area does not contain metallic UST's.

### 3.7 William Ussery Property (Parcel 57)

Parcel 57 is located on the north side of Fayetteville Road approximately 0.2 miles east of Old Aberdeen Road. The EM61 bottom coil results and the differential results are presented in **Figure 15**. A series of small, bottom coil anomalies were recorded along survey line Y=25 from grid coordinate X=5 to X=115, which may be in response to an east-west trending, buried utility line or conduit. Several other bottom coil anomalies were recorded across the survey area that are probably in response to miscellaneous metal debris.

All of the differential anomalies are probably in response to known cultural features or buried debris, suggesting that the proposed ROW area at Parcel 57 does not contain metallic UST's.

### 3.8 Walter McCain Property (Parcel 80)

Parcel 80 is located immediately northwest of the Fayetteville Road and Philadelphia Road intersection and consists of two vacant buildings surrounded by sandy or grass surfaces. A former pump island pad is located south of the eastern-most building. The EM61 bottom coil results and the differential results are presented in **Figure 16**.

GPR surveys conducted across the EM61 anomalies centered near grid coordinates X=170 Y=35, and X=194 Y=32, suggest the presence of two metallic UST's. The probable UST centered near X=170

Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32 appears to be10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by the former pump island pad. Photos of the UST locations along with an image of GPR survey line X=167.5 are presented in **Figure 17**.

Based upon the geophysical results, the remaining portion of the proposed ROW area does not appear to contain metallic UST's.

### 3.9 Leon Wall Property (Parcel 99)

Parcel 99 is located immediately southwest of the Fayetteville Road and Patterson Road intersection and consists mostly of a grass yard surrounding a vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 18** in which a bottom coil, linear anomaly is recorded along survey line Y=230. This linear anomaly is probably in response to a utility line. GPR surveys conducted across the differential EM61 anomaly centered near X=92 Y=165, is probably in response to a water line adjoining the vacant building. GPR surveys were also conducted between the building and the former pump island pad that is centered near coordinates X=84 Y=222. The surveys suggest that the EM anomalies recorded in this portion of the survey area are probably in response to miscellaneous metal debris.

Based upon the geophysical results, the proposed ROW area at Parcel 99 does not appear to contain metallic UST's.

### 3.10 James Porter Property (Parcel 117)

Parcel 117 is a former gas station site located on the south side of Fayetteville Road approximately 0.25 miles west of Locklear Drive. The site consists primarily of grass and asphalt surfaces with a former pump island pad located in front of the vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 19**. The linear, bottom coil anomaly intersecting grid coordinates X=130 Y=54, is probably in response to a buried utility line or conduit. The linear

anomaly intersecting X=40 Y=74, is probably in response to a metal fence. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation across the survey area of Parcel 117 suggests that the proposed ROW area does not appear to contain metallic UST's.

### 3.11 John Evans Property (Parcel 126)

The active Custom Monument Company operates on Parcel 126, which is located immediately northeast of the Fayetteville Road and LockLear Drive intersection. The geophysical survey area consists of grass and asphalt surfaces and the EM61 bottom coil results and the differential results are presented in **Figure 20**. All of the EM61 anomalies recorded across the surveyed portion of the site are probably in response to known cultural features, suggesting that the proposed ROW area does not contain metallic UST's.

### 3.12 Henry Ussery Property (Parcel 140)

Parcel 140 is a former gas station site, which is presently occupied by Bo Henry's Pawn Shop. The property is located immediately southeast of the Fayetteville Road and Port Street intersection. Much of the proposed ROW area consists of sandy or grass-covered surfaces. A concrete pad surrounds the north and west sides of the building. The EM61 bottom coil results and the differential results are presented in **Figure 21**. The linear bottom coil anomaly intersecting grid coordinates X=80 Y=80, is probably in response to a buried utility line.

GPR surveys conducted across the differential anomalies centered near coordinates X=90 Y=60, and X=107 Y=59, suggest the presence of two UST's buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide. Probing with a steel rod across this area suggest the presence of a concrete slab buried approximately 0.3 feet below surface and overlying the UST's. A photo showing the locations of the probable UST along with GPR images are presented in **Figure 22**.

## 4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 13 sites along Fayetteville Road (US 1) in Rockingham, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic UST's within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 13 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results did not detect the presence of unknown metallic UST's within the surveyed portions of the proposed ROW areas at the following sites:

| | |
|---|---|
| W. J. Barnhart Property | (Parcel 4) |
| W. J. Barnhart Property | (Parcel 41A) |
| Wesly Denham Property | (Parcel 42) |
| William Ussery Property | (Parcel 57) |
| Leon Wall Property | (Parcel 99) |
| James Porter Property | (Parcel 117) |
| John Evans Property | (Parcel 126) |

- Julia M. Ratliff Property (Parcel 7): Geophysical results suggest the presence of a UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide. A second UST may be present immediately west of this UST.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

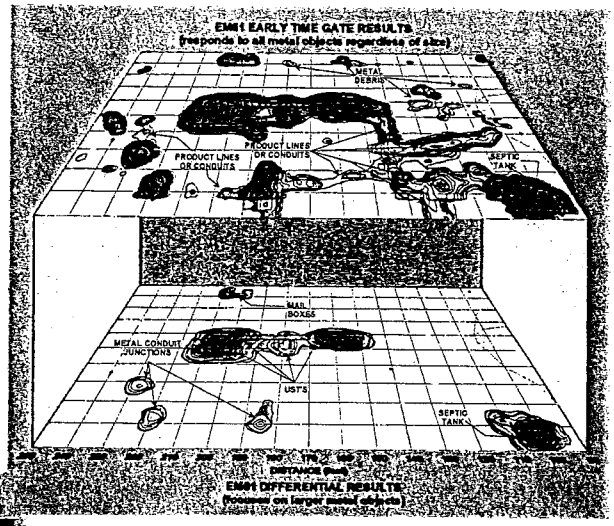
- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

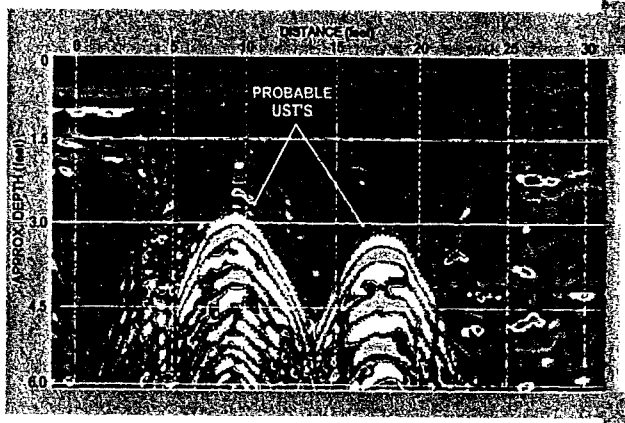
- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

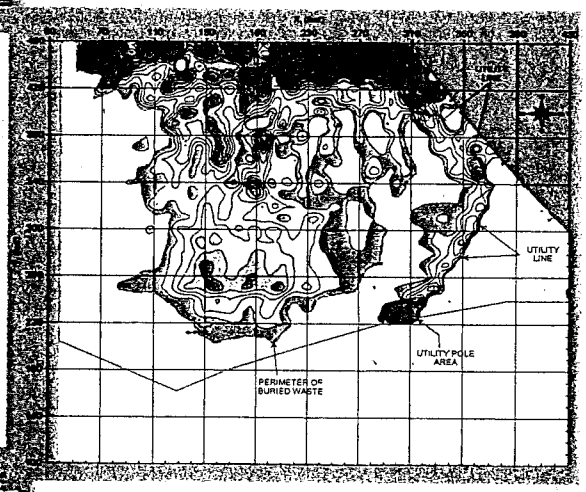
## 5.0 LIMITATIONS

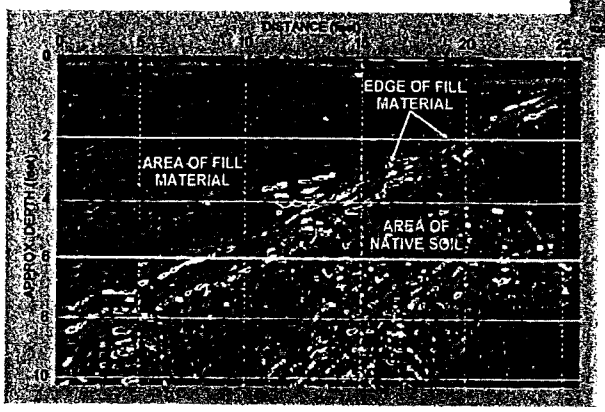
EM61 and GPR surveys have been performed and this report prepared for Solutions Industrial & Environmental Services, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic UST's but only suggest where some of the metallic UST's may be present. The EM61 and GPR anomalies, interpreted as possible UST's or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EMI1 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANK
DISTANCE (feet)
EMI1 DIFFERENTIAL RESULTS
(focused on larger metal objects)


DISTANCE (feet)
0
5
10
15
20
25
30
PROBABLE UST'S
APPROX. DEPTH (feet)
0
1.5
3.0
4.5
6.0

# FIGURES


UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE


DISTANCE (feet)
0
5
10
15
20
25
EDGE OF FILL MATERIAL
AREA OF FILL MATERIAL
AREA OF NATIVE SOIL
APPROX. DEPTH (feet)
0
2
4
6
8
10

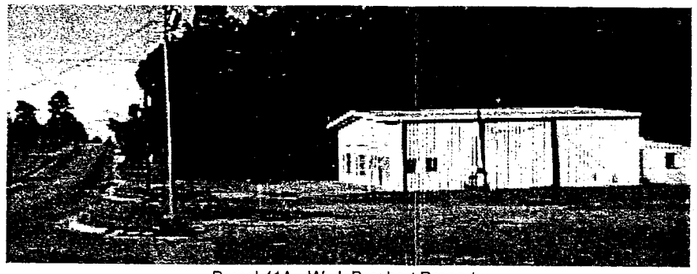
Parcel 4 - W. J. Barnhart Property

Parcel 7 - Julia M. Ratliff Property

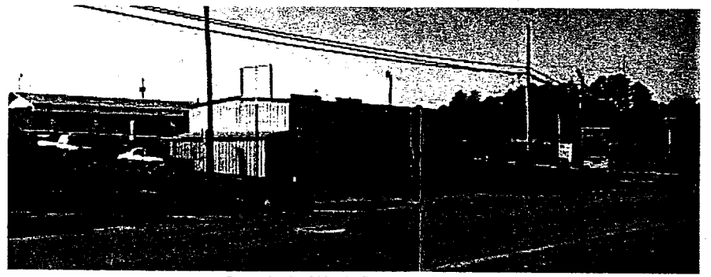
Parcel 15 - Samuel D. Tanner Property

Parcel 17 - Harvey E. Melton Property

Parcel 21 - Samuel D. Tanner Property



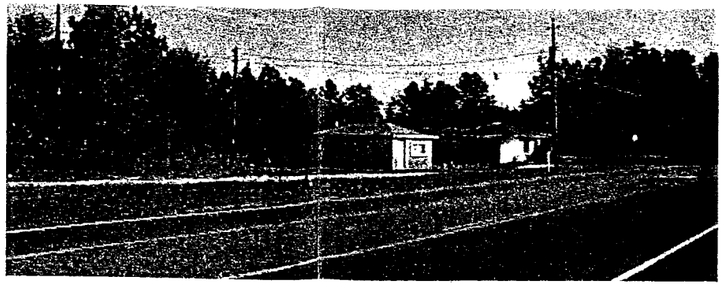
Parcel 41A - W. J. Barnhart Property



Parcel 42 - Wesly Denham Property

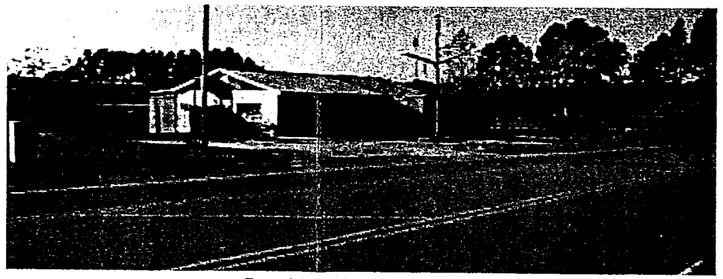
Parcel 57 - William Ussery Property

Parcel 140 - Henry Ussery Property



Parcel 80 - Walter McCain Property

Parcel 99 - Leon Wall Property



Parcel 117 - James Porter Property

Parcel 126 - John Evans Property

SITE PHOTOS

FIGURE 1

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRWN | MJD | | |
| CH'KD | | | |
| DATE | 11/28/05 | | |
| LAY | | | |
| DWG | | | |
| FIGURE | | | |
| J-NO. | 2005-292 | | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: ROCKINGHAM SITES

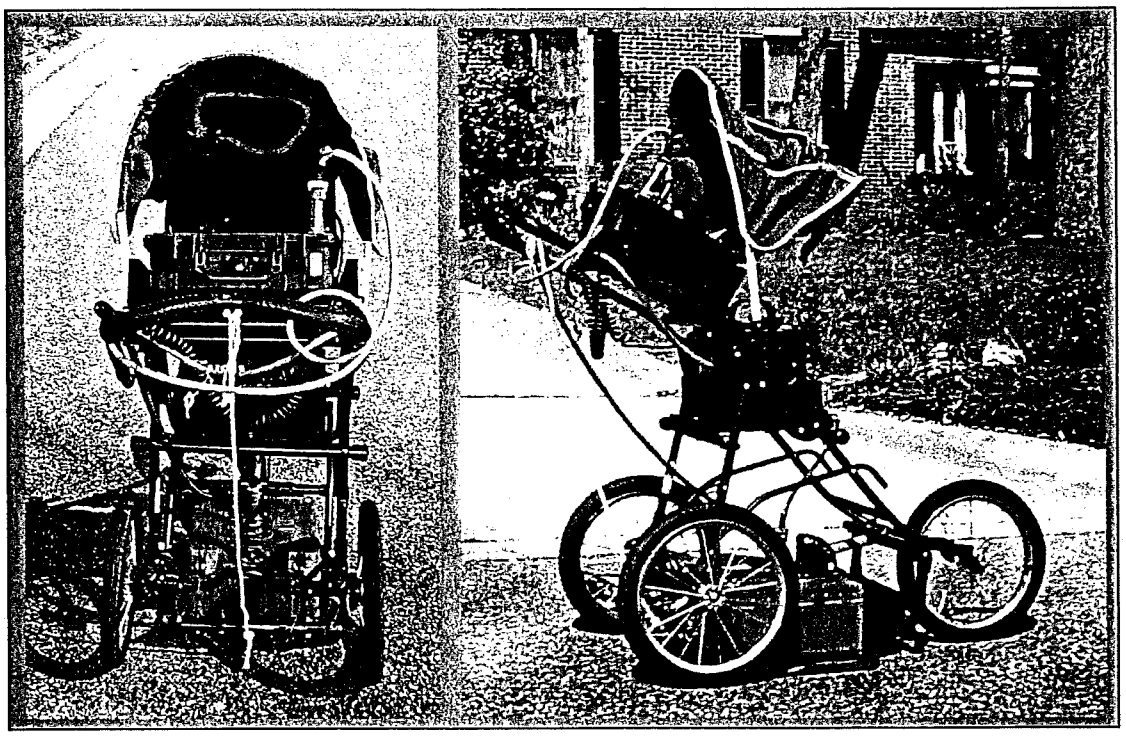
CITY: ROCKINGHAM

STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

The Geonics EM61 metal detector was used to conduct the metal detection surveys at the Rockingham sites in November 2005.



The SIR-2000 GPR system equipped with a 400 MHz antenna that was used at the Rockingham sites in November 2005.

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

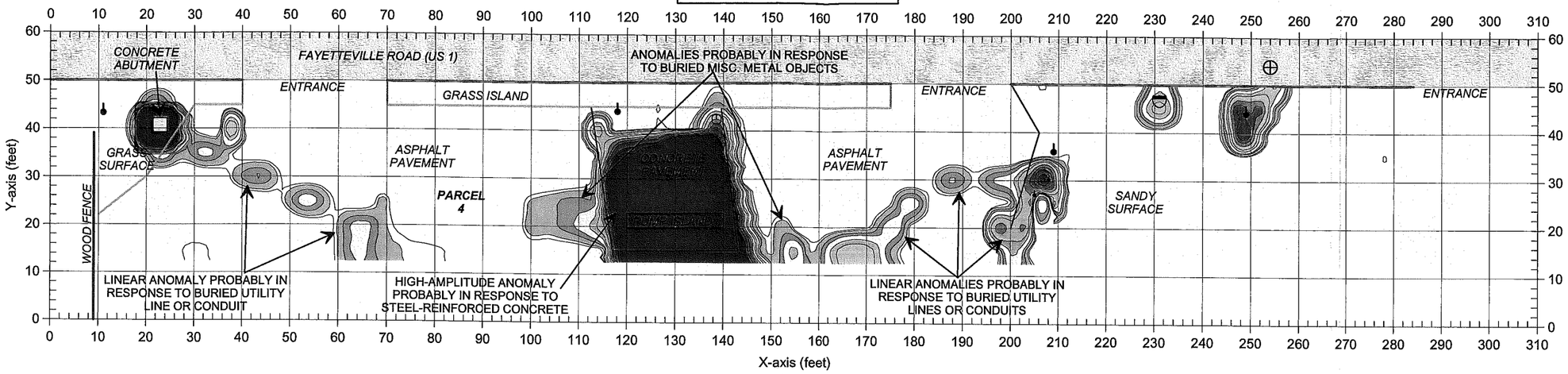
| | | | | | |
|---|---|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE | 11/28/05 | DRWN |
| SITE | ROCKINGHAM SITES | | LAY | | CHKD |
| CITY | ROCKINGHAM | STATE NORTH CAROLINA | DWG | | |
| TITLE | GEOPHYSICAL RESULTS | | JOB | 2005-292 | SOURCE |

GRAPHIC SCALE IN METERS

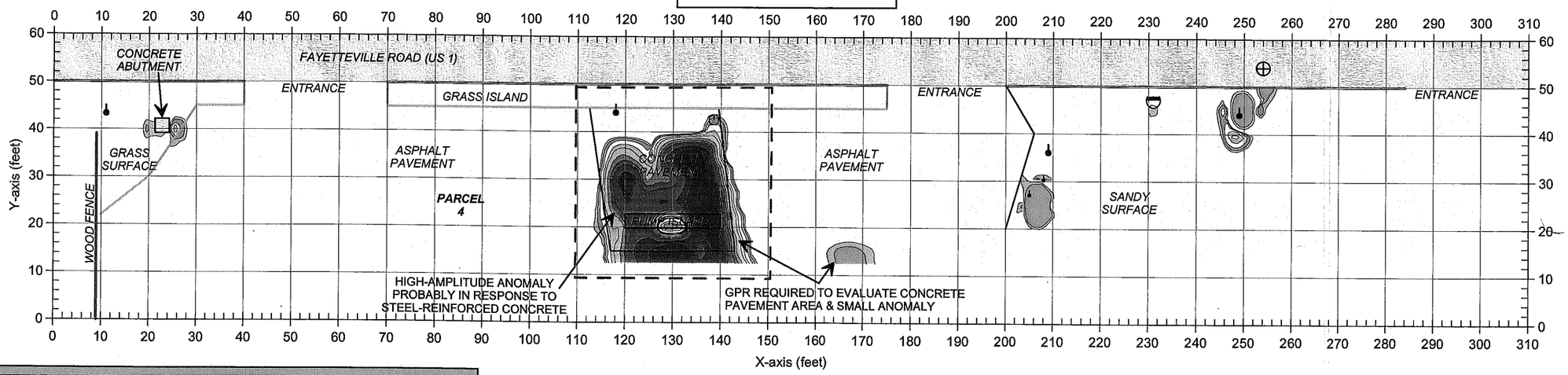
GEOPHYSICAL EQUIPMENT

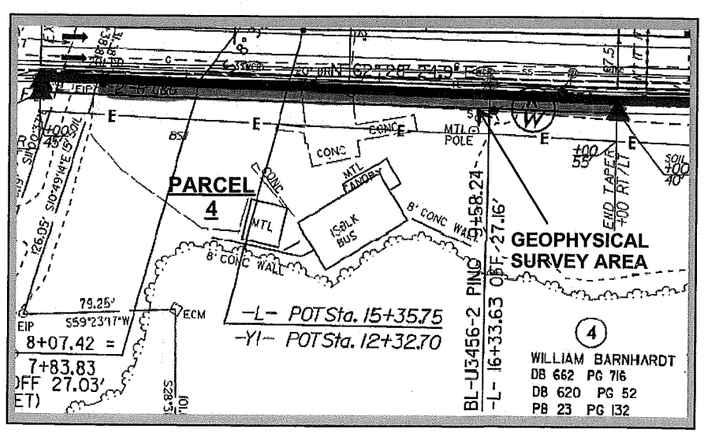
FIGURE 2

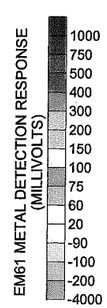
## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE OR LIGHT POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY AREA

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 3

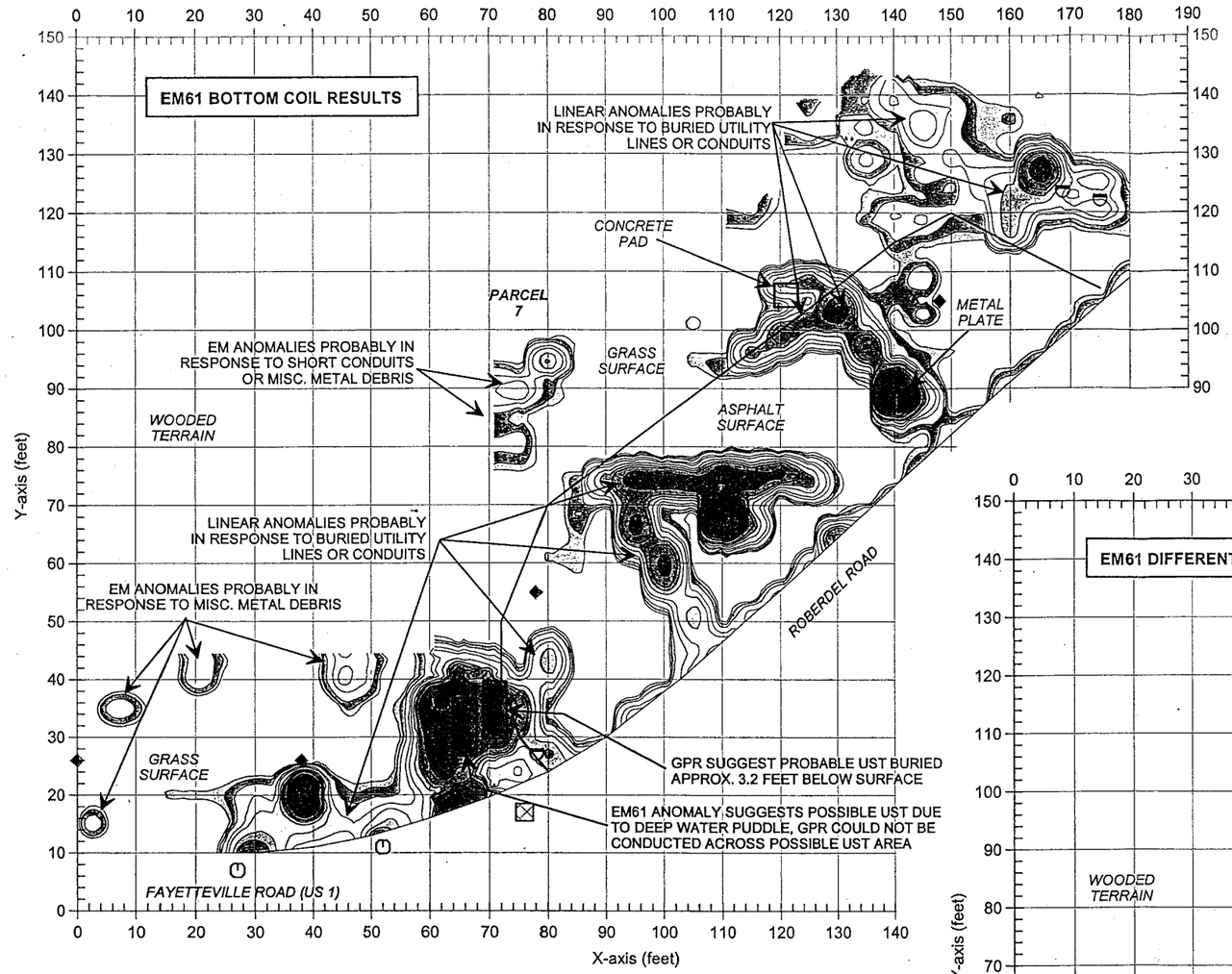
EM61
METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: W. J. BARNHART PROPERTY (PARCEL 4)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

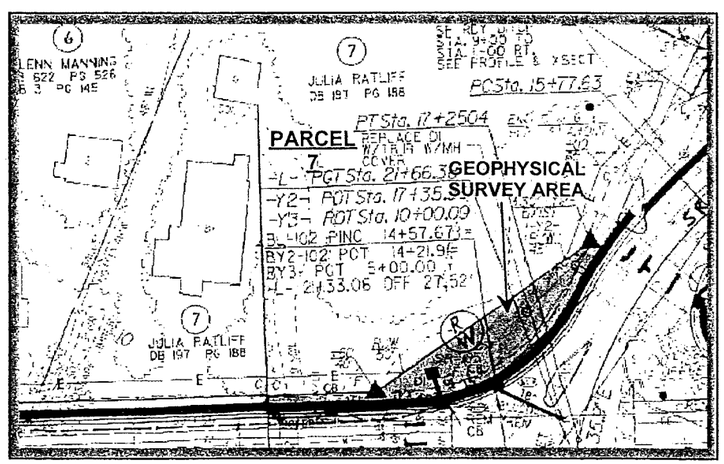
- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH & EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

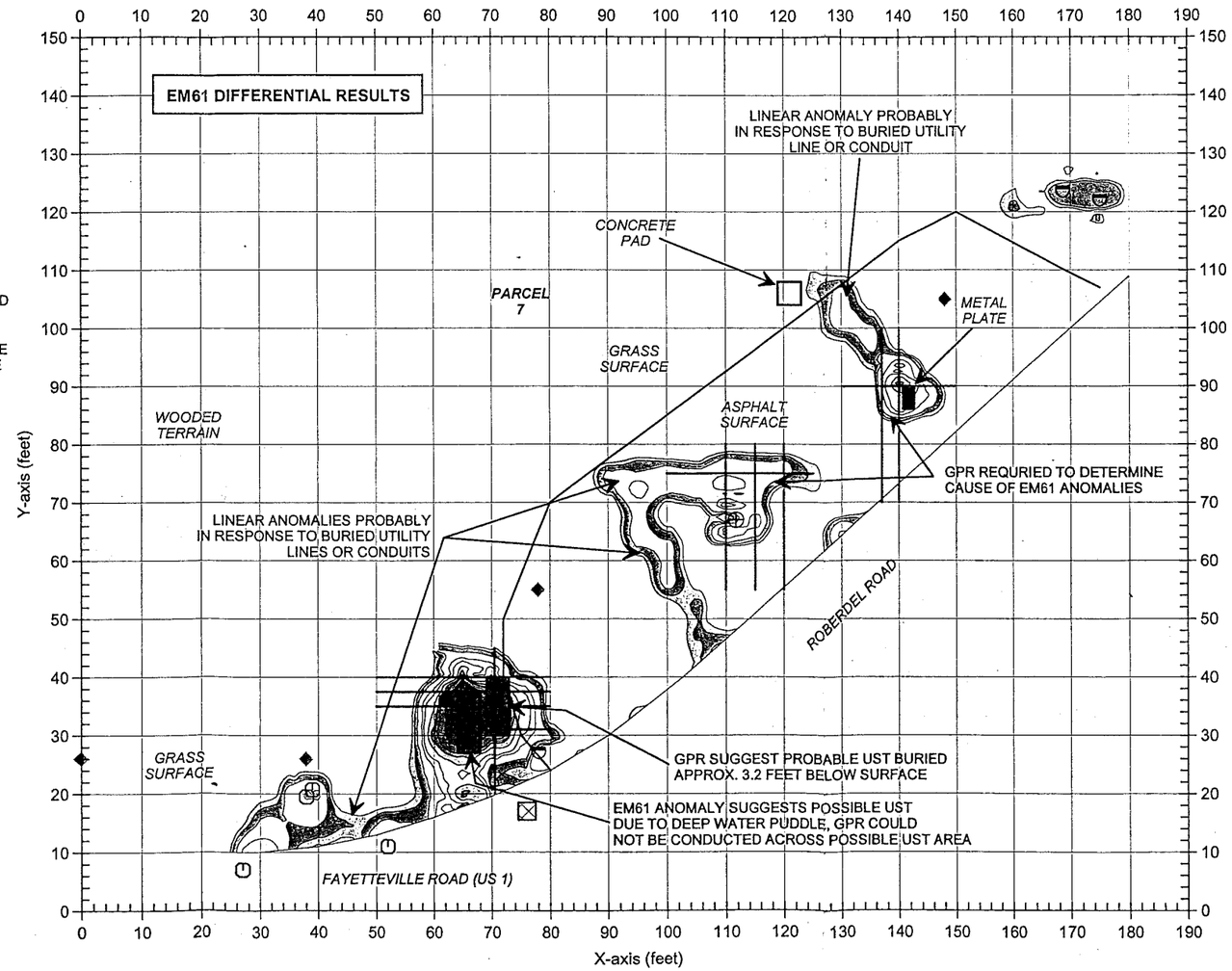
The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -90 50 60 75 100 150 200 300 400 500 750 1000



APPROXIMATE NORTH




EM61 METAL DETECTION RESULTS

FIGURE 4

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DATE | 11/25/05 |
| DRWN | MJD |
| LAY | |
| CHKD | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

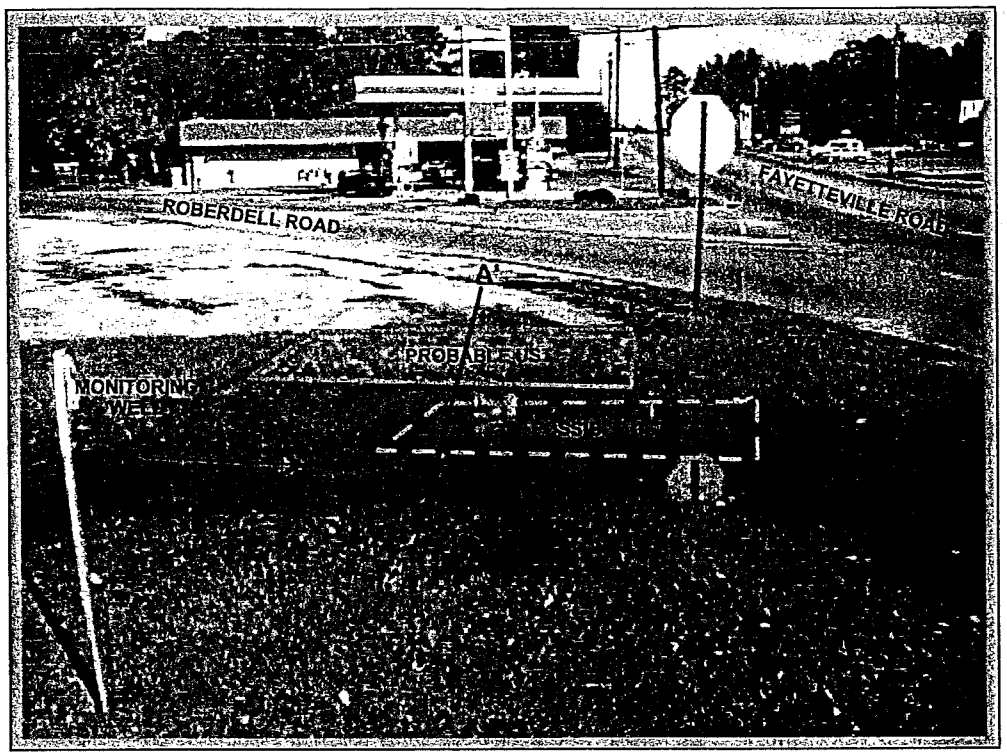
SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7)

CITY: ROCKINGHAM

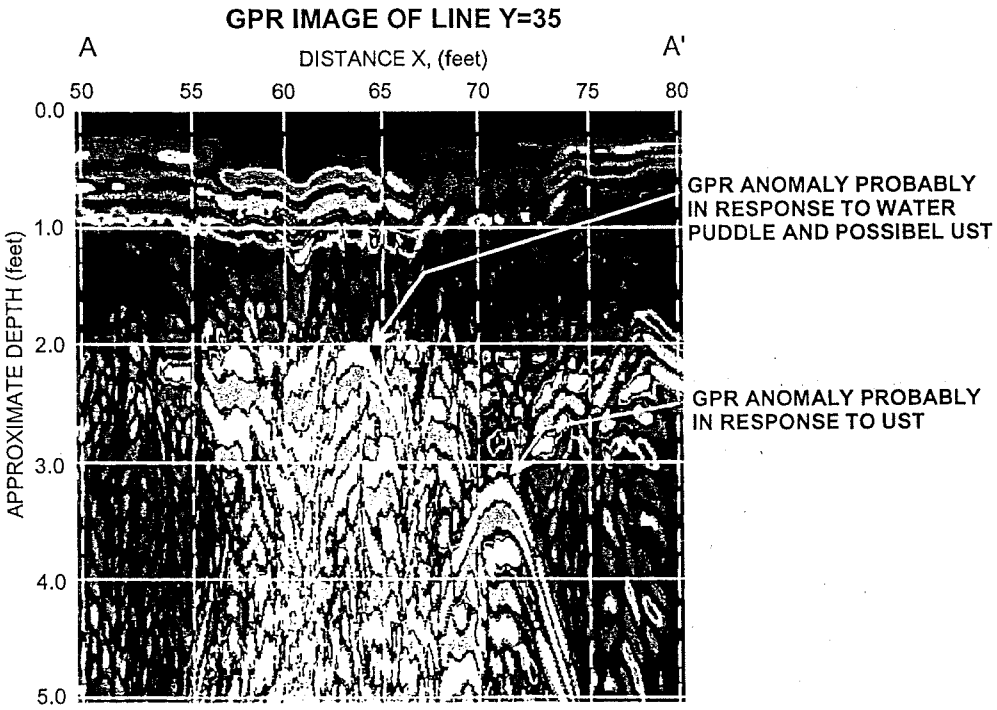
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



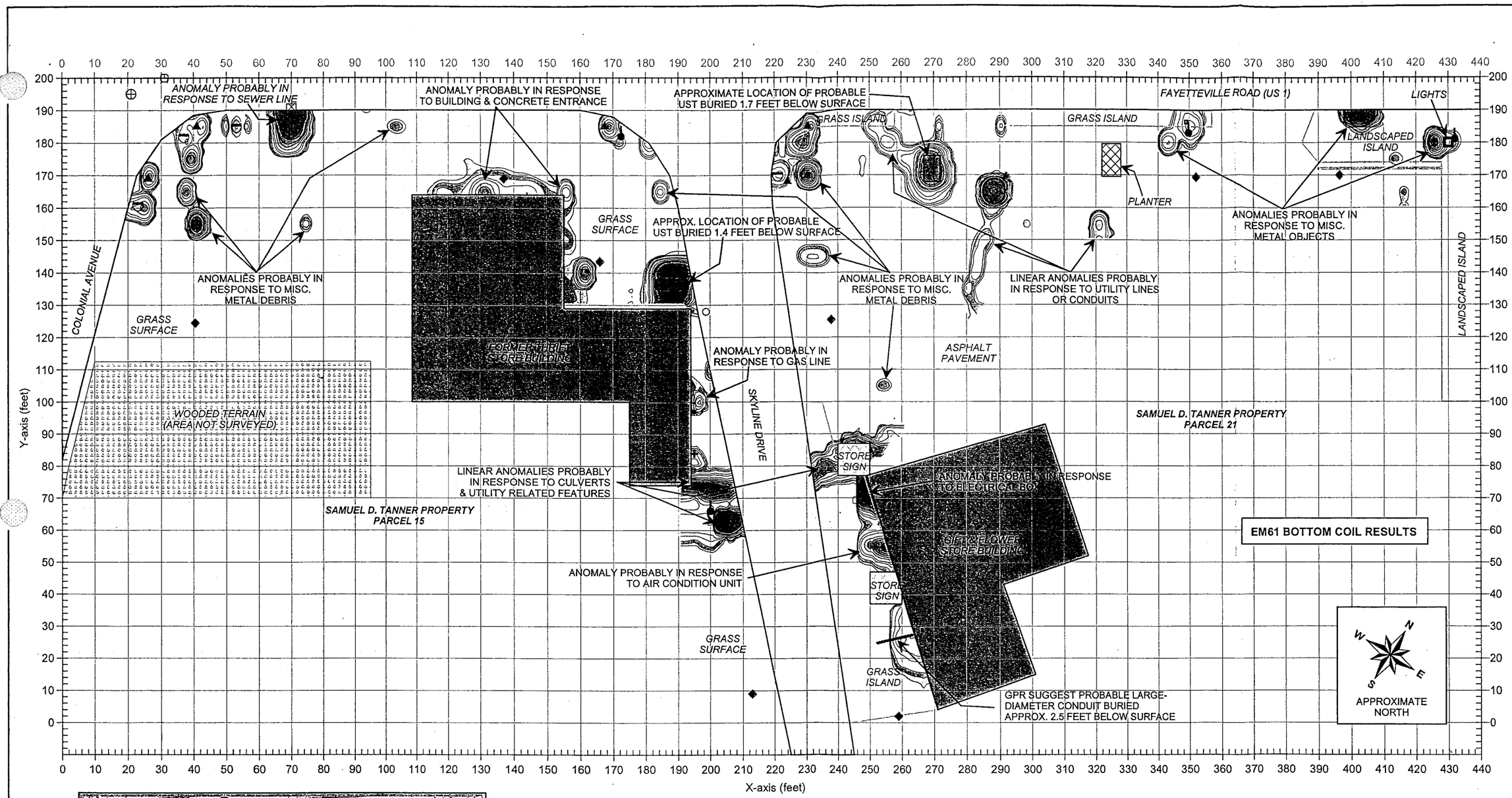

The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

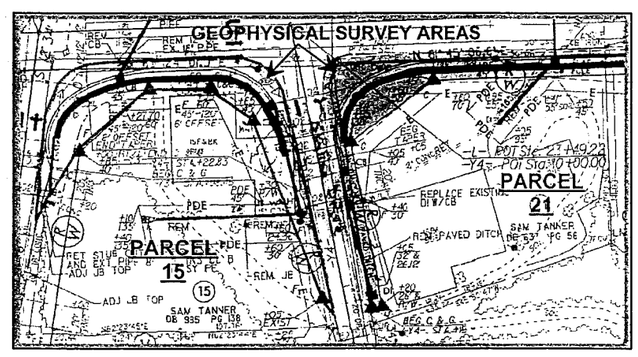


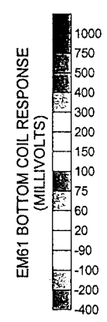

The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | SOURCE: | FIGURE 5 |

GRAPHIC SCALE IN METERS




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 6

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

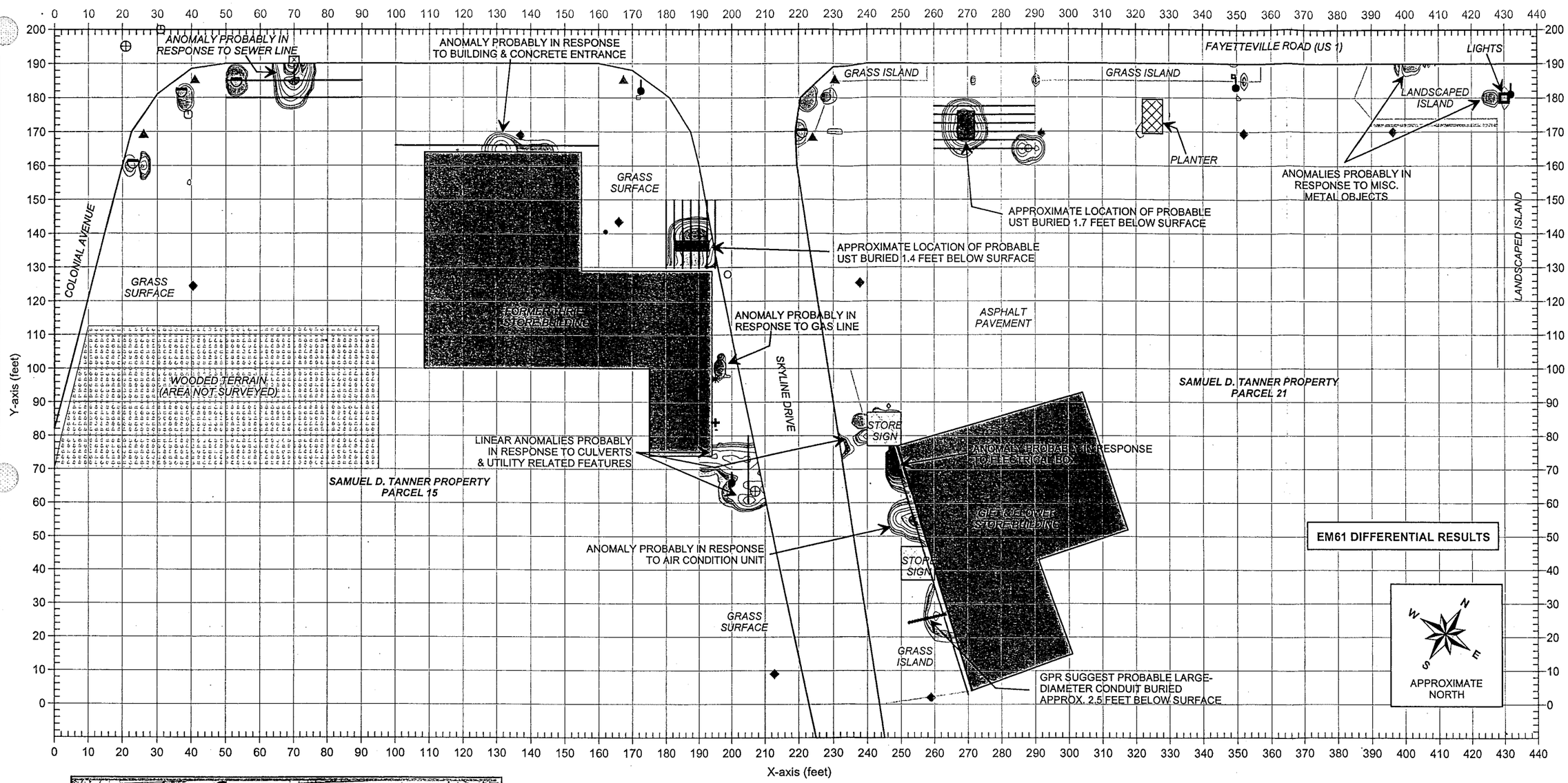
CITY: ROCKINGHAM STATE: NORTH CAROLINA

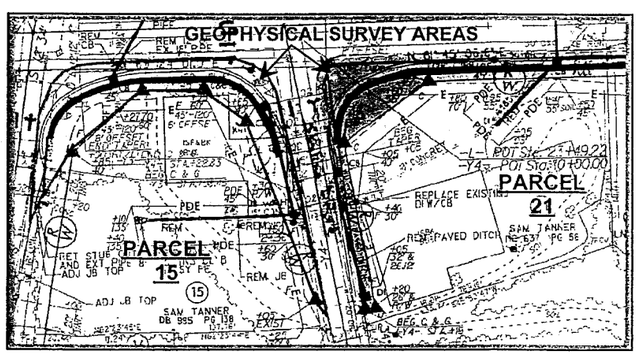
TITLE: GEOPHYSICAL RESULTS

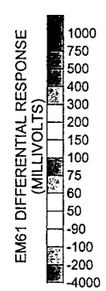
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

FIGURE 7

# EM61 DIFFERENTIAL RESULTS




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

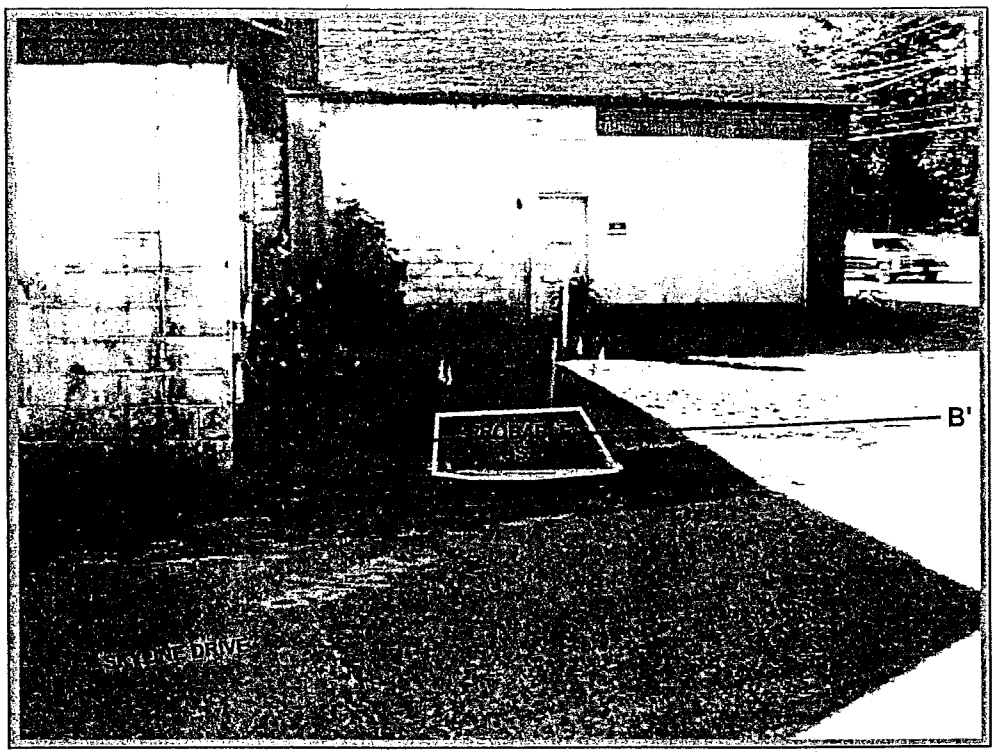
Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

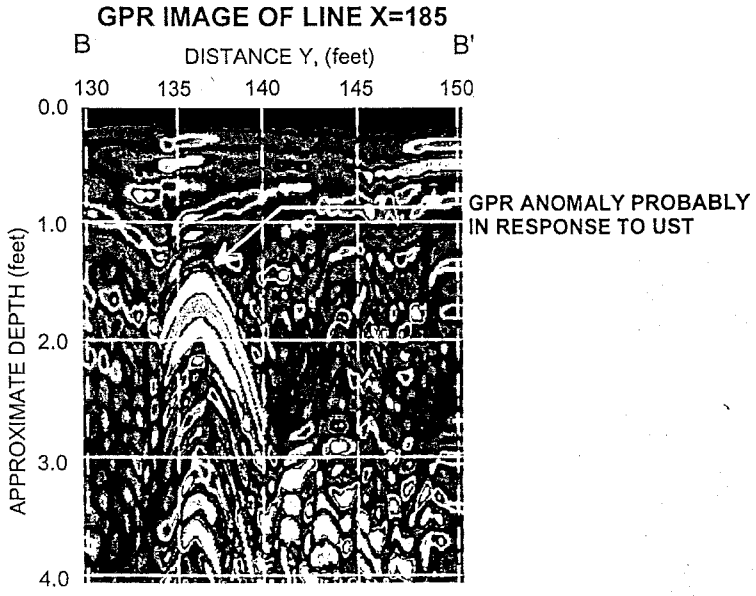
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/25/05 |
| DRAWN | MJD |
| CHKD | |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

GRAPHIC SCALE IN METERS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



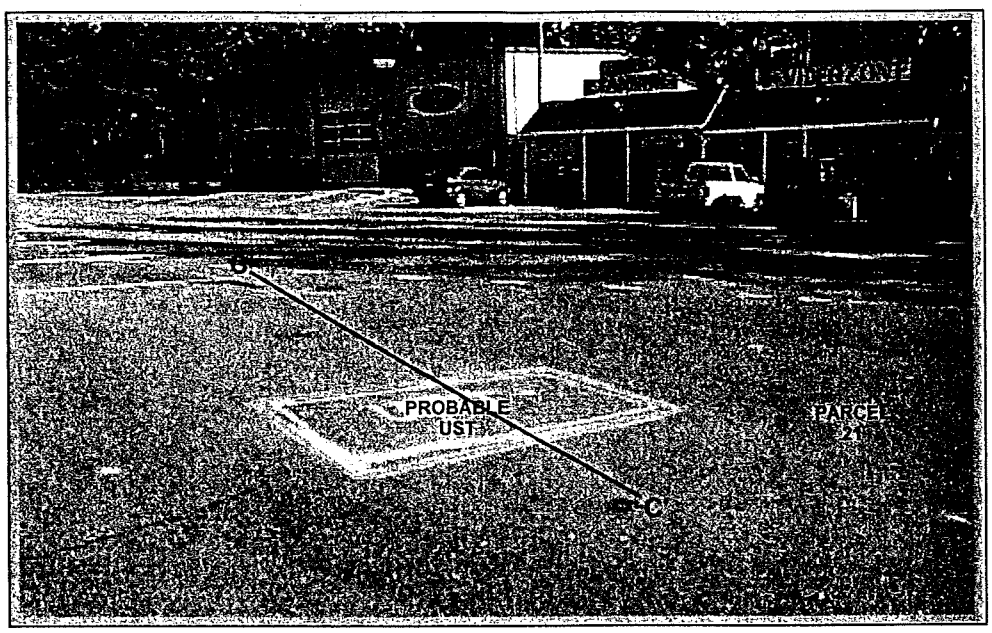

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 15.



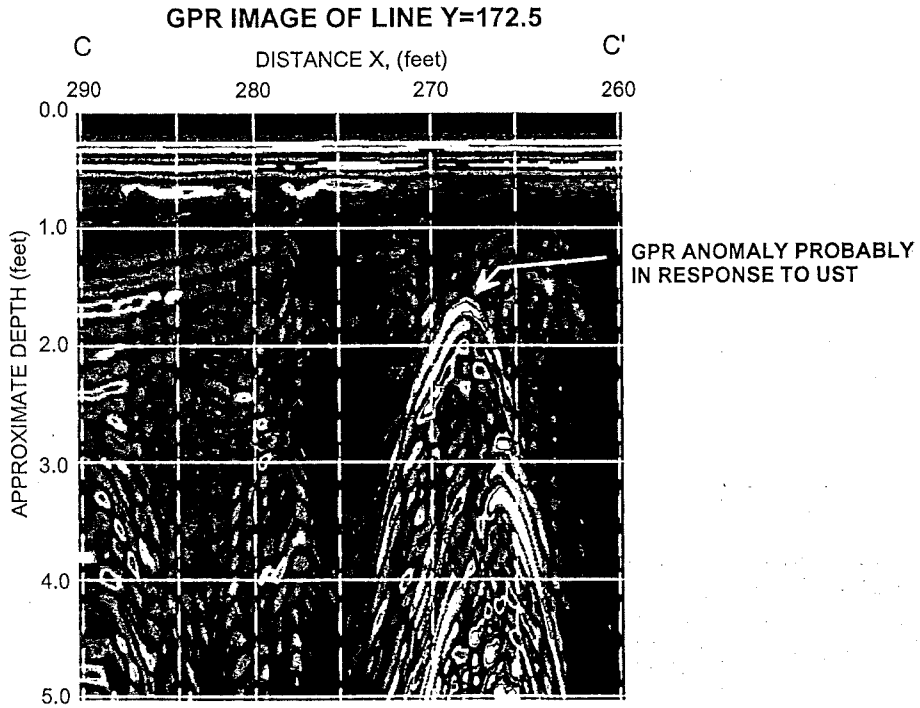

The GPR image obtained along a portion of survey line X=185 shows the anomaly that is probably in response to a UST near Y=137 and buried approximately 1.4 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 15) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J.NO.: 2005-292 | FOLDR: | FIGURE 8 |

GRAPHIC SCALE IN METERS



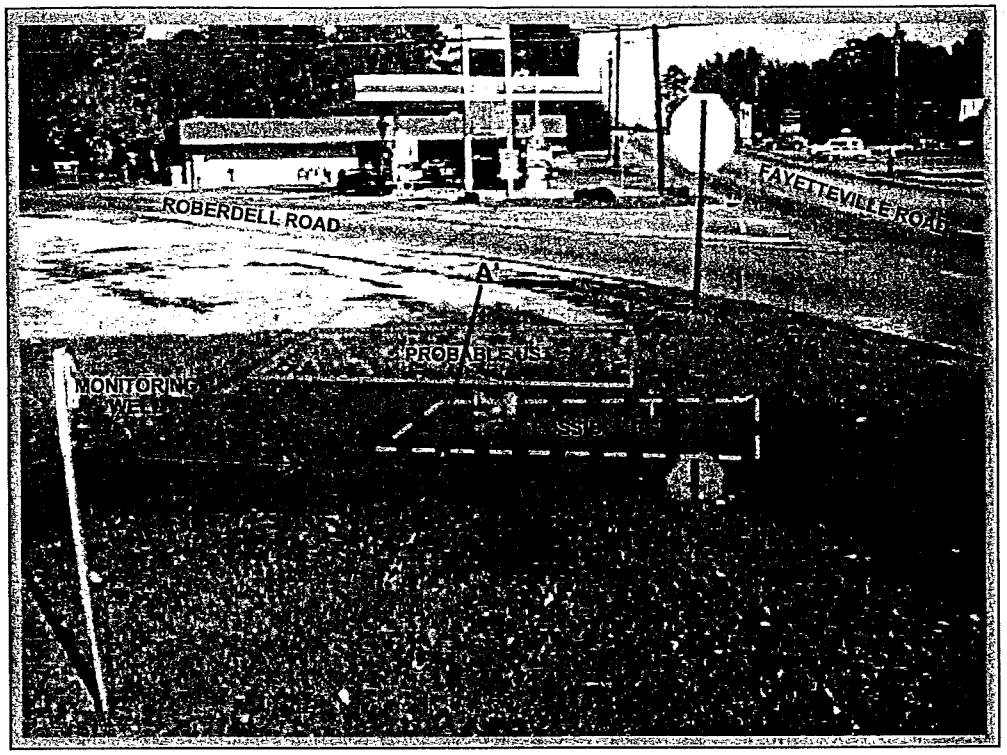

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 21.



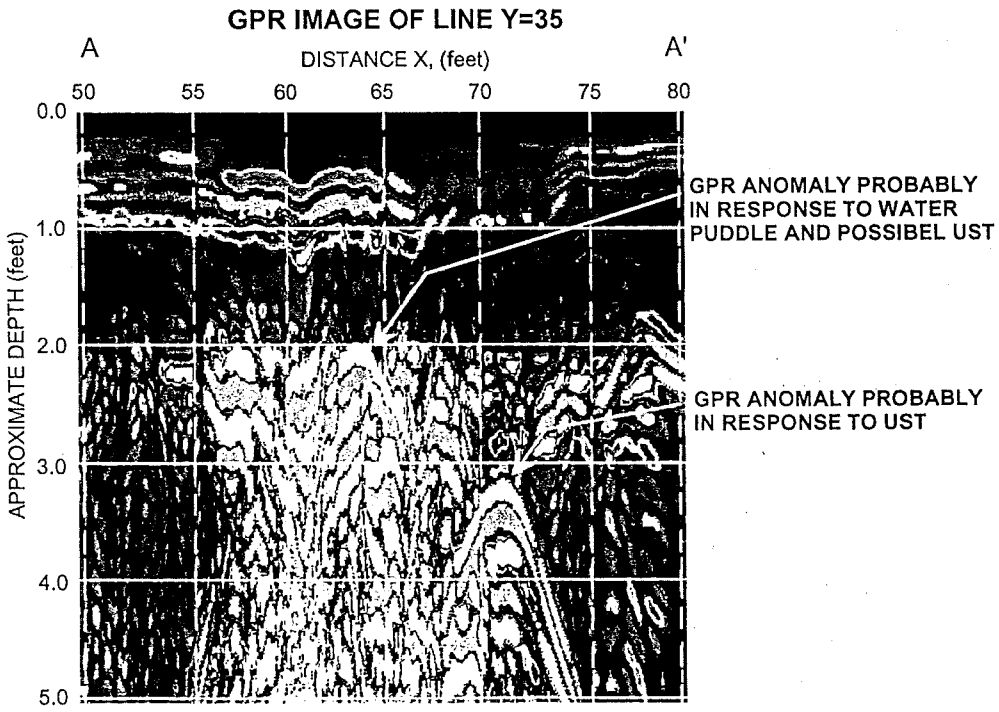

The GPR image obtained along a portion of survey line Y=172.5 shows the anomaly that is probably in response to a UST near X=268 and buried approximately 1.7 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 21) | | LAY: | CKRD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO.: 2005-292 | REVIS: | FIGURE 9 |

GRAPHIC SCALE IN METERS




The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

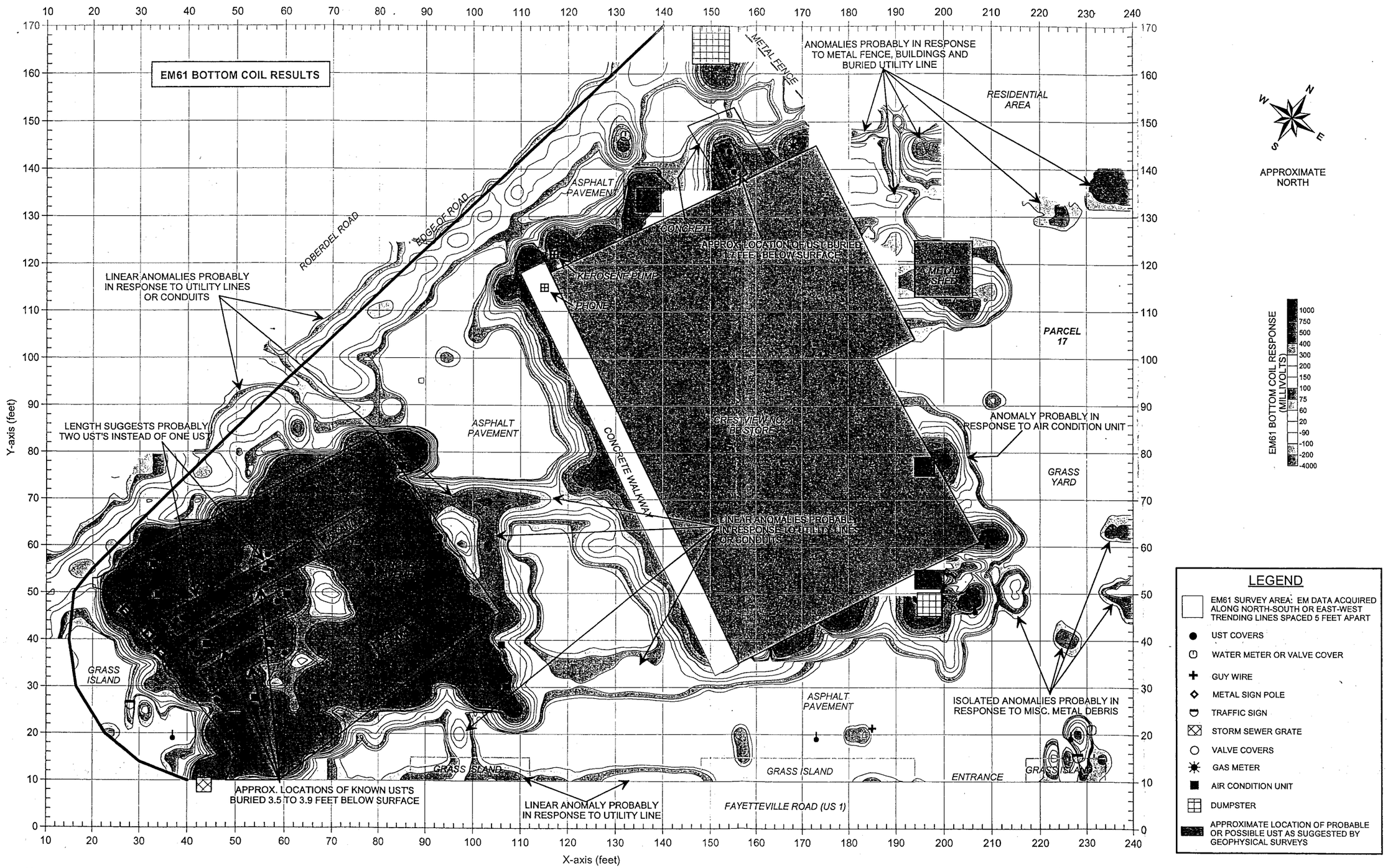



The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | GRAPHIC SCALE IN METERS |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J-NO.: 2005-292 | FIGURE: | |

PHOTO & GPR IMAGE OF UST LOCATION

FIGURE 5



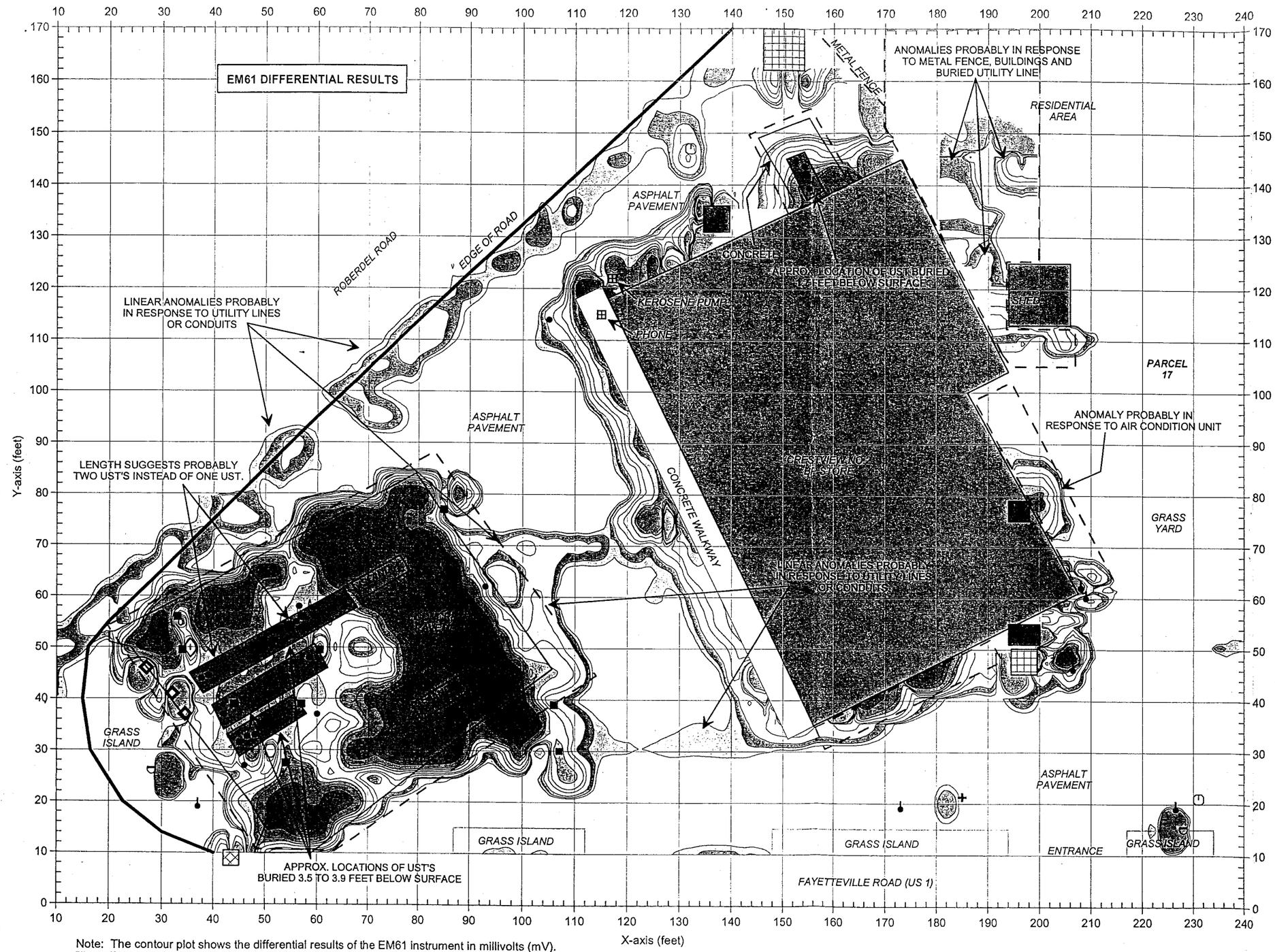

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 10

EM61 BOTTOM COIL RESULTS

| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| DRWN | MJD |
| CHKD | |
| FIGURE | |
| GRAPHIC SCALE IN METERS | |

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




Note: The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 11

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/25/05 | J-NO. | 2005-292 |
| LAY | | DWG | |

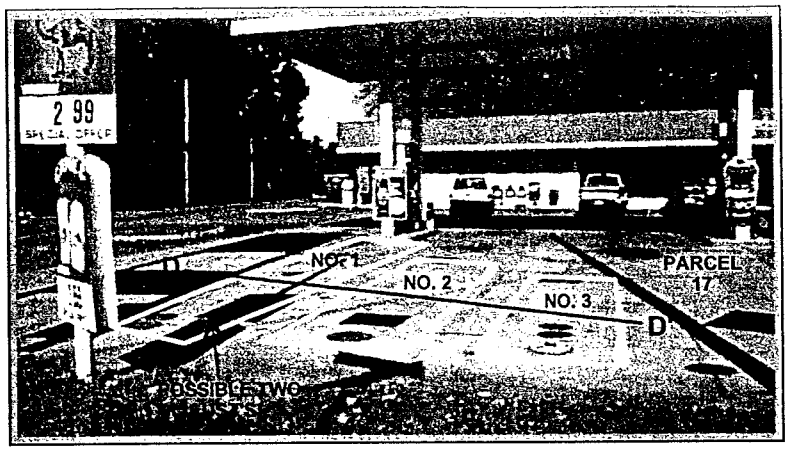
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: HARVEY E. MELTON PROPERTY (PARCEL 17)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

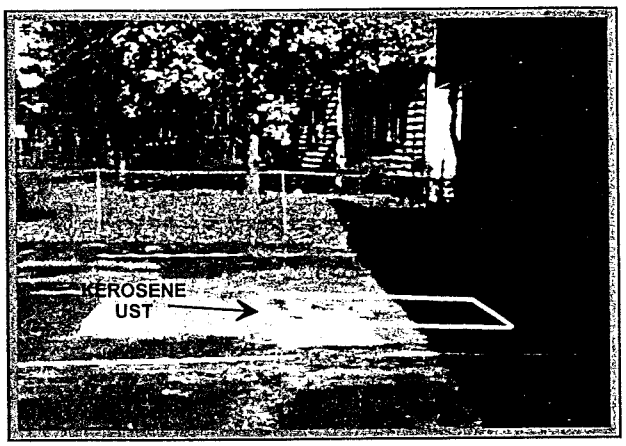
TITLE: GEOPHYSICAL RESULTS

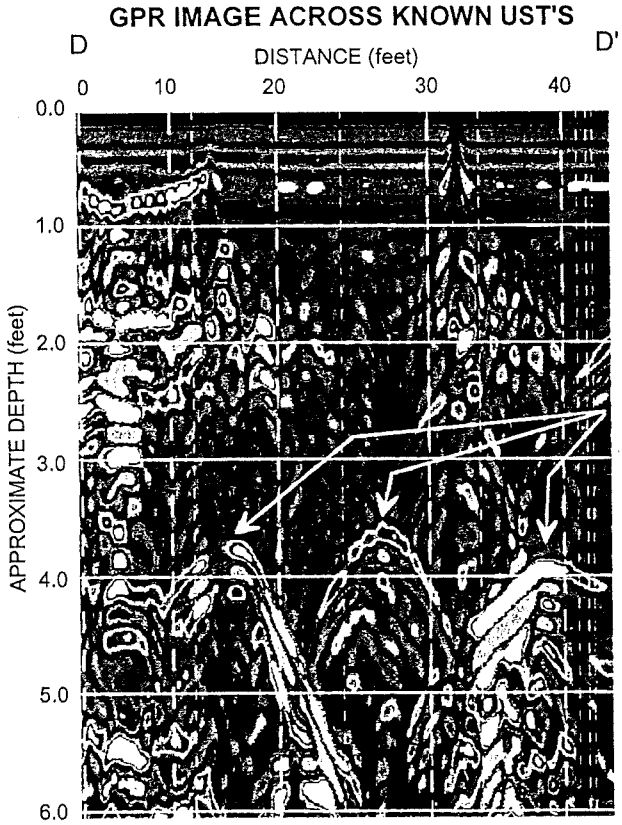
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approxiamte location of the three or four known and active UST's, as suggested by the geophysical results, at Parcel 17. The UST's appear to be approximately 3.5 to 3.9 feet below surface.

The photo shows the approximate location of the kerosene UST, as suggested by the geophysical results, at Parcel 17. The UST is located along the northwest wall of the store and is buried approximately 2.4 feet below surface.



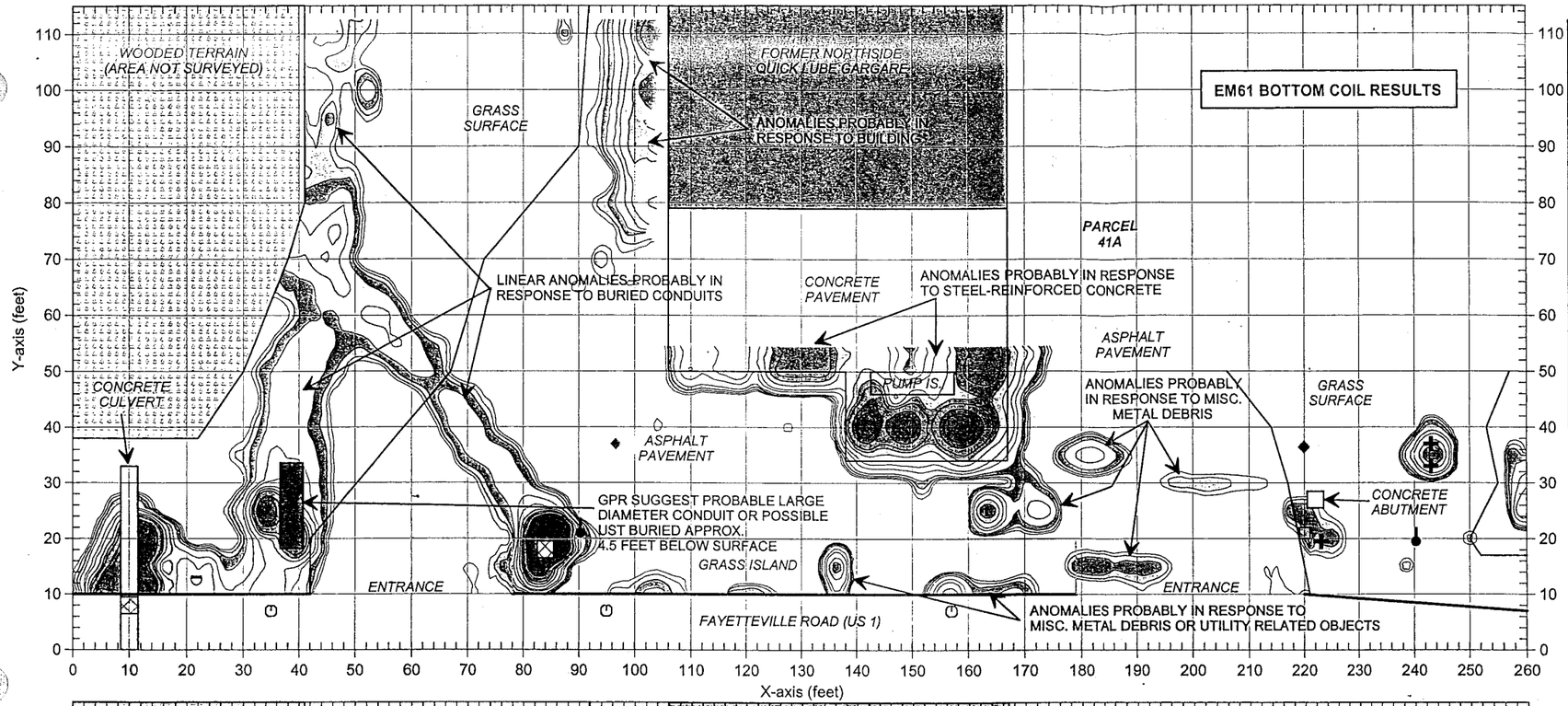



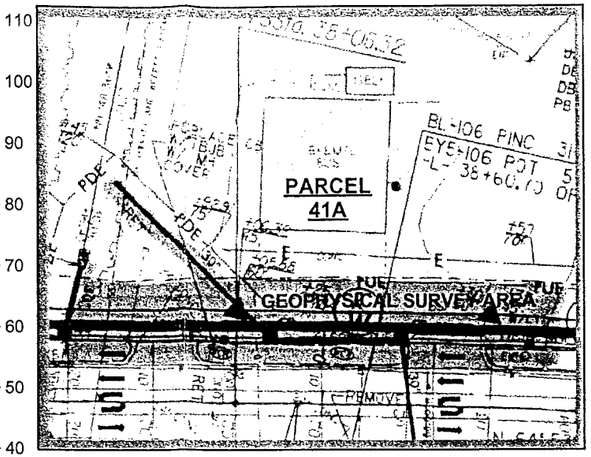

**GPR ANOMALIES PROBABLY IN RESPONSE TO THREE UST'S BURIED 3.5 TO 3.9 FEET BELOW SURFACE**

The GPR image is obtained along a traverse line oriented perpendicular to the axis of the UST's. The three GPR anomalies in response to the probable UST's suggest that the UST's are buried approximately 3.5 to 3.9 feet below surface.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTOS & GPR IMAGE OF UST LOCATIONS |
| | SITE: HARVEY E. MELTON PROPERTY (PARCEL 17) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J-NO.: 2005-292 | XOURE: | FIGURE 12 |

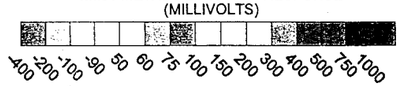
GRAPHIC SCALE IN METERS

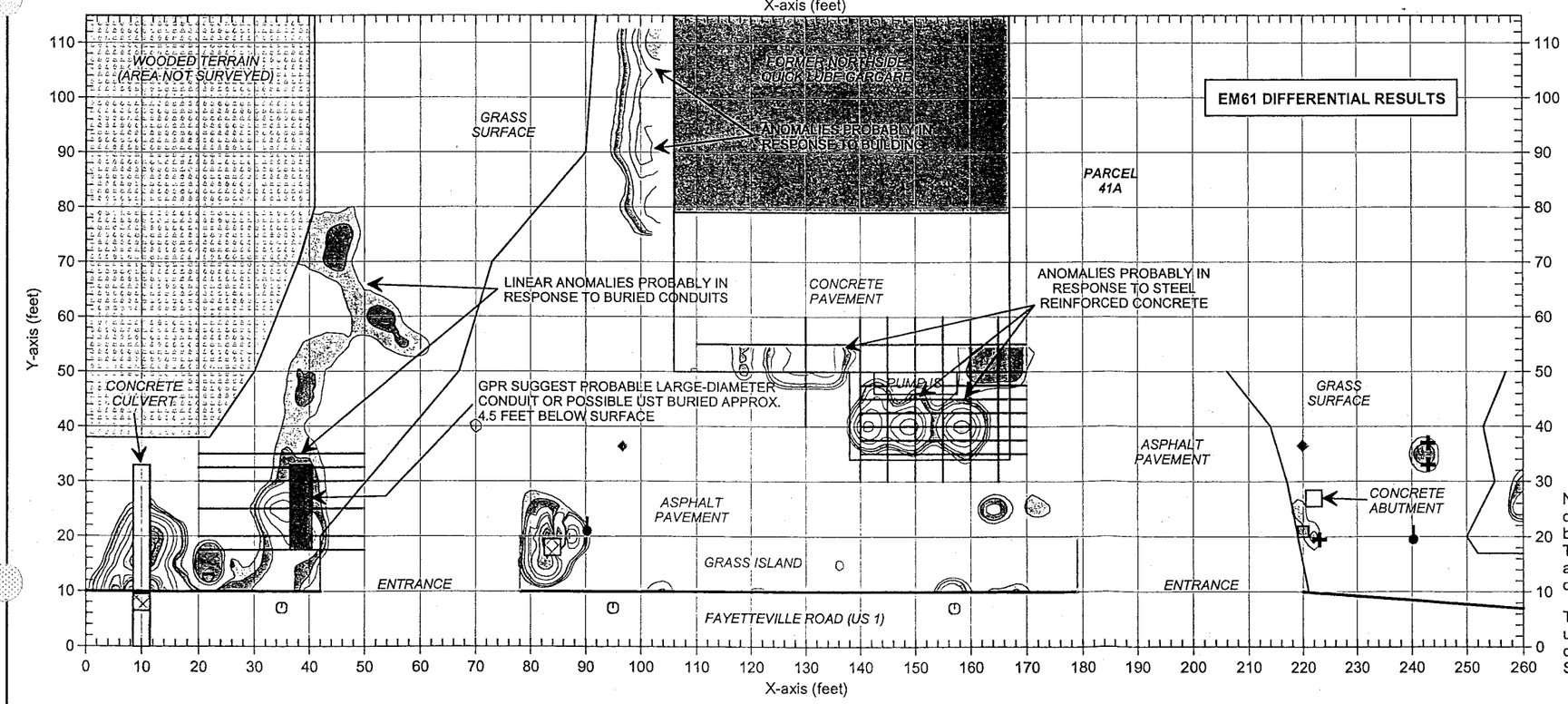


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MAIL BOX
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE LARGE DIAMETER CONDUIT OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 13

# EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| J-NO. | 2005-292 |
| FIGURE | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

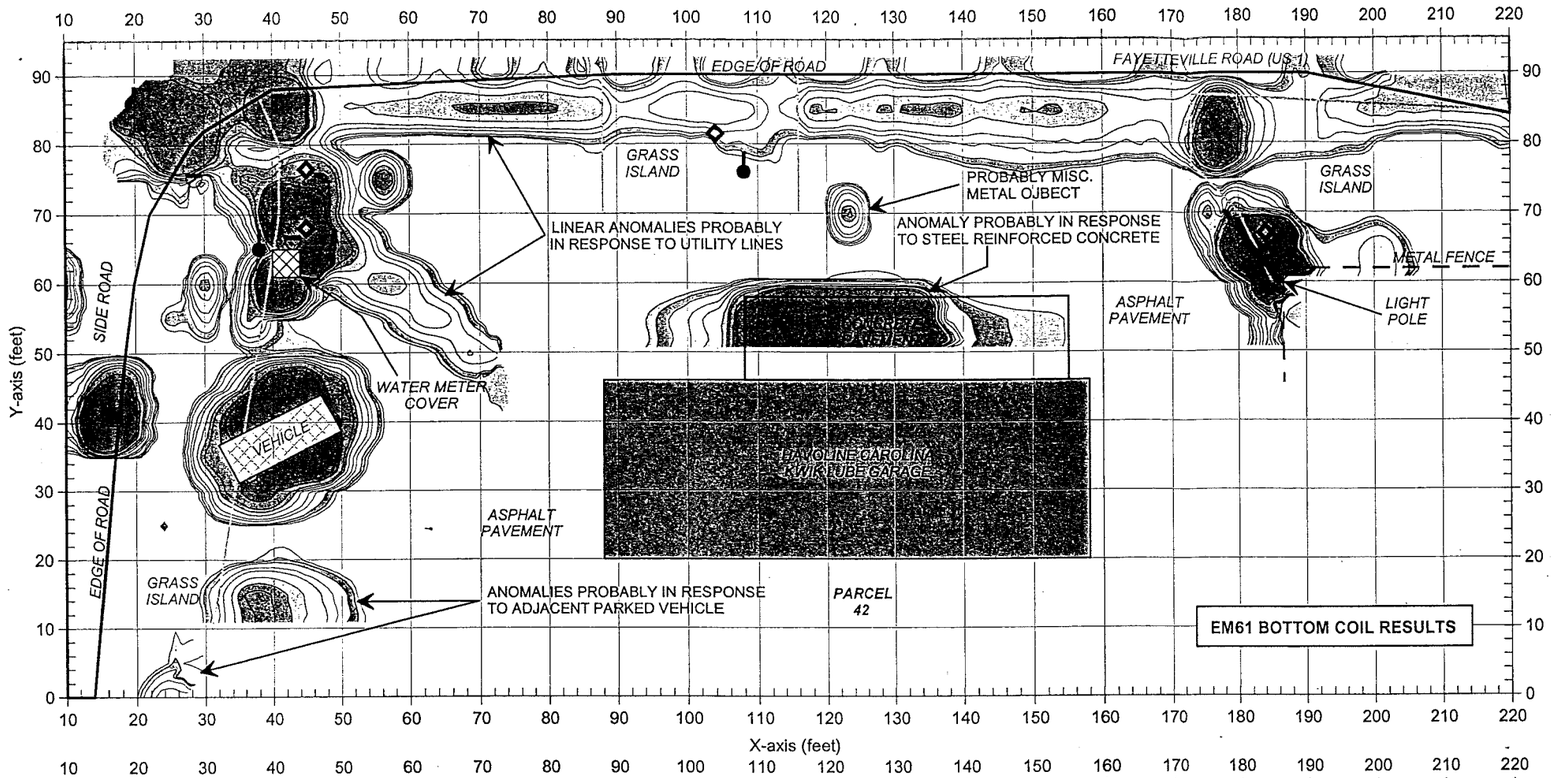
SITE: W.J. BARNHART PROPERTY (PARCEL 41A)

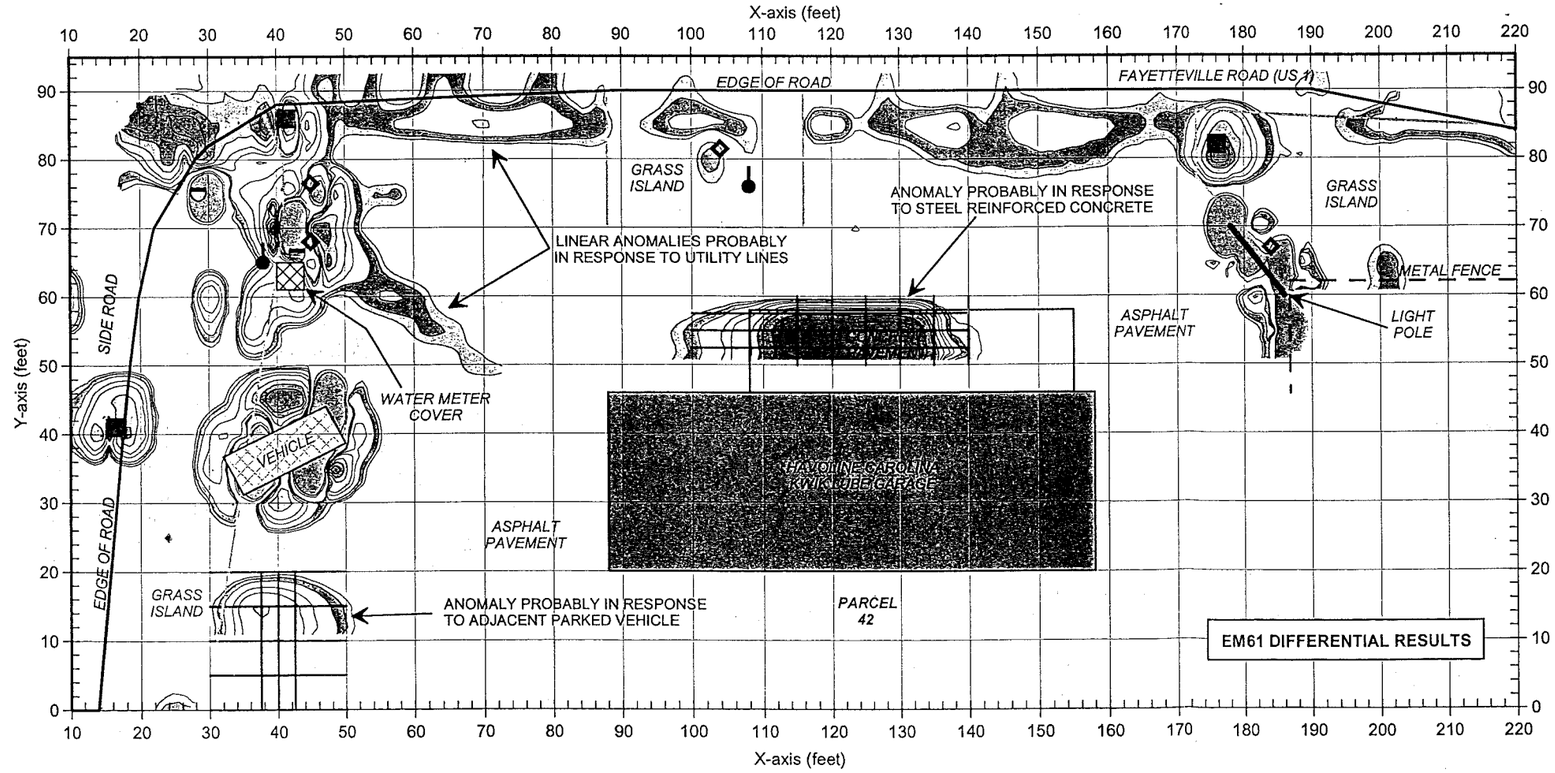
CITY: ROCKINGHAM

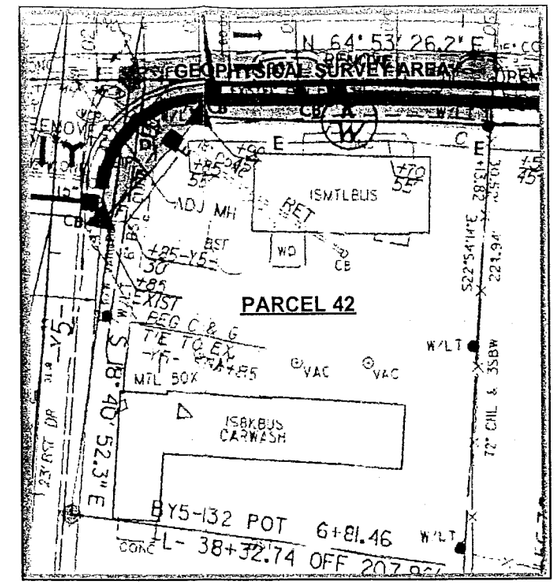
STATE: NORTH CAROLINA

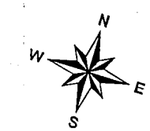
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



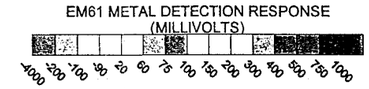




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- METAL SIGN POLE
- STORM SEWER GRATE
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 15, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 14

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

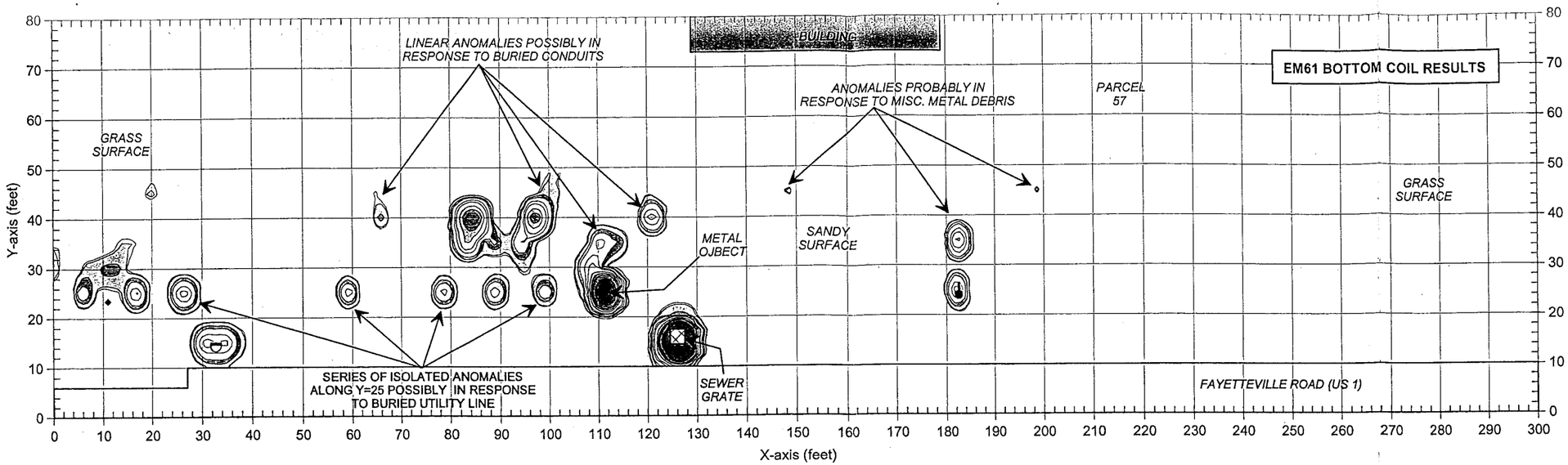
| DRWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |

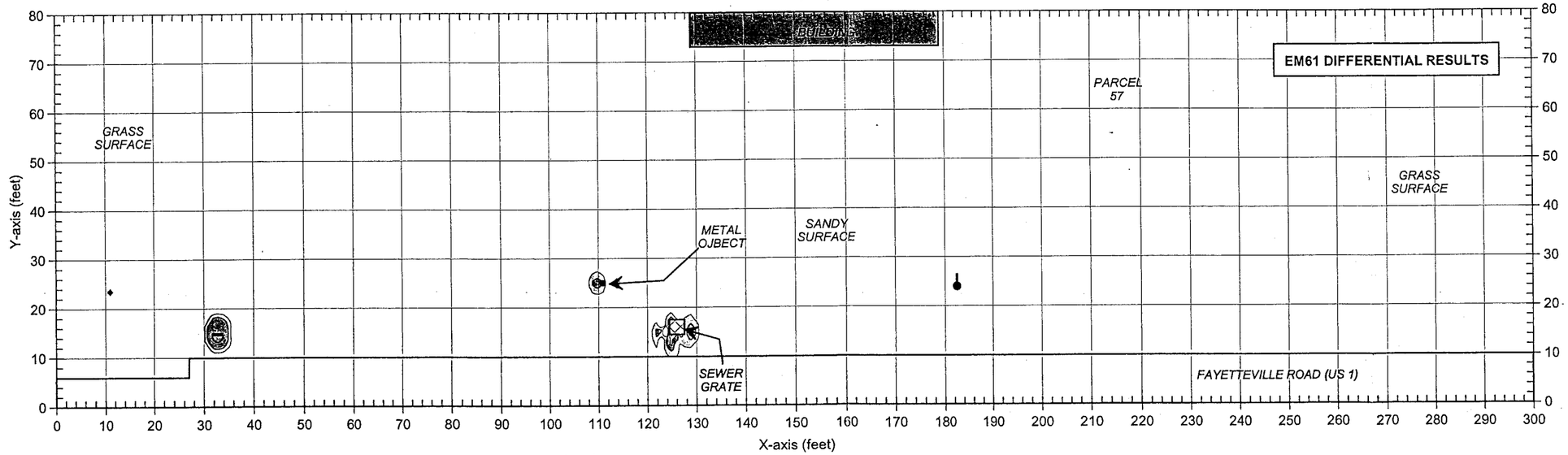
| DATE | DWG | JOB NO. |
|---|---|---|
| 11/26/05 | | 2005-292 |

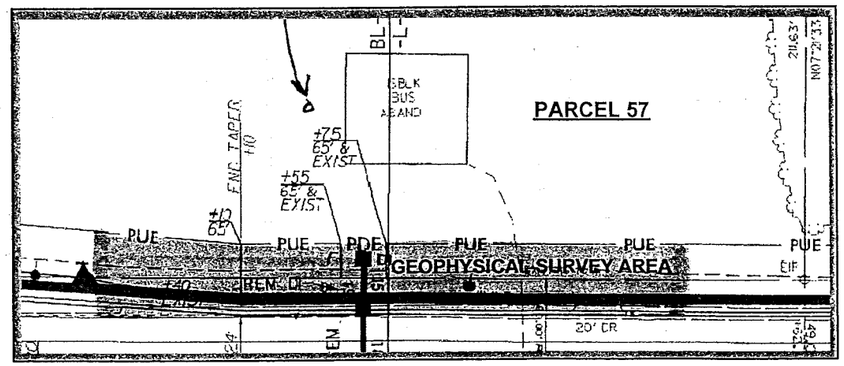
| CLIENT | SITE | CITY | STATE |
|---|---|---|---|
| SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | WESLEY DENHAM PROPERTY (PARCEL 42) | ROCKINGHAM | NORTH CAROLINA |

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-1000 -250 -100 -50 -25 -10 10 25 50 100 250 500 750 1000

N W E S

APPROXIMATE NORTH

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) surveys were not conducted at this site.

FIGURE 15

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/18/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |

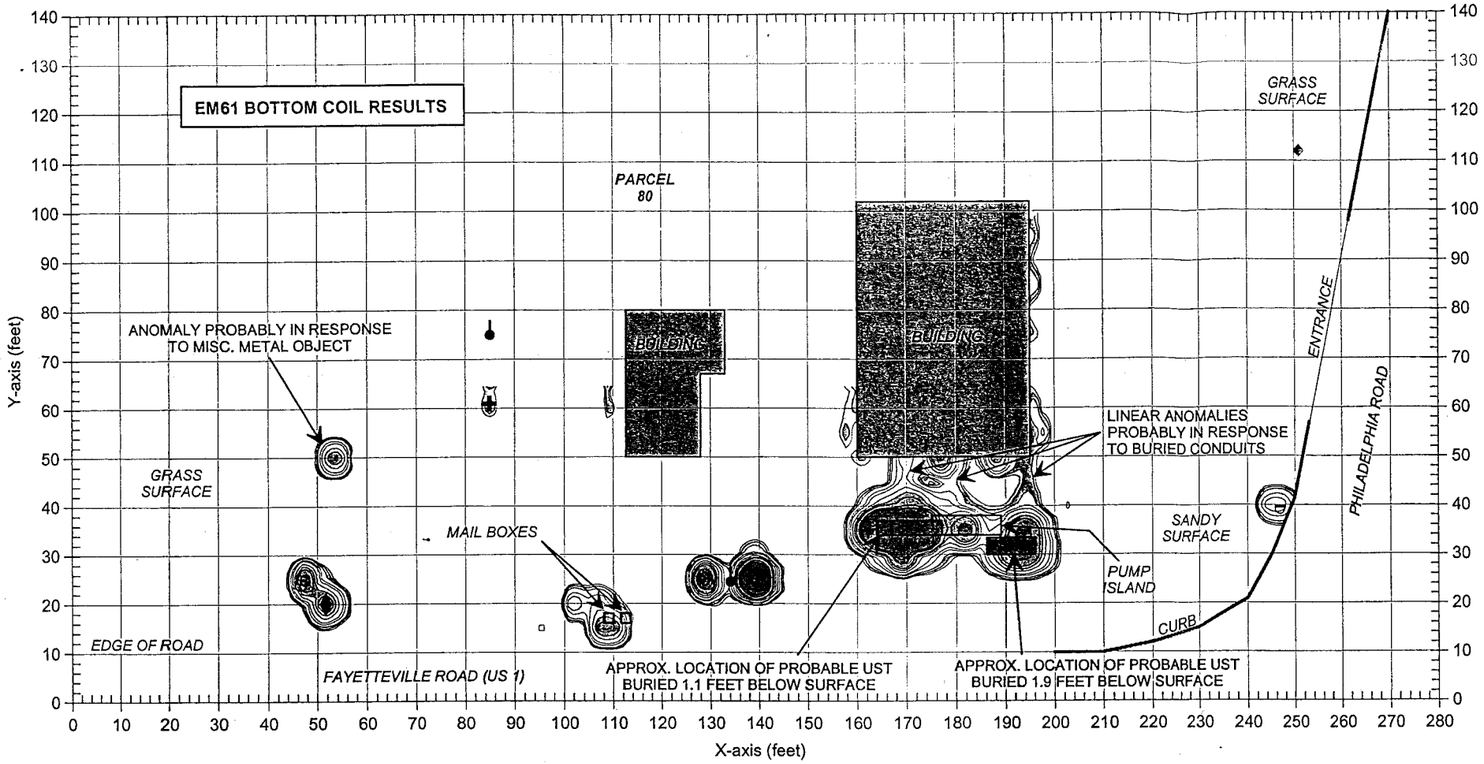
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

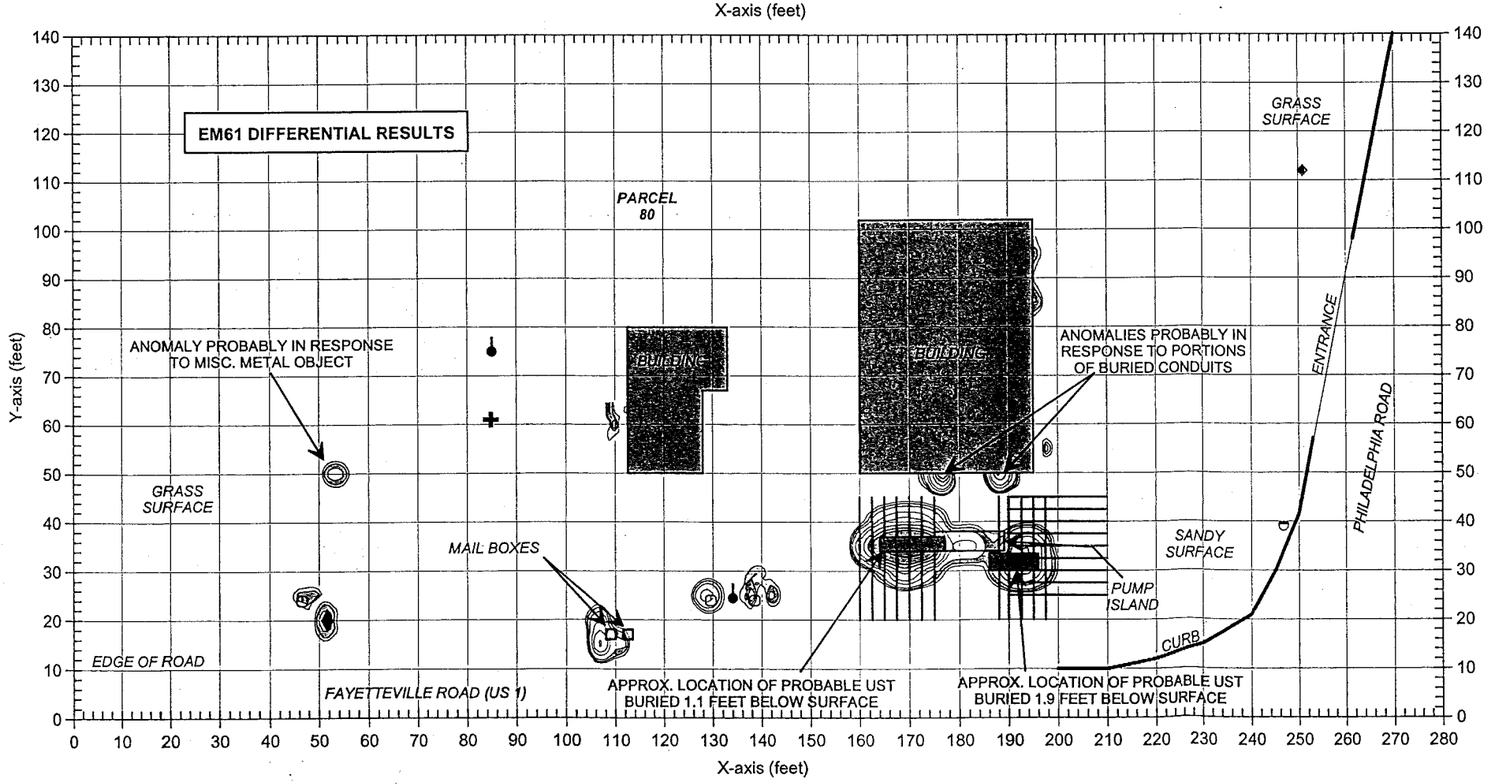
SITE: WILLIAM USSERY PROPERTY (PARCEL 57)

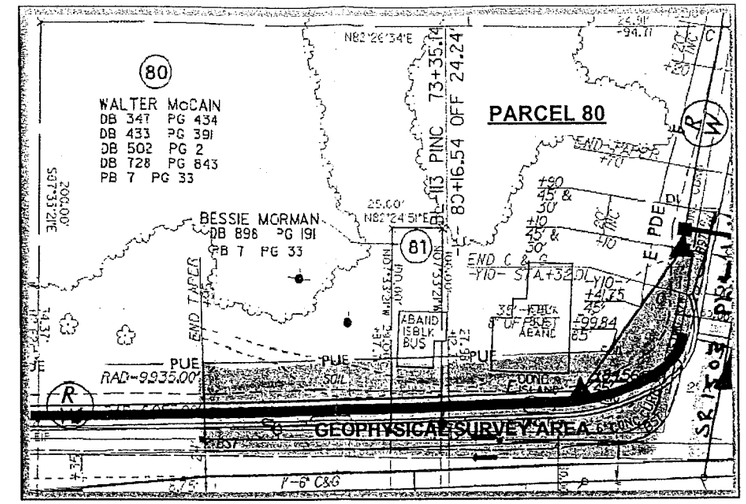
CITY: ROCKINGHAM STATE: NORTH CAROLINA

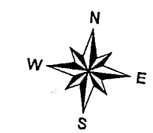
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



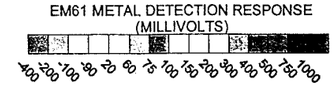




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- FIRE HYDRANT
- TRAFFIC SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 16

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| DRAWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |
| DATE | LAY | DWG | J-NO. |
| 11/25/05 | | | 2005-292 |

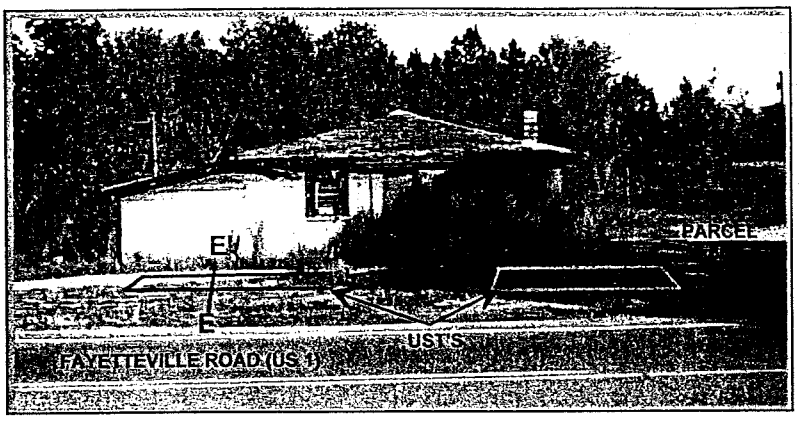
SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

WALTER McCAIN PROPERTY (PARCEL 80)

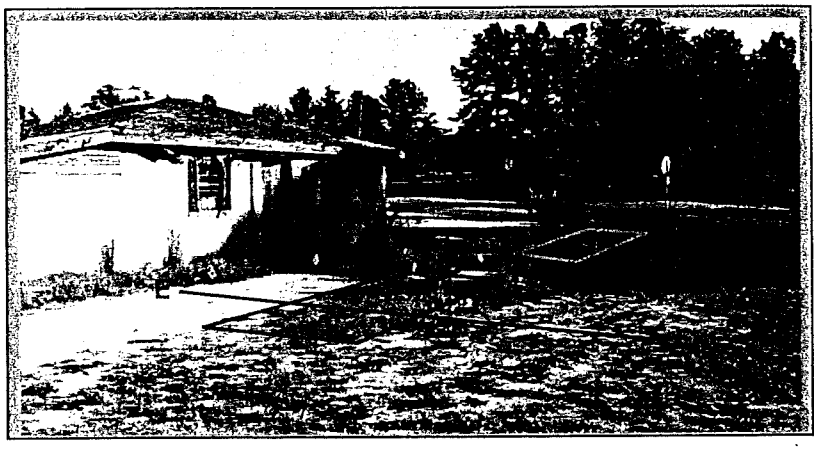
ROCKINGHAM | NORTH CAROLINA

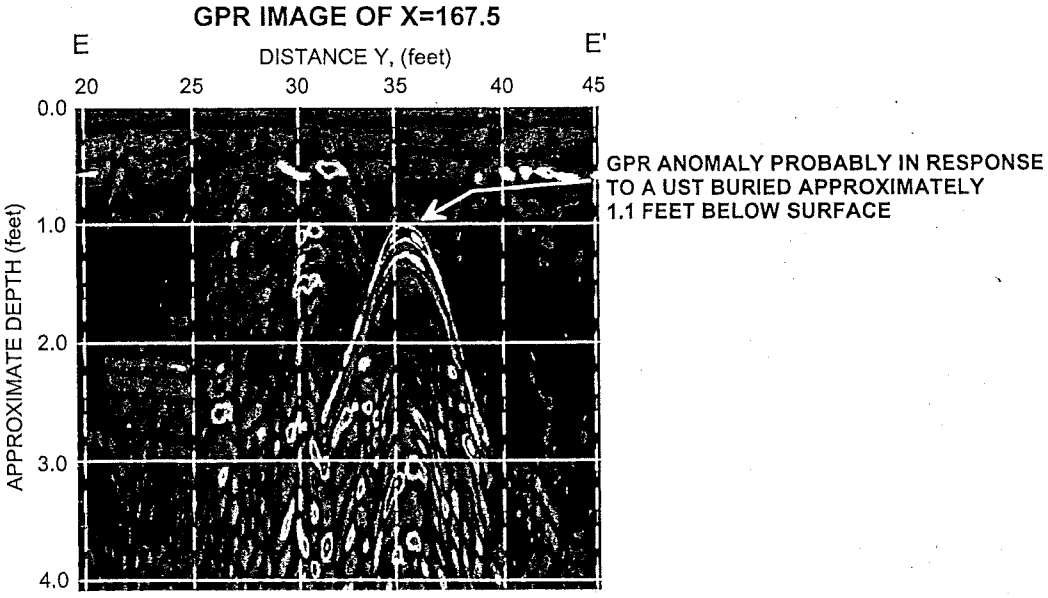
GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




The two photos show the approximate locations of the two probable UST's at Parcel 80, as suggested by the geophysical results. The UST's appear to be buried approximately 1 to 2 feet below surface. A former pump island lies between the two probable UST's.





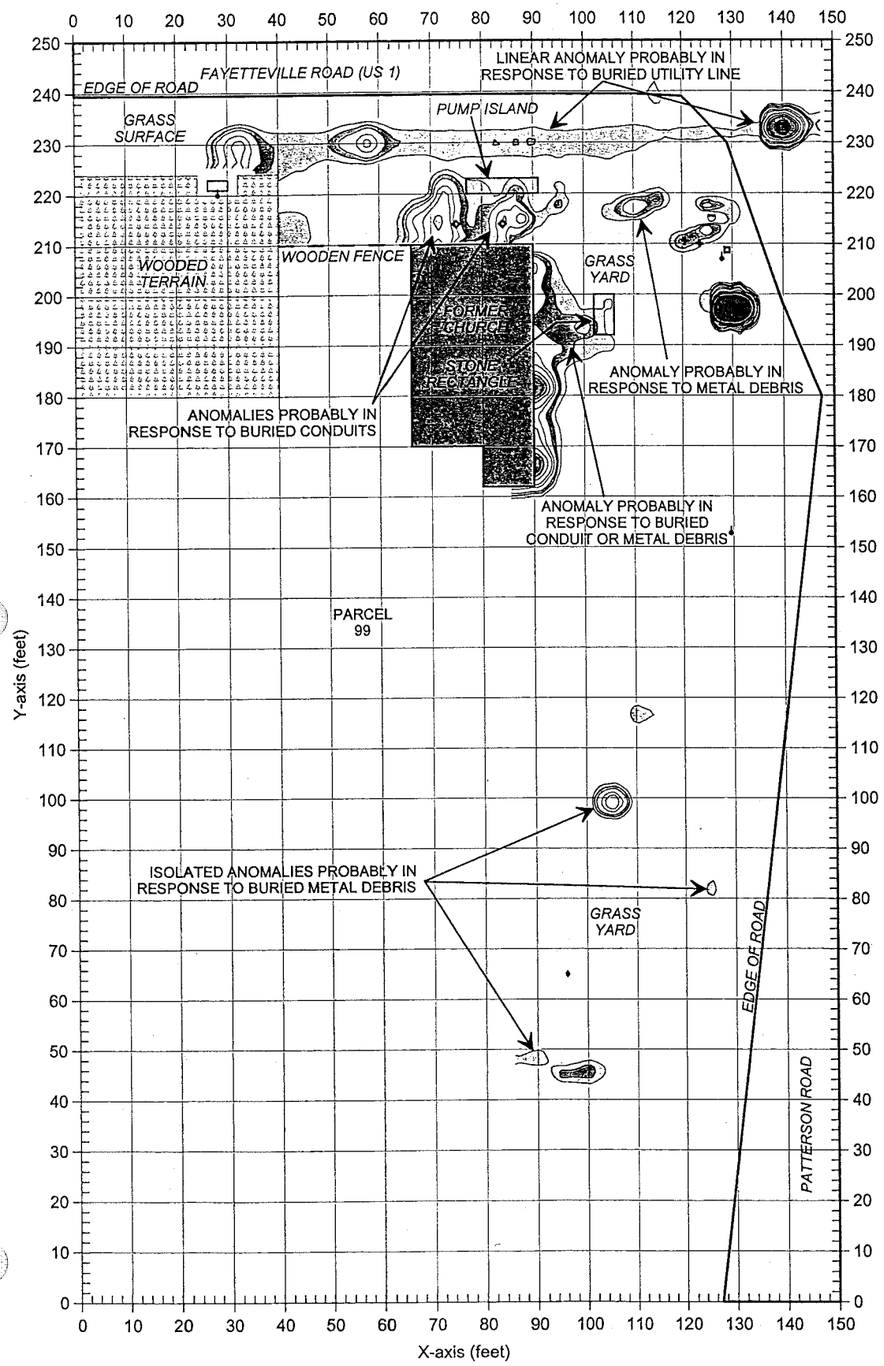

| | | | |
|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE: 11/28/05 | DRWN: |
| | SITE: WALTER McCAIN PROPERTY (PARCEL 80) | LAY: | CHKD: |
| | CITY: ROCKINGHAM / STATE: NORTH CAROLINA | DWG: | |
| | TITLE: GEOPHYSICAL RESULTS | JNO.: 2005-292 | FIGURE: |

GRAPHIC SCALE IN METERS

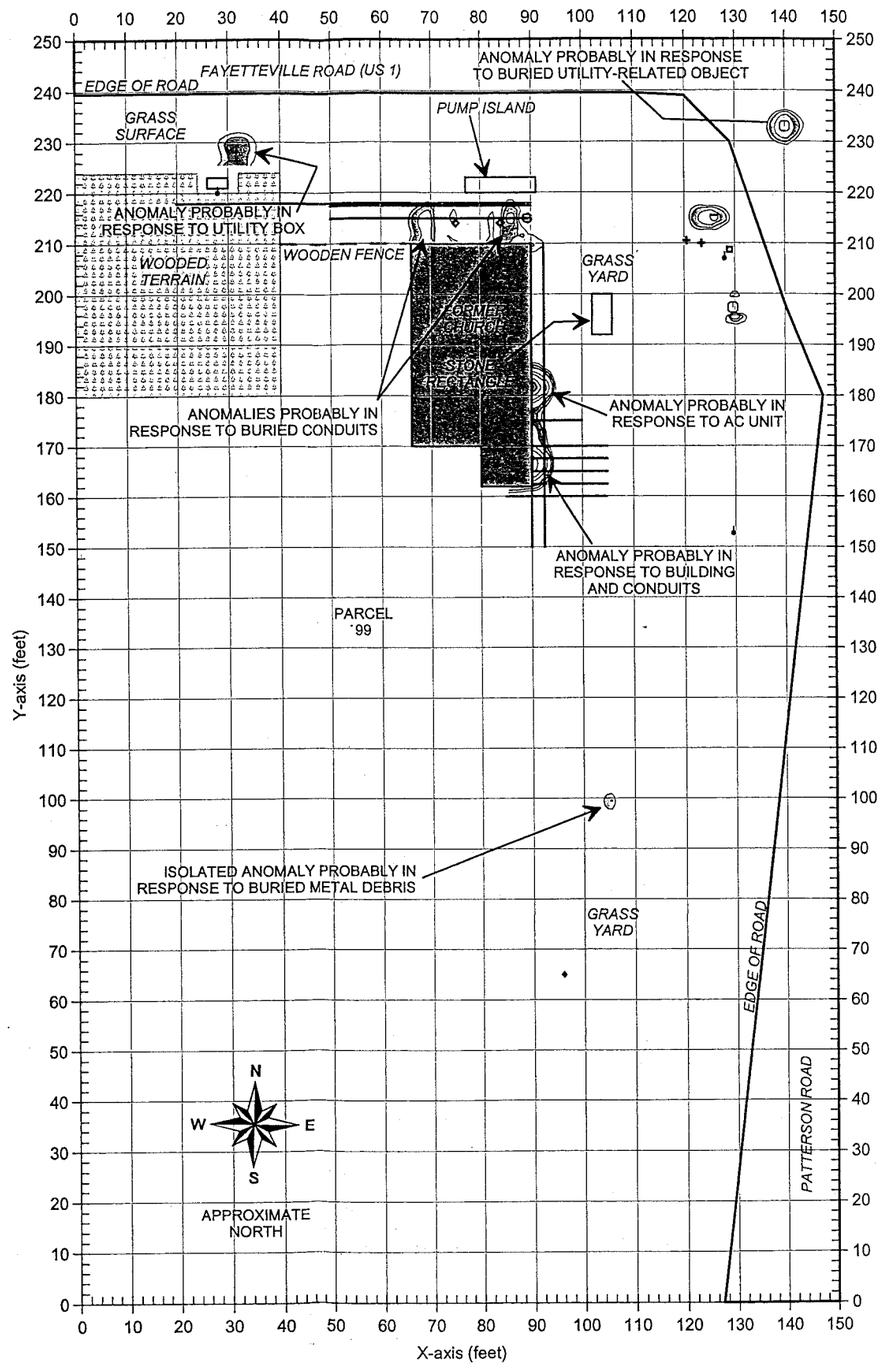
PHOTOS & GPR IMAGE OF UST LOCATIONS

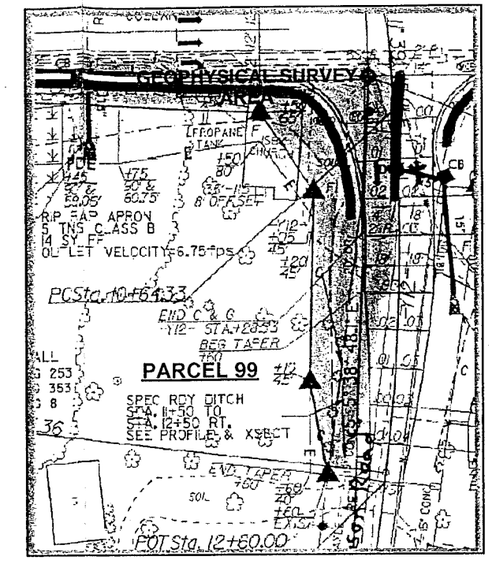
FIGURE 17

## EM61 BOTTOM COIL RESULTS

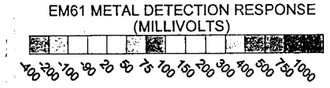



## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CANOPY POLE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 18

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

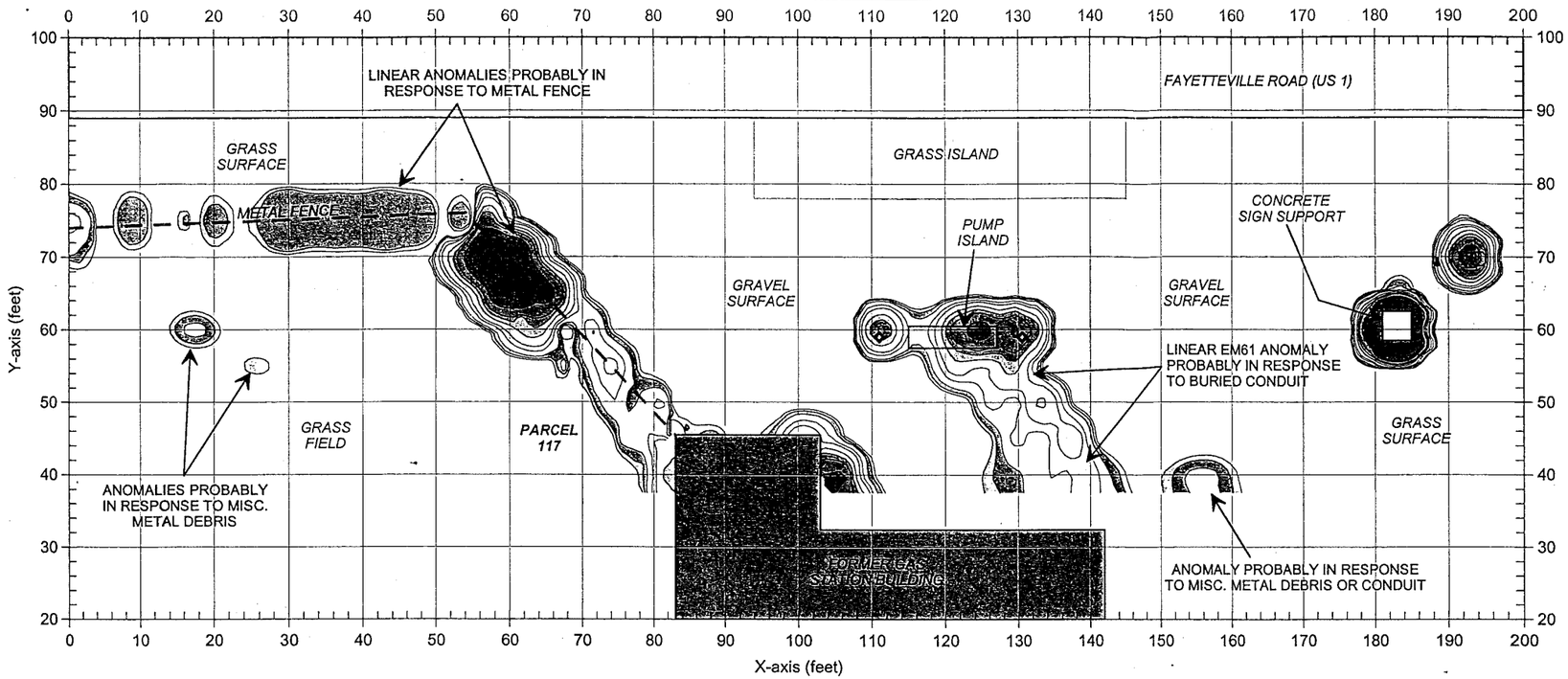
| DATE | DWG | CHKD | DRWN |
|---|---|---|---|
| 11/26/05 | | | MJD |

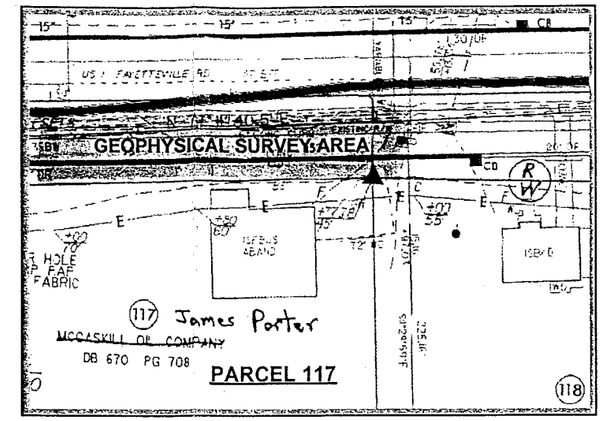
J.NO. 2005-292 FIGURE

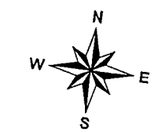
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: LEON WALL PROPERTY (PARCEL 99)
CITY: ROCKINGHAM STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

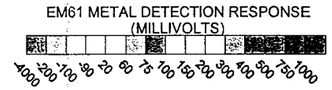


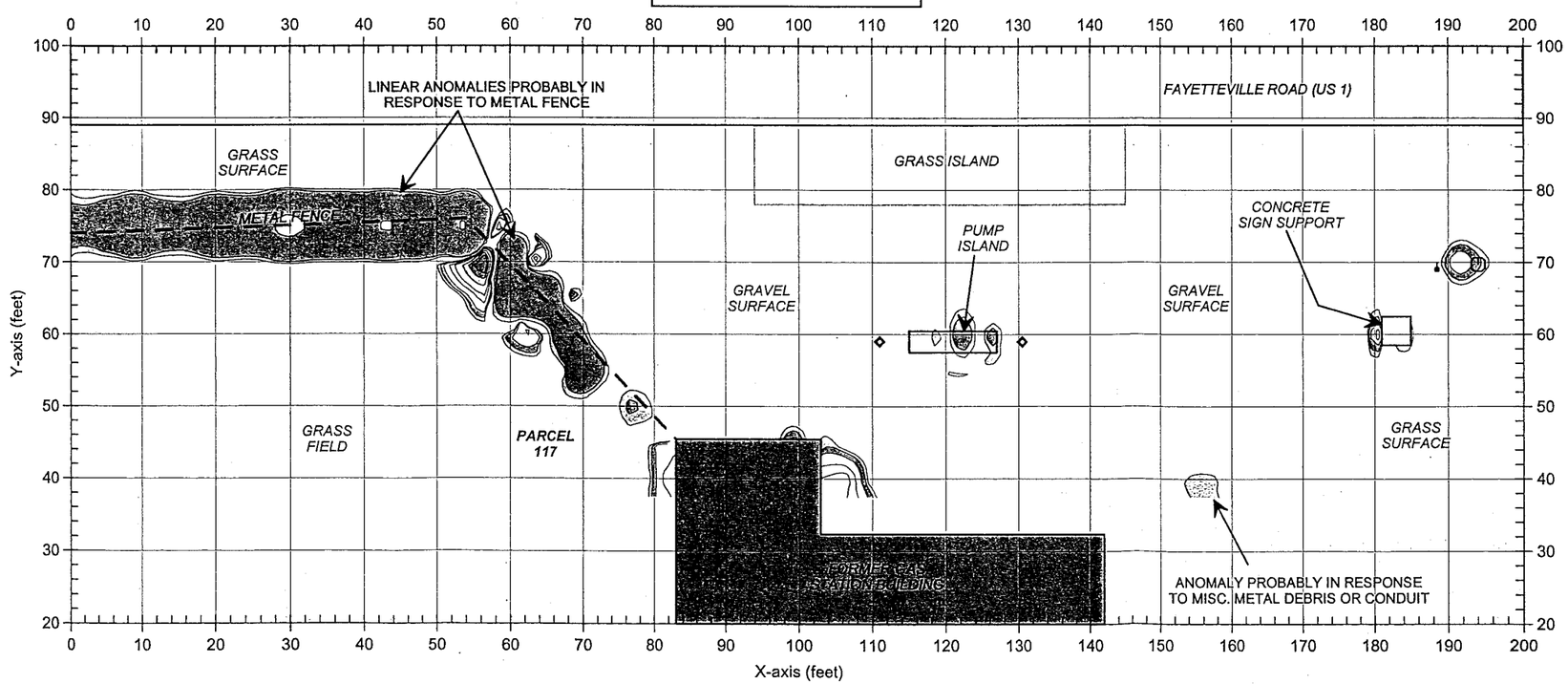




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SUPPORT POLE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar surveys were not conducted at this site.

FIGURE 19

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| DRWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |

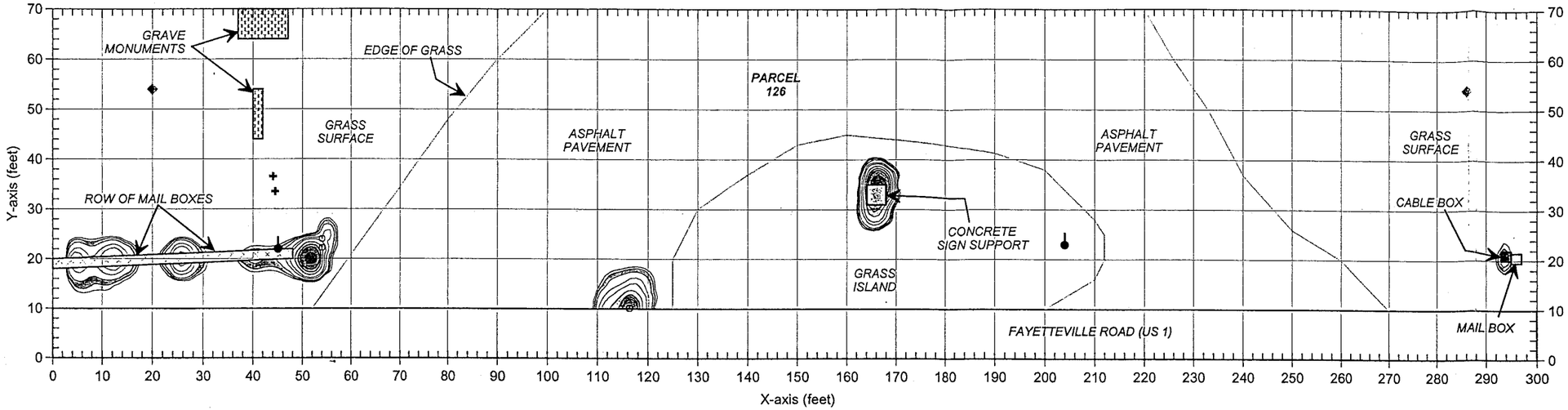
| DATE | LAY | DWG | J.NO. |
|---|---|---|---|
| 11/26/05 | | | 2005-292 |

| CLIENT | SITE | CITY | STATE |
|---|---|---|---|
| SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | JAMES PORTER PROPERTY (PARCEL 117) | ROCKINGHAM | NORTH CAROLINA |

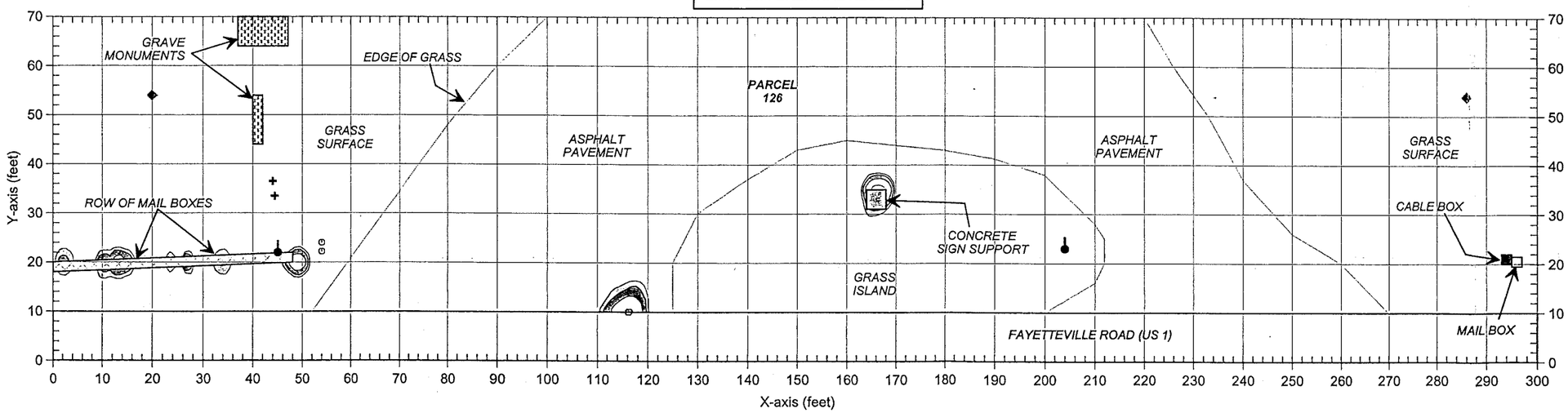
TITLE: GEOPHYSICAL RESULTS

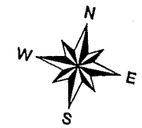
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

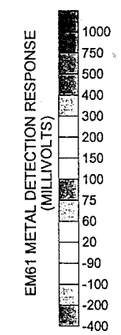


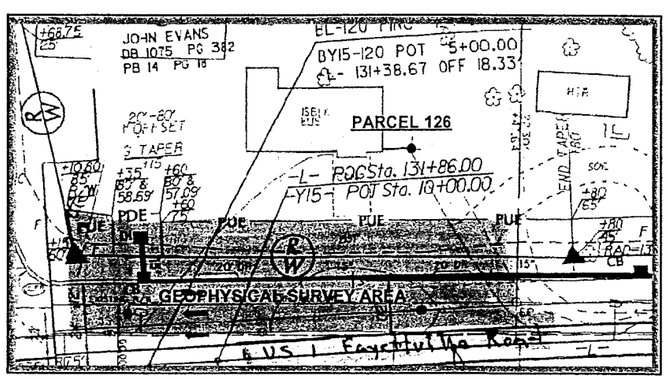

## EM61 DIFFERENTIAL RESULTS




APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- UTILITY POLE
- WATER METER OR VALVE COVER
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- GUY WIRE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size, The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 Instrument. Ground penetrating radar (GPR) data surveys were not conducted at this site

FIGURE 20

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

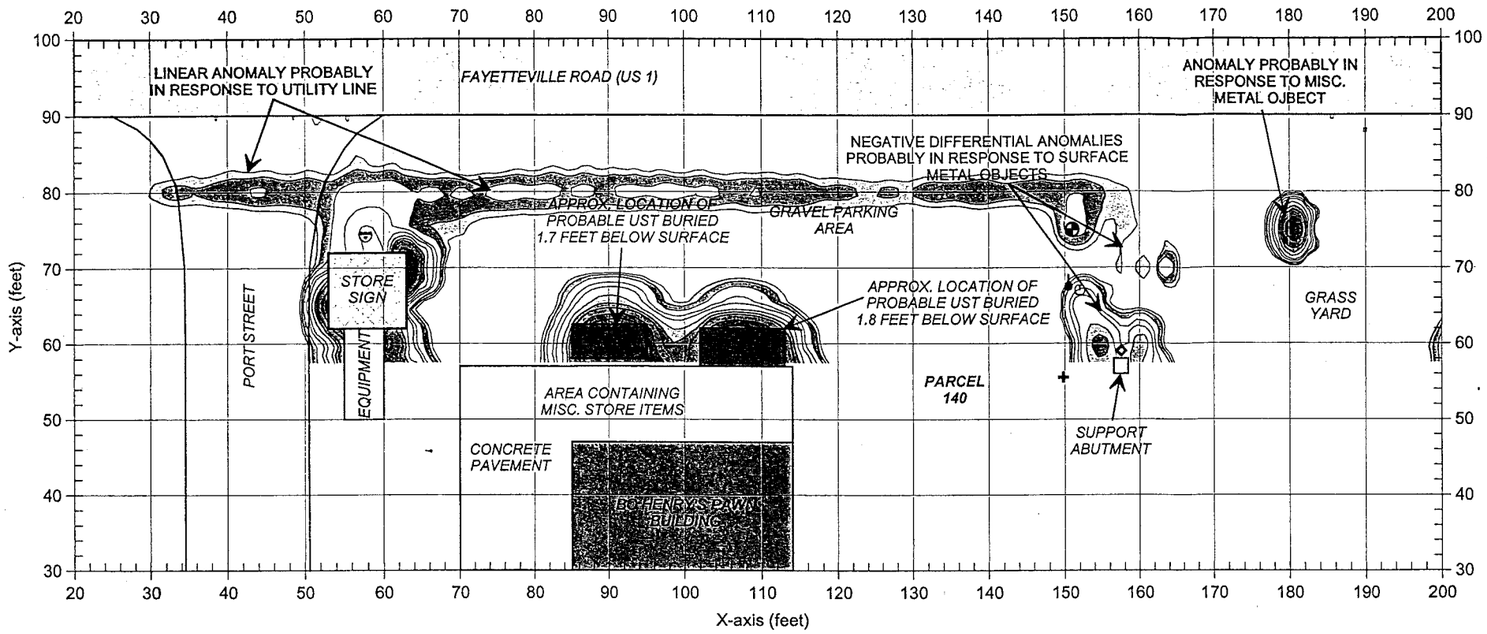
SITE: JOHN EVANS PROPERTY (PARCEL 126)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

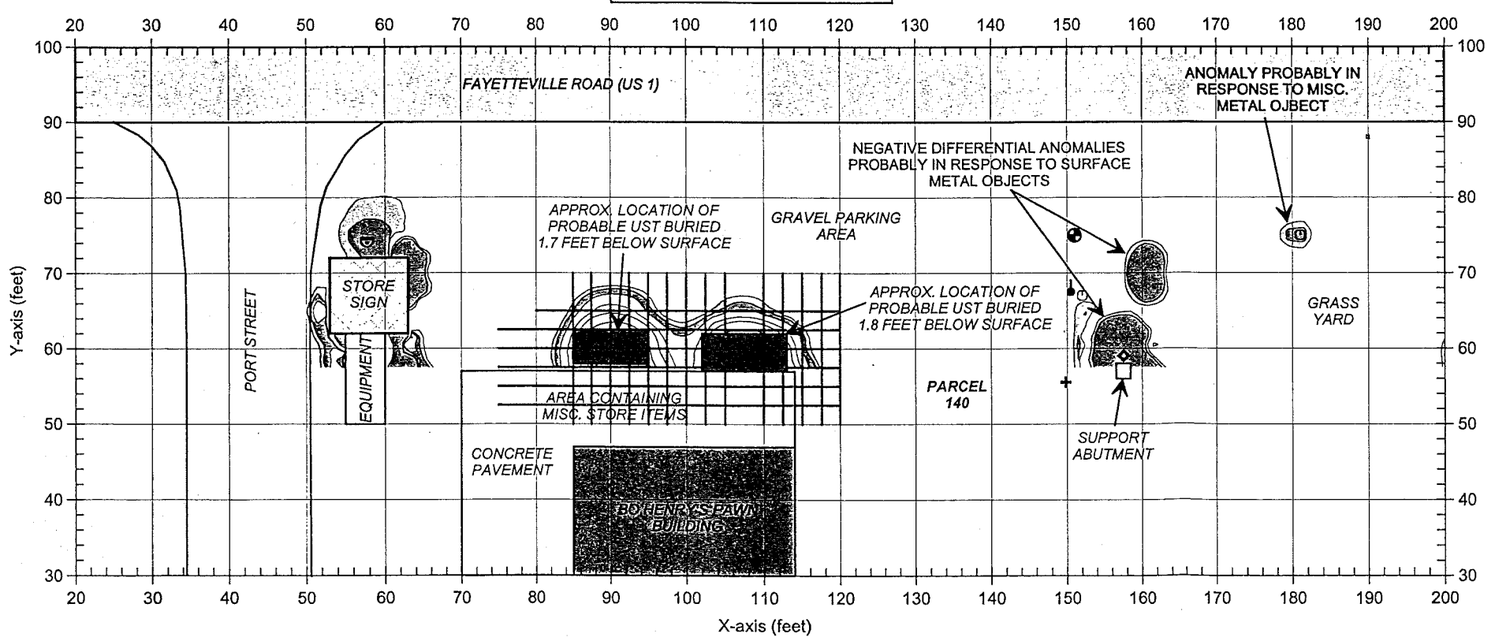
TITLE: GEOPHYSICAL RESULTS

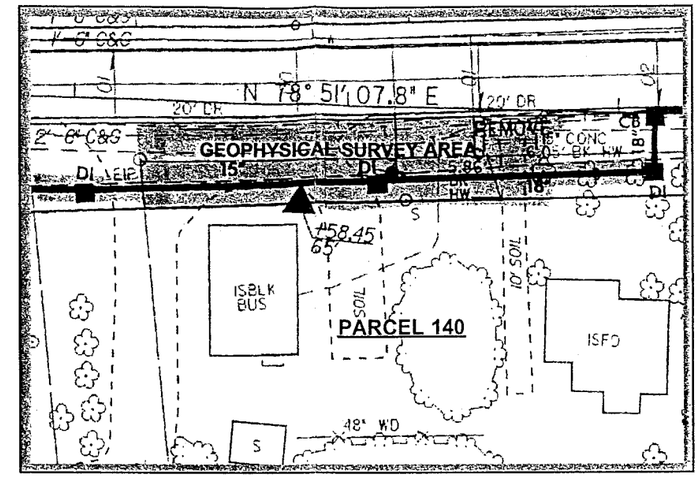
PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

EM61 BOTTOM COIL RESULTS

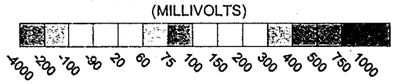


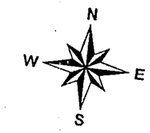

EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




APPROXIMATE NORTH

## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- FIBER OPTIC LINE SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 21

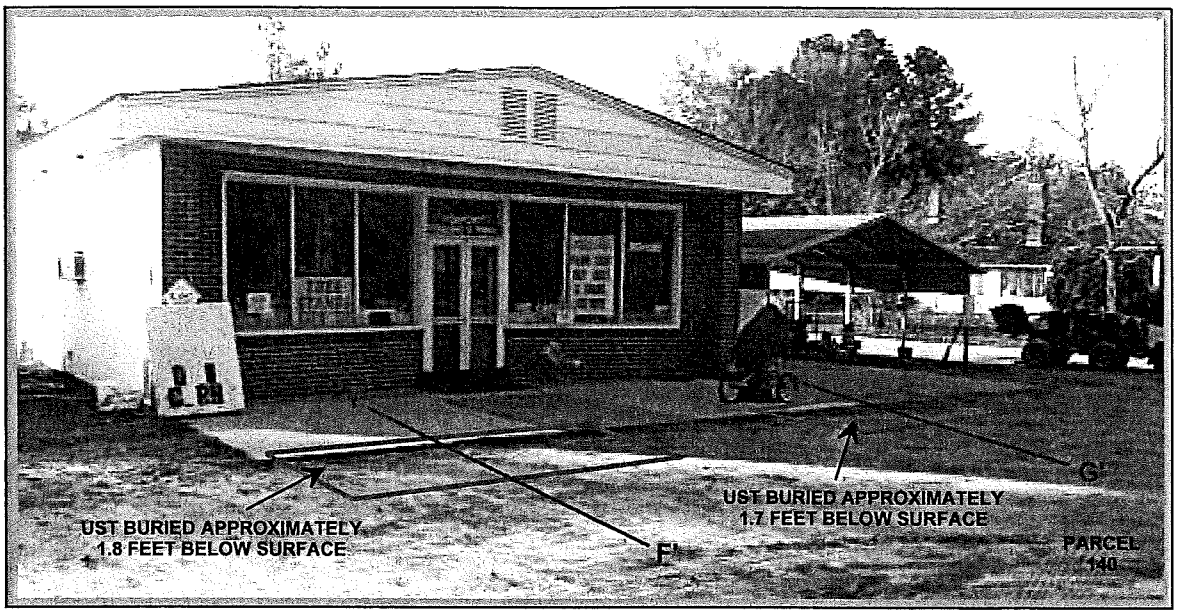
EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

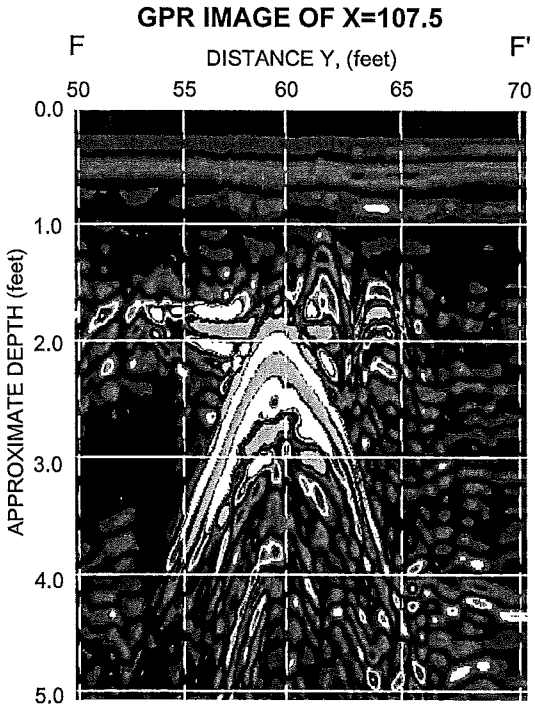
| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

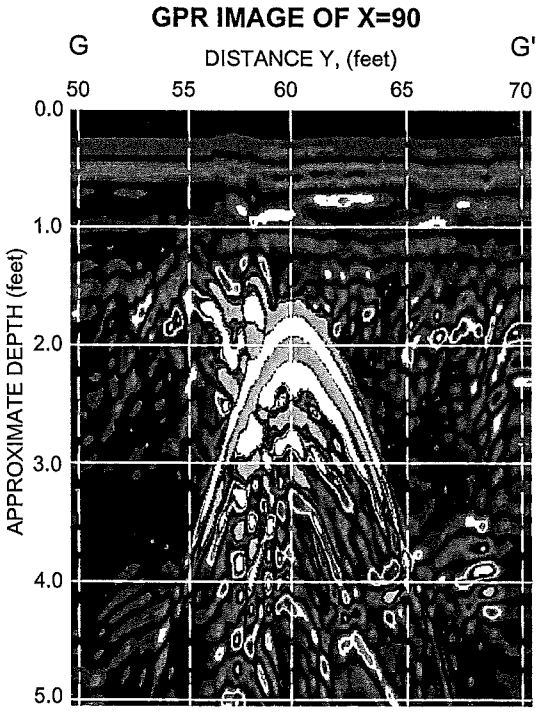
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: HENRY USSERY PROPERTY (PARCEL 140)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approximate locations of the two UST's, as suggested by the geophysical results at Parcel 140. The UST's appear to be approximately 1.8 and 1.7 feet below surface.




The GPR images obtained along survey lines X=107.5 and X=90 show the anomalies that are probably in response to the two UST's buried at Parcel 140. The GPR data suggest the UST's are buried approximately 1.8 feet and 1.7 feet below surface, respectively.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGES OF UST LOCATIONS |
| | SITE: HENRY USSERY PROPERTY (PARCEL 140) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JOB NO.: 2005-292 | FIGURE: | FIGURE 22 |

GRAPHIC SCALE IN METERS

# APPENDIX C

# BORING LOGS

# Log of Soil Boring 4-1

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-1
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH/SM *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen ppm (250 500 750) / FID Field Screen ppm (250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | **SC** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | **SC** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | **SC** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 6–8 | | **SC** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

**Solutions-IES, Inc.**
**1101 Nowell Road**
**Raleigh, NC 27607**
**(919) 873-1060**

Solutions-IES
Industrial & Environmental Services

# Log of Soil Boring 4-2

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-2
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0 | | ***Asphalt*** | | | | | | |
| 1 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 2 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 3 (1 m) | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 5 | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 6 (2 m) | | ***SC*** Dry, tan clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 10 (3 m) | | | | | | | | |
| 13 (4 m) | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 4-3

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-3
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) | FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | | |
| | | ***Asphalt*** | | | | | | | |
| 1 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 59 | | | |
| 2 | | ***SC*** Dry, tan, clayey fine sand, petroleum odor | | MC | 100 | 145 | | | |
| 3 (1 m) | | | | | | | | | |
| 4 | | ***SC*** Dry, tan, clayey fine sand, petroleum odor | | MC | 100 | 9 | | | |
| 5 | | | | | | | | | |
| 6 | | ***SC*** Dry, tan, clayey fine sand, petroleum odor | | MC | 100 | 51 | | | |
| 7 (2 m) | | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | | |
| 9 | | | | | | | | | |
| 10 (3 m) | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 (4 m) | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |

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# Log of Soil Boring 4-4

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-4
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 6–8 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 4-5

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-5
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–2 | SC | Dry, tan/orange, clayey fine sand | | MC | 100 | 28 | | |
| 2–4 | SC | Dry, tan/orange, clayey fine sand | | MC | 100 | 29 | | |
| 4–6 | SC | Dry, gray, clayey fine sand, petroleum odor | | MC | 100 | 85 | | |
| 6–8 | SC | Dry, tan, clayey fine sand, petroleum odor | | MC | 100 | 555 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 4-6

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-6
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH / SW *Total Depth of Boring:* 8 feet

| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm) 250 500 750 / FID Field Screen (ppm) 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| 0 | | Ground Surface | | | | | | |
| 0–2 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | **SC** Dry, gray, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 1 | | |
| 6–8 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 1 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 4-7

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-7
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH / SCK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | | | |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | **SC** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 2 | | |
| 6–8 | | **SC** Dry, tan/orange, clayey fine sand | | MC | 100 | 4 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 4-8

*Project:* Rockingham Sites (Parcel 004) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 4-8
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 12/07/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [signature] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | | | |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, orange, fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 6–8 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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**Raleigh, NC 27607**
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# APPENDIX D

# LABORATORY ANALYTICAL REPORT

Pace Analytical
www.pacelabs.com

**Pace Analytical Services, Inc.**
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

December 20, 2005

Mr. Christopher A. Peoples
NC DOT
Materials & Test Unit
1801 Blue Ridge Road
Raleigh, NC 27607

RE: Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Dear Mr. Peoples:

Enclosed are the analytical results for sample(s) received by the laboratory on December 7, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

Pace Analytical
www.pacelabs.com

**Pace Analytical Services, Inc.**
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Solid results are reported on a dry weight basis

Lab Sample No: 926419938 — Project Sample Number: 92108998-001 — Date Collected: 12/07/05 11:30
Client Sample ID: 4-3(6-8) — Matrix: Soil — Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | ReqLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 14.3 | % | | 12/08/05 12:09 | KDF | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.8 | 12/16/05 23:09 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 62 | % | | 12/16/05 23:09 | KBS | 629-99-2 | | |
| Date Extracted | 12/14/05 | | | 12/14/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.7 | 12/12/05 18:31 | DHW | | | |
| 4-Bromofluorobenzene (S) | 100 | % | | 12/12/05 18:31 | DHW | 460-00-4 | | |



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Fax: 828.252.4618

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419946 | Project Sample Number: 92108998-002 | Date Collected: 12/07/05 11:30
Client Sample ID: 4-5(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 15.5 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.9 | 12/19/05 13:58 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 82 | % | | 12/19/05 13:58 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.5 | 12/10/05 19:38 | DHW | | | |
| 4-Bromofluorobenzene (S) | 95 | % | | 12/10/05 19:38 | DHW | 460-00-4 | | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419953 Project Sample Number: 92108998-003 Date Collected: 12/07/05 11:35
Client Sample ID: 4-6(6-8) Matrix: Soil Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 12.1 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.7 | 12/19/05 14:33 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 78 | % | | 12/19/05 14:33 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.1 | 12/10/05 20:22 | DHW | | | |
| 4-Bromofluorobenzene (S) | 82 | % | | 12/10/05 20:22 | DHW | 460-00-4 | | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

Lab Sample No: 926419961 | Project Sample Number: 92108998-004 | Date Collected: 12/07/05 11:35
Client Sample ID: 4-7(6-8) | Matrix: Soil | Date Received: 12/07/05 15:30

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 15.0 | % | | 12/12/05 09:55 | | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.9 | 12/19/05 15:08 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 78 | % | | 12/19/05 15:08 | KBS | 629-99-2 | | |
| Date Extracted | 12/16/05 | | | 12/16/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.4 | 12/10/05 20:57 | DHW | | | |
| 4-Bromofluorobenzene (S) | 78 | % | | 12/10/05 20:57 | DHW | 460-00-4 | | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 145042 — Analysis Method: EPA 8015
QC Batch Method: EPA 3545 — Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926419938

METHOD BLANK: 926446337
Associated Lab Samples: 926419938

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 62 | | |

LABORATORY CONTROL SAMPLE: 926446345

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 97.66 | 59 | |
| n-Pentacosane (S) | | | | 91 | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 145256 — Analysis Method: EPA 8015
QC Batch Method: EPA 3545 — Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926419946 926419953 926419961

METHOD BLANK: 926454893
Associated Lab Samples: 926419946 926419953 926419961

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 89 | | |

LABORATORY CONTROL SAMPLE: 926454901

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 137.2 | 82 | |
| n-Pentacosane (S) | | | | 98 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926454919 926454927

| Parameter | Units | 926440710 Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | RPD | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 7.728 | 219.50 | 181.9 | 165.2 | 79 | 72 | 10 | |
| n-Pentacosane (S) | | | | | | 101 | 92 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144711 — Analysis Method: EPA 8015
QC Batch Method: EPA 8015 — Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926419938 926419946 926419953 926419961

METHOD BLANK: 926431222
Associated Lab Samples: 926419938 926419946 926419953 926419961

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 70 | | |

LABORATORY CONTROL SAMPLE: 926431230

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 27.78 | 111 | |
| 4-Bromofluorobenzene (S) | | | | 75 | |

MATRIX SPIKE: 926431248

| Parameter | Units | 926419839 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 0.03725 | 20.55 | 24.16 | 117 | |
| 4-Bromofluorobenzene (S) | | | | | 76 | |

SAMPLE DUPLICATE: 926431255

| Parameter | Units | 926419854 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 5.000 | 5.300 | 6 | |
| 4-Bromofluorobenzene (S) | % | 96 | 88 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144560 — Analysis Method: % Moisture
QC Batch Method: — Analysis Description: Percent Moisture
Associated Lab Samples: 926419938

SAMPLE DUPLICATE: 926422742

| Parameter | Units | 926422221 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 24.30 | 24.50 | 1 | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

QC Batch: 144771 — Analysis Method: % Moisture
QC Batch Method: — Analysis Description: Percent Moisture
Associated Lab Samples: 926419946 926419953 926419961

SAMPLE DUPLICATE: 926435561

| Parameter | Units | 926432873 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 16.20 | 20.90 | 25 | |



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Lab Project Number: 92108998
Client Project ID: NCDOT 34950.1.1 Parcel 4

## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |



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# PRELIMINARY SITE ASSESSMENT
# PARCEL 057, WILLIAM USSERY PROPERTY
# FAYETTEVILLE ROAD (US HIGHWAY 1)
# ROCKINGHAM, NORTH CAROLINA
# NC DOT PROJECT: U-3456
# WBS ELEMENT: 34950.1.1

**Prepared for:**
**NC Department of Transportation**
**Geotechnical Engineering Unit**
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

**Prepared by:**
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**Solutions-IES Project No. 2730.05A2.NDOT**

Brian M. Rebar
Field Services Manager

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Project Manager

NORTH CAROLINA PROFESSIONAL SEAL 022585 ENGINEER SHERI LANE KNOX 12/22/05

**December 22, 2005**

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TABLE 2 – SUMMARY OF SOIL ANALYTICAL RESULTS

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FIGURE 2 – SITE MAP

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APPENDIX A – PHOTOGRAPHS

APPENDIX B – GEOPHYSICAL DATA

APPENDIX C – BORING LOGS

APPENDIX D – LABORATORY ANALYTICAL REPORTS

## 1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening Fayetteville Road (US-1) in Rockingham, Richmond County, North Carolina. The project will require the NCDOT to acquire additional property for new roadway construction. On November 3, 2005, Solutions-IES submitted a proposal to conduct Preliminary Site Assessments (PSAs) for 14 parcels of land that contain or reportedly contained underground storage tanks (USTs) or are areas of concern identified by NCDOT. This report summarizes the results of field and laboratory activities conducted during the PSA of the William Ussery property located on the north side of Fayetteville Road approximately 0.1 mile east of Old Aberdeen Road (Parcel 057). The location of the parcel is shown on Figures 1 and 2. The scope of work was performed as outlined in Solutions-IES proposal NC05449P.

## 2.0 BACKGROUND AND SITE DESCRIPTION

Parcel 057 borders the north side of Fayetteville Road, just east of the Old Aberdeen Road intersection. The proposed right-of-way will require acquisition of part of the property. A vacant building currently stands on the parcel. According to the property owner, the facility never operated as a gas station. However, there is an oil changing pit inside the building and a waste oil UST located on the west side of the building approximately 111 feet from the centerline of Fayetteville Road. The vacant building and waste oil UST are located north and outside of the study area (Figure 2). Photographs of the site are included in Appendix A.

## 3.0 FIELD ACTIVITIES

Prior to beginning subsurface sampling, Solutions-IES contacted the North Carolina One Call Center to locate underground utilities at the site. Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electro-magnetic survey of the subsurface in the proposed right-of-way and easement area. The survey was performed on November 12, 2005. The electromagnetic survey (EM61) did not identify any USTs in the study area. Ground penetrating radar (GPR) surveys were not performed because suspect anomalies were not identified by the electromagnetic survey. Images of the EM61 findings are included as Figure 15 in Appendix B. After a review of the geophysical report, Solutions-IES mobilized to the site on November 28, 2005 to collect soil samples from the proposed right-of-way. Seven soil borings were advanced at the site to a depth of 8 feet below ground surface (ft bgs) using a Geoprobe®. The borings were spaced approximately 50 feet apart except for boring SB-5 (Sample ID 57-5), which was located in the vicinity of a proposed drop inlet for the future drainage pipe (Figure 3).

A MacroCore® sampler fitted with a dedicated polyvinyl chloride (PVC) liner was used to collect samples at 4-foot intervals. Each soil sample was split into two aliquots. Each aliquot was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the other bag was sealed and placed at ambient temperature for field screening with a flame ionization detector (FID). After approximately 20 minutes to allow accumulation of volatile organic compounds (VOCs) in the headspace of the bag, each sealed bag was scanned with the FID. The FID readings were rounded to the nearest whole number and entered on the boring logs along with the soil description and any indications of petroleum staining or odor (Appendix C).

The subsurface soil at the site consisted primarily of fine sand (Borings 57-1 through 57-6) to boring termination (Unified Soil Classification SP). However, clayey fine sand was encountered in Boring 57-7. Groundwater was encountered in boring 57-7 at a depth of 7.5 ft bgs, but due to standing water at the site and the clayey soils present, this water is likely to be perched and not representative of the groundwater.

Headspace screening of the soils from the site ranged from 0.0 to 0.6 parts per million (ppm). The FID readings are summarized on Table 1. The two soil samples with the highest FID readings were submitted for laboratory analysis (57-1 and 57-2). Soil boring 57-1 displayed an FID measurement of 0.3 ppm in the sample collected from 6-8 ft bgs. An FID reading of 0.6 ppm was measured in soil boring 57-2 in the sample collected from 4-6 ft bgs. The samples were placed in laboratory-supplied containers and stored on ice pending shipment to Pace Analytical Services, Inc. (Pace) in Huntersville, NC using chain-of-custody procedures. The samples were submitted for analysis of gasoline range organics (GRO) and diesel range organics (DRO) total petroleum hydrocarbons (TPH) by EPA Modified Method 8015 with preparation methods 5030 and 3545, respectively.

## 4.0 LABORATORY RESULTS

According to the laboratory analytical results, concentrations of TPH (GRO and DRO) were not detected in either of the soil samples analyzed above the standard. The analytical results are summarized in Table 2, and the laboratory reports for the soil samples are included in Appendix D.

## 5.0 DISCUSSION AND CONCLUSSIONS

Solutions-IES advanced seven soil borings at parcel 057 to a depth of 8 ft bgs within the study area. The highest FID reading (0.6 ppm) was measured in the sample collected from boring 57-2 at a depth of 4-6 ft

bgs. Laboratory analytical data for the collected soil samples (57-1 and 57-2) did not indicate concentrations of TPH (GRO or DRO) above the laboratory method detection limits.

Laboratory data and field observations do not indicate a release of petroleum hydrocarbons at the site. Therefore, Solutions-IES does not recommend additional assessment activities at this time.

# TABLES

**TABLE 1**
**SUMMARY OF FIELD SCREENING RESULTS FOR SOIL**
**Parcel 057 – William Ussery Property**
**Intersection of Old Aberdeen Road and Fayetteville Road, Rockingham, North Carolina**
**State Project: U-3456 WBS Element: 34950.1.1**
**November 28, 2005**

| Sample Depth Below Ground Surface | Soil Borings | | | | | | |
|---|---|---|---|---|---|---|---|
| | 57-1 | 57-2 | 57-3 | 57-4 | 57-5 | 57-6 | 57-7 |
| | FID Reading (ppm) | | | | | | |
| 0 - 2 feet | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 - 4 feet | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 - 6 feet | 0.1 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 6 - 8 feet | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |

Notes:

1. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
2. Samples denoted by shaded cells were submitted for laboratory analysis.

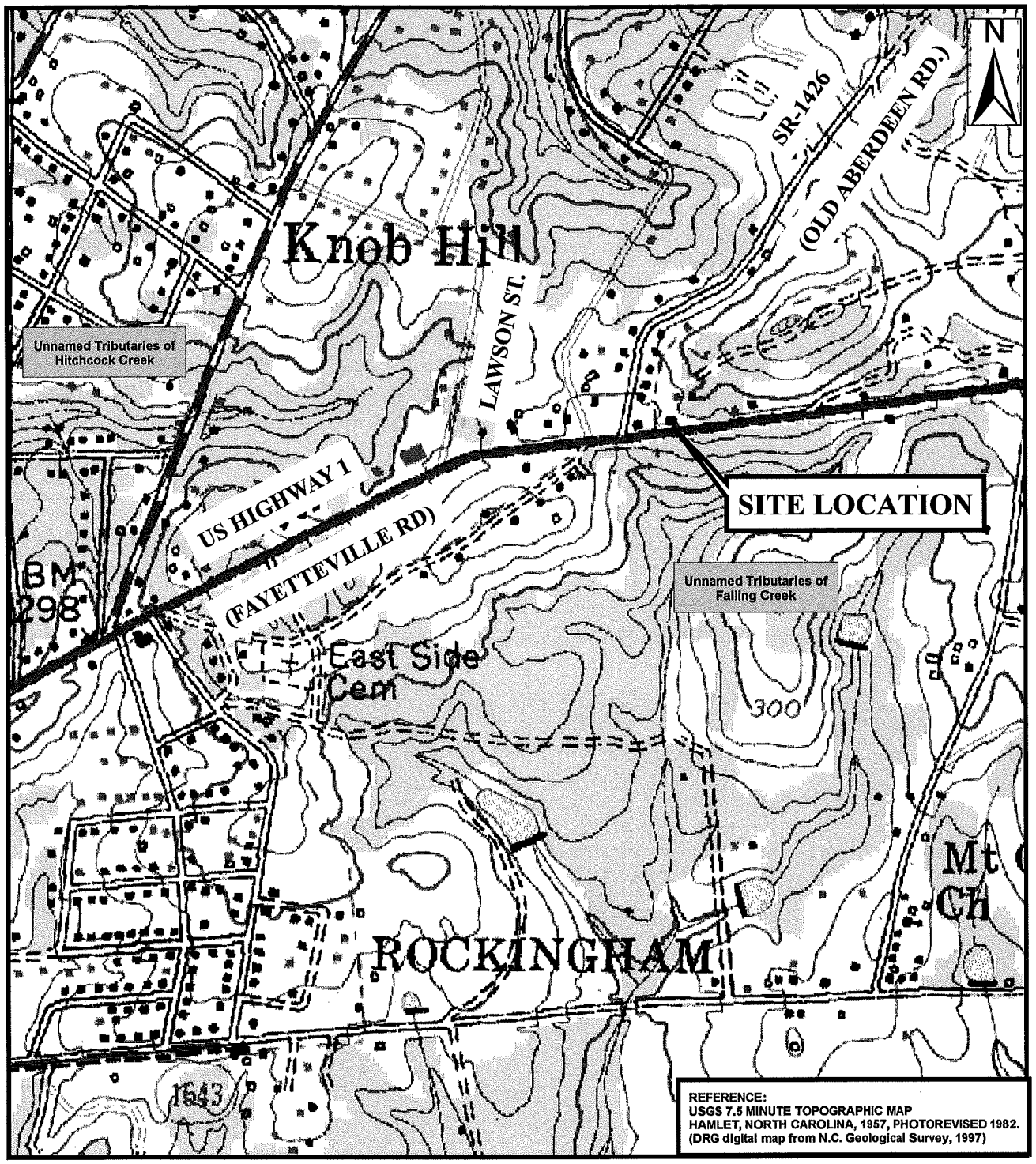
**TABLE 2**
**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 057 – William Ussery Property**
**Intersection of Old Aberdeen Road and Fayetteville Road, Rockingham, North Carolina**
**State Project: U-3456 WBS Element: 34950.1.1**
**November 28, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 57-1 | 6-8 | <4.8 | <5.4 |
| 57-2 | 4-6 | <4.6 | <5.2 |

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons

# FIGURES




1:10,000

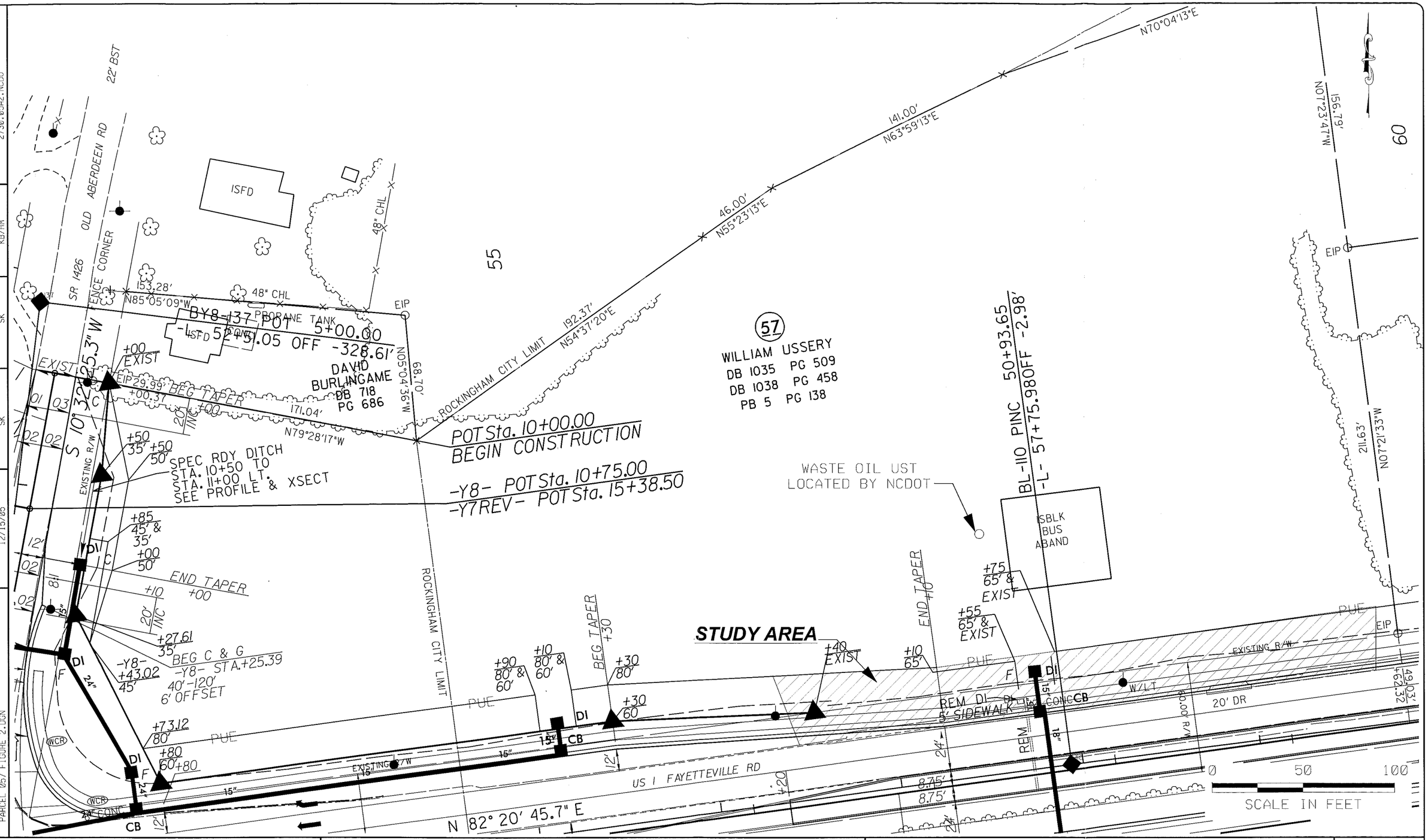
SITE LOCATION MAP
PARCEL 057 - WILLIAM USSERY PROPERTY
FAYETTEVILLE ROAD (US HIGHWAY 1)
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA

Solutions
Industrial & Environmental Services

1101 Nowell Road, Raleigh, NC 27609
Phone (919) 873-1060, Fax (919) 873-1074

| | | | |
|---|---|---|---|
| Created by: KBB<br>Checked by: BR<br>File: FIG1.mxd<br>Software: ESRI ArcMap 9.0 | | Project: 2730.05A2.NCDO<br>Date: 12/15/05 | |
| | | FIGURE | 1 |

PROJECT NUMBER 2730.05A2.NCDO
DRAFTER KB/HM
CHECKED BY SK
PROJECT MANAGER SK
DATE 12/15/05
FILE PARCEL 057 FIGURE 2.DGN





Solutions-IES
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1101 NOWELL ROAD
RALEIGH, NORTH CAROLINA 27607
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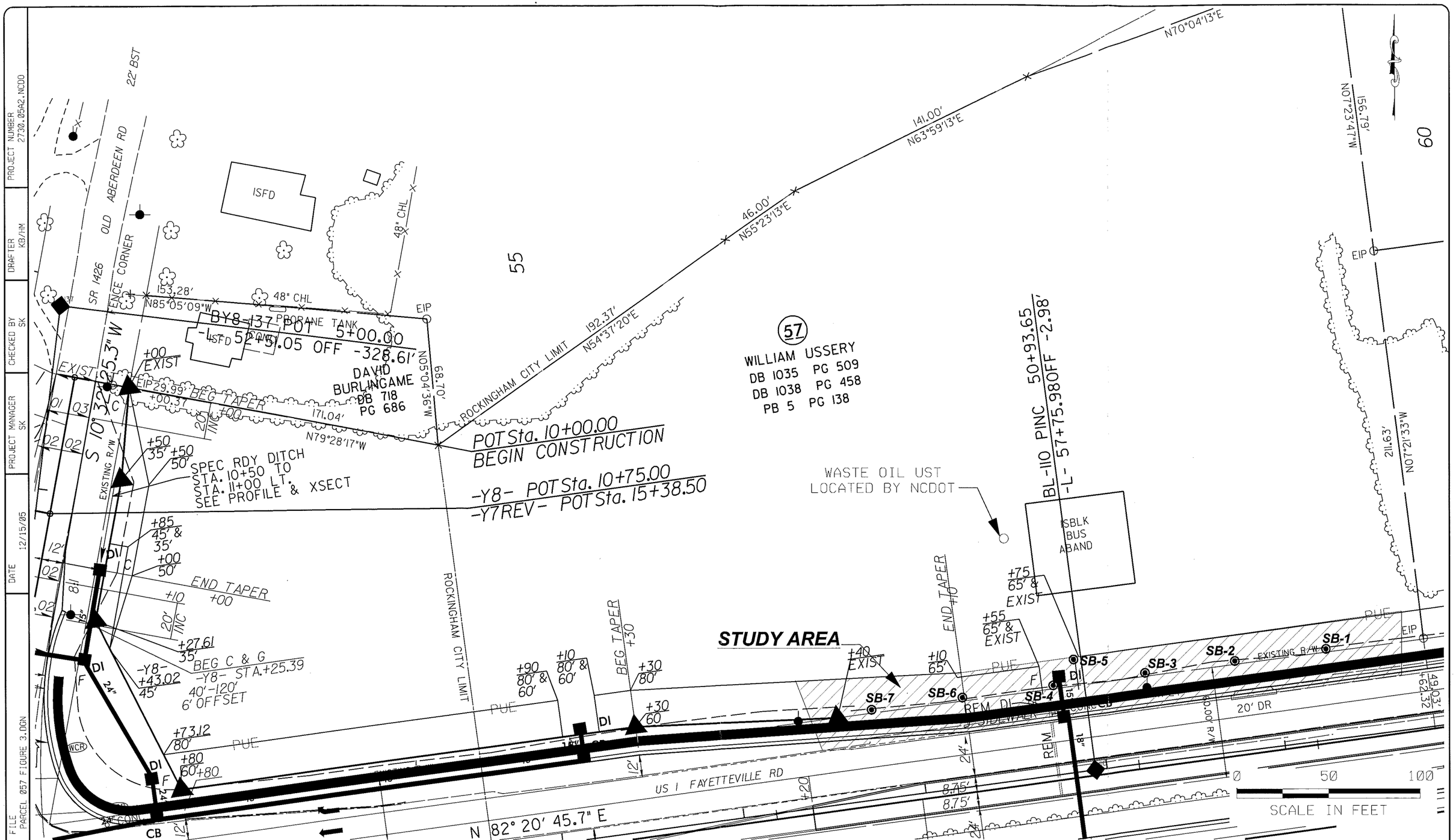
SITE MAP
PARCEL 057 - WILLIAM USSERY PROPERTY
FAYETTEVILLE ROAD (US HIGHWAY 1)
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA

FIGURE: 2

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SOIL BORING LOCATIONS
PARCEL 057 - WILLIAM USSERY PROPERTY
FAYETTEVILLE ROAD (US HIGHWAY 1)
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA

FIGURE: 3

# APPENDIX A

# PHOTOGRAPHS

**Photograph 1** - Looking east at Parcel 057, boring locations are marked with orange flags.

**Photograph 2** - Looking west at Parcel 057, boring locations are marked with orange flags.

# APPENDIX B

# GEOPHYSICAL DATA

Pyramid Project # 2005292

# GEOPHYSICAL INVESTIGATION REPORT

*GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S*

## Rockingham, US 1 (Fayetteville Road) Sites

**Rockingham, North Carolina**
**State Project Number U-3456**

**November 30, 2005**

**Report prepared for:** Sheri Knox & Daniel Hirth
Solutions Industrial & Environmental Services Inc.
1101 Nowell Rd.
Raleigh, NC 27607

**Prepared by:** _____
Douglas Canavello, PG

**Reviewed by:** _____
Brett S. Higgins


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**GREENSBORO, NC 27401**
**(336) 335-3174**

**Solutions Industrial & Environmental Services Inc.**
**GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S**
**Rockingham, US 1 (Fayetteville Road) Sites**
**State Project Number U-3456**

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## 1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions Industrial & Environmental Services, Inc. during the period of November 11-23, 2005, within the proposed Right-of-Way (ROW) areas at 13 sites in Rockingham, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3456 and WBS Element 34950.1.1. The sites are located along the north or south sides of US 1 (Fayetteville Road) from 0.25 miles west of SR-1424 (Roberdell Road) to 0.25 miles west of SR 1640 (Wiregrass Road). The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Mr. Walt Beckwith, PG provided maps during the week of November 1, 2005 that outlined the geophysical survey areas of each site. Solutions IES representatives, Ms. Sheri Knox, PE and Mr. Daniel Hirth, PG provided guidance during the geophysical investigations. Geophysical surveys were conducted at the following 13 sites:

| Property Owner | Parcel | Present Use of Property |
|---|---|---|
| W. J. Barnhart Property | (Parcel 4) | Used Car Lot & Auto Repair Garage |
| Julia M. Ratliff Property | (Parcel 7) | Vacant Lot |
| Samuel D. Tanner Property | (Parcel 15) | Vacant Building & Lot |
| Harvey E. Melton Property | (Parcel 17) | BP Gas Station |
| Samuel D. Tanner Property | (Parcel 21) | Strip Mall |
| W. J. Barnhart Property | (Parcel 41A) | Vacant Building & Lot |
| Wesly Denham Property | (Parcel 42) | Havoline Carolina Quick Lube |
| William Ussery Property | (Parcel 57) | Vacant Building & Lot |
| Walter McCain Property | (Parcel 80) | Vacant Buildings & Lot |
| Leon Wall Property | (Parcel 99) | Vacant Building & Lot |
| James Porter Property | (Parcel 117) | Vacant Building & Lot |
| John Evans Property | (Parcel 126) | Custom Monument Company |
| Henry Ussery Property | (Parcel 140) | Bo Henry's Pawn Shop |

Photos of the above sites are presented in **Figure 1**.

## 2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot survey grid was established across the proposed ROW areas of the 13 sites using water-based marking paint. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the manufacture's specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST's and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 24 scans per second. A 110 MHz high pass filter and an 800 MHz low pass filter were used during data

acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately seven feet, based on an estimated two-way travel time of 7 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint software. The locations of GPR survey areas or individual GPR survey lines are shown as dashed, purple rectangles or solid purple lines, respectively on the EM61 differential contour plots. Photos of the EM61 and GPR instruments are shown in **Figure 2**. The approximate perimeters of probable or possible UST's , based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags when possible. The approximate locations of probable or possible UST's are shown on the EM61 contour plots as magenta-shaded rectangles.

During the weeks of November 14 and November 23, 2005, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox and Mr. Hirth.

## 3.0 DISCUSSION OF RESULTS

### 3.1 Parcel 4 - W. J. Barnhart Property

Parcel 4 is located on the southern side of Fayetteville Road and contains an active used car lot and auto repair garage. The western portion of the ROW area consists of asphalt with a concrete pad and the eastern portion of the ROW area consists of a sandy surface.

The bottom coil results and the differential results are presented in **Figure 3**. The linear anomaly intersecting grid coordinates X=50 Y=26, is probably in response to a buried utility line or conduit. The high amplitude anomaly centered near the former pump island area is probably in response to the steel-reinforced concrete pad. GPR surveys conducted across the steel-reinforced concrete pad did not detect any large metal objects. The geophysical results suggest that the ROW area at Parcel 4 does not contain metallic UST's.

### 3.2 Parcel 7 - Julia M. Ratliff Property

The Ratliff property is located northwest of the Fayetteville Road and Roberdell Road intersection. The parcel consists of an open, asphalt and grass-covered lot. The EM61 bottom coil results and the differential results are presented in **Figure 4**. The linear bottom coil, EM61 anomalies, such as the ones intersecting grid coordinates X=100 Y=60, X=110 Y=74, and X=130 Y=104, are probably in response to utility lines or conduits. GPR surveys conducted across a portion of the EM anomaly centered near grid coordinates X=65 Y=35, suggest the presence of at least one UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide.

A large water puddle was present across the western portion of the EM anomaly when the GPR surveys were conducted that prevented GPR data to be collected across the entire anomaly. However, based on the location of the probable UST, the size of the EM61 anomaly suggests that a second UST may be centered near grid coordinates X=64 Y=32. Concrete was encountered approximately three inches below surface across this area, which prevented probing with a steel rod to determine whether a second UST exists. A photo showing the approximate location of the probable and possible UST's along with a GPR image obtained along survey line Y=35 are presented in **Figure 5**.

The geophysical results suggest that the remaining portion of the proposed ROW area at Parcel 7 does not contain metallic UST's.

### 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties

Parcels 15 and 21 are located immediately southwest and southeast, respectively of the Fayetteville Road and Skyline Drive intersection. Parcel 15 consists primarily of grass and gravel surfaces, whereas the front portion of Parcel 21 consists of an asphalt-covered parking area. The EM61 bottom coil results and the differential results are presented in **Figures 6 and 7**, respectively.

GPR surveys across the EM61 anomaly centered near grid coordinates X=188 Y=135, (on Parcel 15) suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below

surface. The surveys also suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

At Parcel 21, GPR surveys acquired across the EM anomaly centered near grid coordinates X=269 Y=173, suggest the presence of a UST buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide. Photos showing the approximate locations of the probable UST's at Parcels 15 and 21, along with corresponding GPR images are presented in Figures **8 and 9**, respectively.

### 3.4 Harvey E. Melton Property (Parcel 17)

The Melton property is an active BP gas station and store located northeast of the Fayetteville Road and Roberdell Road intersection. The pump island area consists of a steel-reinforced concrete surface that overlies the known and active UST's, whereas the parking area adjacent to the store consists of asphalt pavement. A grass yard surrounds the back portion of the site.

The EM61 bottom coil results and the differential results are presented in Figures **10 and 11**, respectively. The linear bottom coil, EM anomalies are probably in response to utility lines or conduits. The majority of non-linear anomalies are probably in response to cultural features such as storm drains, signs, utility-related objects, buildings, metal fence, and steel-reinforced concrete.

GPR surveys were conducted across the concrete pavement and across the area containing the active UST's. The surveys delineated the footprint of the three and possibly four active UST's that are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. A GPR image obtained across the UST area is presented in **Figure 12** and suggests that the tanks lie approximately 3.5 to 3.9 feet below surface.

GPR data acquired across the EM61 anomaly centered near X=155 Y=144, delineated the footprint of the kerosene tank that is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide. A photo showing the location of the

tank is presented in Figure 12. The geophysical results suggest that the remainder of the surveyed area at Parcel 17 does not contain UST's.

### 3.5 W. J. Barnhart Property (Parcel 41A)

Parcel 41A is a former gas station site located on the north side of Fayetteville Road approximately 300 feet west of Lawson Street. The geophysical survey area consists of asphalt and grass-covered surfaces with a concrete pad located around a former pump island. The EM61 bottom coil results and the differential results are presented in **Figure 13**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=40 Y=50, X=45 Y=95, and X=70 Y=40, are probably in response to utility lines or conduits.

GPR surveys conducted across a portion of the linear anomaly centered at X=37 Y=22, suggest the probable presence of a wide-diameter (more than 2.5 feet wide) conduit or possibly a UST that is approximately 15 to 17 feet long and buried approximately 4.5 feet below surface. This probable wide-diameter conduit (centered near X=38 Y=25) is located parallel and contingent with the probable utility line identified by the EM61 survey, suggesting that the probable conduit is a utility-related object. However, the footprint of this probable utility-related conduit or possible UST was marked in the field with spray paint and pin flags.

GPR surveys conducted across the concrete pad adjacent to the pump island suggest that the EM61 anomalies recorded in this area are probable in response to steel-reinforcement in the concrete. With the exception of the probable utility-related feature found at X=38 Y=25, the geophysical findings obtained within the survey area at Parcel 41A suggest that the ROW area does not contain metallic UST's.

### 3.6 Wesly Denham Property (Parcel 42)

The Havoline Carolina Kwik Lube garage operates at Parcel 42, which is located on the south side of Fayetteville Road. Asphalt and grass surfaces cover much of the proposed ROW area with a small concrete pad located in front of the building. The EM61 bottom coil results and the differential

results are presented in **Figure 14**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=60 Y=58, and X=80 Y=85, are probably in response to utility lines or conduits. The high amplitude anomaly centered near grid coordinates X=40 Y=40, is in response to a vehicle that could not be moved for the geophysical investigations. The anomalies centered near X=40 Y=12, and X=120 Y=55, are in response to a nearby vehicle and steel-reinforced concrete, respectively.

The geophysical results obtained within the surveyed portion of Parcel 42 suggest that the proposed ROW area does not contain metallic UST's.

### 3.7 William Ussery Property (Parcel 57)

Parcel 57 is located on the north side of Fayetteville Road approximately 0.2 miles east of Old Aberdeen Road. The EM61 bottom coil results and the differential results are presented in **Figure 15**. A series of small, bottom coil anomalies were recorded along survey line Y=25 from grid coordinate X=5 to X=115, which may be in response to an east-west trending, buried utility line or conduit. Several other bottom coil anomalies were recorded across the survey area that are probably in response to miscellaneous metal debris.

All of the differential anomalies are probably in response to known cultural features or buried debris, suggesting that the proposed ROW area at Parcel 57 does not contain metallic UST's.

### 3.8 Walter McCain Property (Parcel 80)

Parcel 80 is located immediately northwest of the Fayetteville Road and Philadelphia Road intersection and consists of two vacant buildings surrounded by sandy or grass surfaces. A former pump island pad is located south of the eastern-most building. The EM61 bottom coil results and the differential results are presented in **Figure 16**.

GPR surveys conducted across the EM61 anomalies centered near grid coordinates X=170 Y=35, and X=194 Y=32, suggest the presence of two metallic UST's. The probable UST centered near X=170

Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32 appears to be10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by the former pump island pad. Photos of the UST locations along with an image of GPR survey line X=167.5 are presented in **Figure 17**.

Based upon the geophysical results, the remaining portion of the proposed ROW area does not appear to contain metallic UST's.

### 3.9 Leon Wall Property (Parcel 99)

Parcel 99 is located immediately southwest of the Fayetteville Road and Patterson Road intersection and consists mostly of a grass yard surrounding a vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 18** in which a bottom coil, linear anomaly is recorded along survey line Y=230. This linear anomaly is probably in response to a utility line. GPR surveys conducted across the differential EM61 anomaly centered near X=92 Y=165, is probably in response to a water line adjoining the vacant building. GPR surveys were also conducted between the building and the former pump island pad that is centered near coordinates X=84 Y=222. The surveys suggest that the EM anomalies recorded in this portion of the survey area are probably in response to miscellaneous metal debris.

Based upon the geophysical results, the proposed ROW area at Parcel 99 does not appear to contain metallic UST's.

### 3.10 James Porter Property (Parcel 117)

Parcel 117 is a former gas station site located on the south side of Fayetteville Road approximately 0.25 miles west of Locklear Drive. The site consists primarily of grass and asphalt surfaces with a former pump island pad located in front of the vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 19**. The linear, bottom coil anomaly intersecting grid coordinates X=130 Y=54, is probably in response to a buried utility line or conduit. The linear

anomaly intersecting X=40 Y=74, is probably in response to a metal fence. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation across the survey area of Parcel 117 suggests that the proposed ROW area does not appear to contain metallic UST's.

### 3.11 John Evans Property (Parcel 126)

The active Custom Monument Company operates on Parcel 126, which is located immediately northeast of the Fayetteville Road and LockLear Drive intersection. The geophysical survey area consists of grass and asphalt surfaces and the EM61 bottom coil results and the differential results are presented in **Figure 20**. All of the EM61 anomalies recorded across the surveyed portion of the site are probably in response to known cultural features, suggesting that the proposed ROW area does not contain metallic UST's.

### 3.12 Henry Ussery Property (Parcel 140)

Parcel 140 is a former gas station site, which is presently occupied by Bo Henry's Pawn Shop. The property is located immediately southeast of the Fayetteville Road and Port Street intersection. Much of the proposed ROW area consists of sandy or grass-covered surfaces. A concrete pad surrounds the north and west sides of the building. The EM61 bottom coil results and the differential results are presented in **Figure 21**. The linear bottom coil anomaly intersecting grid coordinates X=80 Y=80, is probably in response to a buried utility line.

GPR surveys conducted across the differential anomalies centered near coordinates X=90 Y=60, and X=107 Y=59, suggest the presence of two UST's buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide. Probing with a steel rod across this area suggest the presence of a concrete slab buried approximately 0.3 feet below surface and overlying the UST's. A photo showing the locations of the probable UST along with GPR images are presented in **Figure 22**.

## 4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 13 sites along Fayetteville Road (US 1) in Rockingham, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic UST's within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 13 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results did not detect the presence of unknown metallic UST's within the surveyed portions of the proposed ROW areas at the following sites:

| | |
|---|---|
| W. J. Barnhart Property | (Parcel 4) |
| W. J. Barnhart Property | (Parcel 41A) |
| Wesly Denham Property | (Parcel 42) |
| William Ussery Property | (Parcel 57) |
| Leon Wall Property | (Parcel 99) |
| James Porter Property | (Parcel 117) |
| John Evans Property | (Parcel 126) |

- Julia M. Ratliff Property (Parcel 7): Geophysical results suggest the presence of a UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide. A second UST may be present immediately west of this UST.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

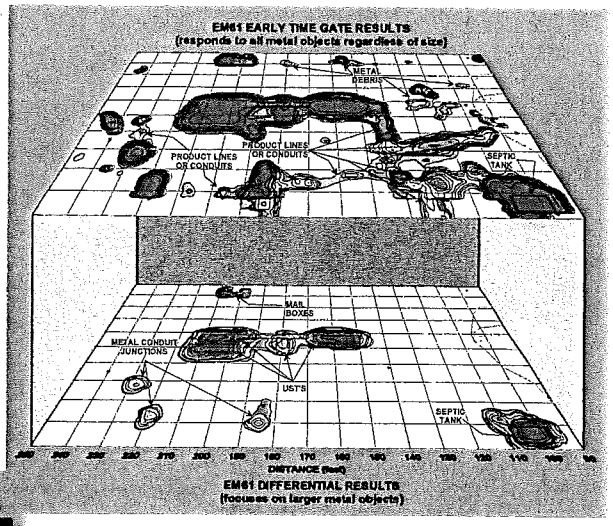
- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

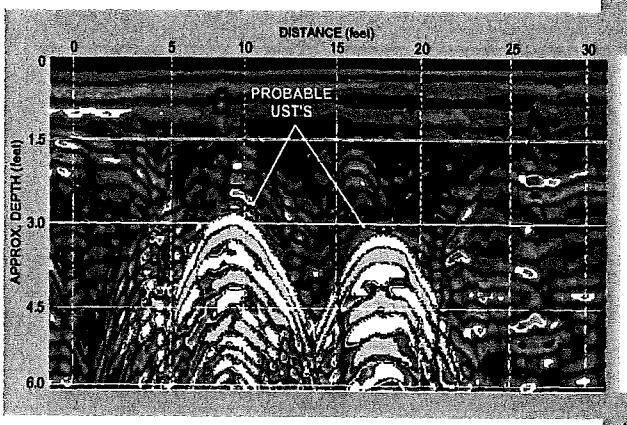
- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

## 5.0 LIMITATIONS

EM61 and GPR surveys have been performed and this report prepared for Solutions Industrial & Environmental Services, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic UST's but only suggest where some of the metallic UST's may be present. The EM61 and GPR anomalies, interpreted as possible UST's or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EM61 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANK
DISTANCE (feet)
EM61 DIFFERENTIAL RESULTS
(focuses on larger metal objects)


DISTANCE (feet)
0
5
10
15
20
25
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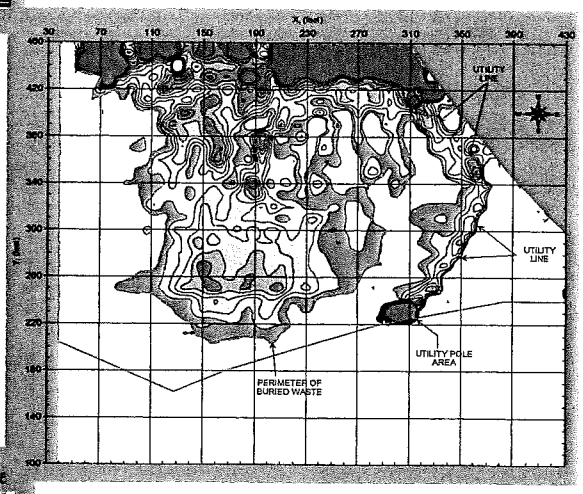
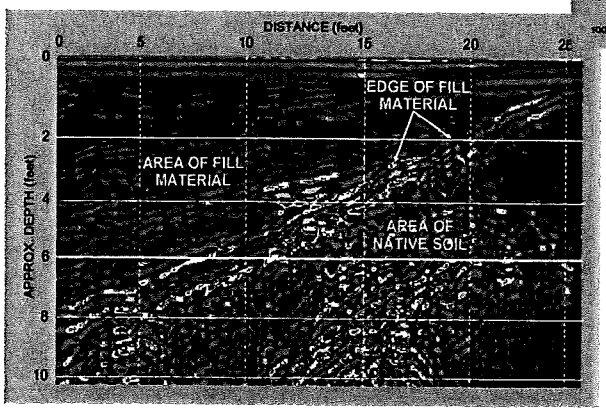
PROBABLE UST'S
APPROX. DEPTH (feet)
0
1.5
3.0
4.5
6.0

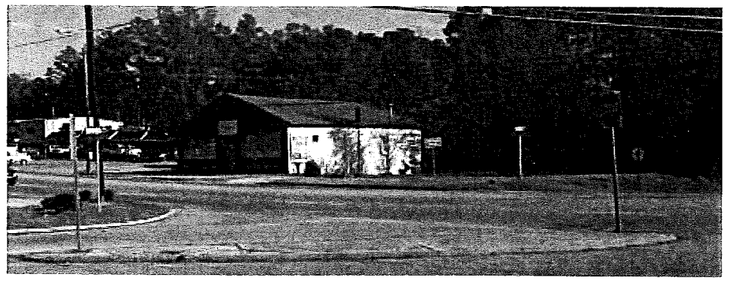
# FIGURES


X (feet)
UTILITY LINE
UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE


DISTANCE (feet)
0
5
10
15
20
25
EDGE OF FILL MATERIAL
AREA OF FILL MATERIAL
AREA OF NATIVE SOIL
APPROX. DEPTH (feet)
0
2
4
6
8
10

Parcel 4 - W. J. Barnhart Property

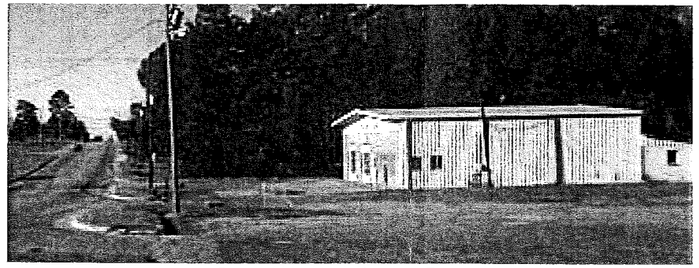
Parcel 7 - Julia M. Ratliff Property



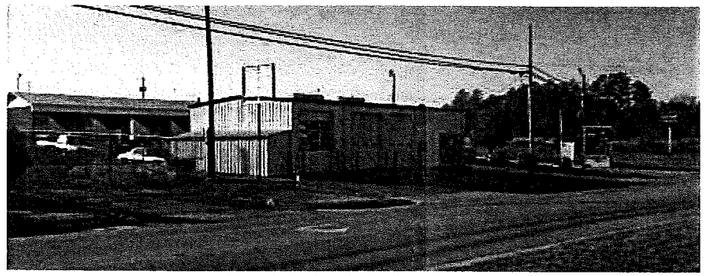
Parcel 15 - Samuel D. Tanner Property

Parcel 17 - Harvey E. Melton Property

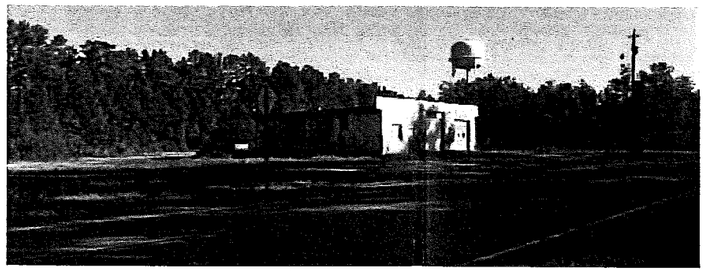
Parcel 21 - Samuel D. Tanner Property



Parcel 41A - W. J. Barnhart Property

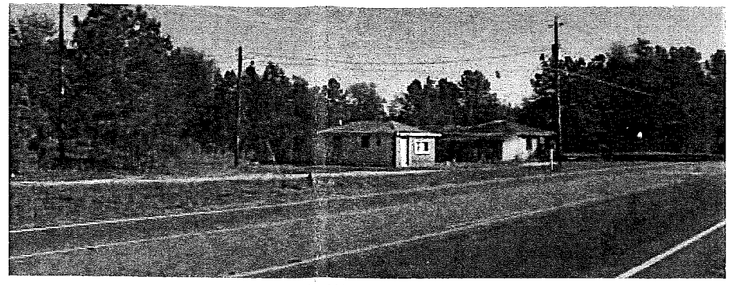


Parcel 42 - Wesly Denham Property

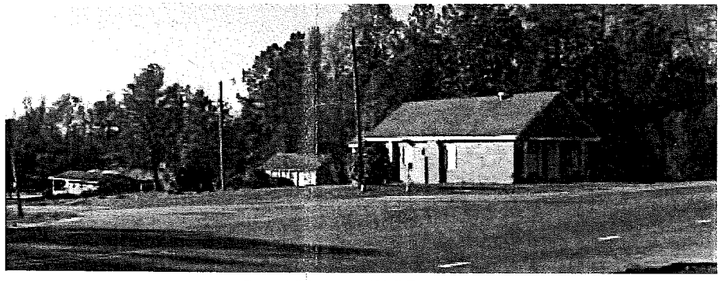


Parcel 57 - William Ussery Property

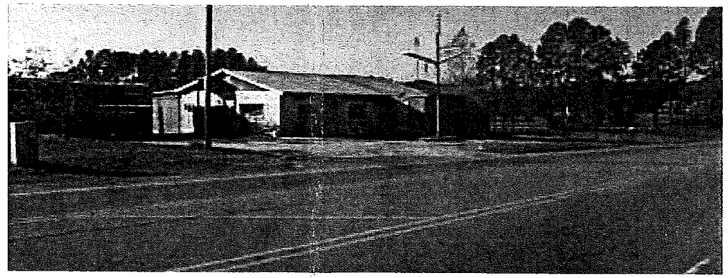
Parcel 140 - Henry Ussery Property



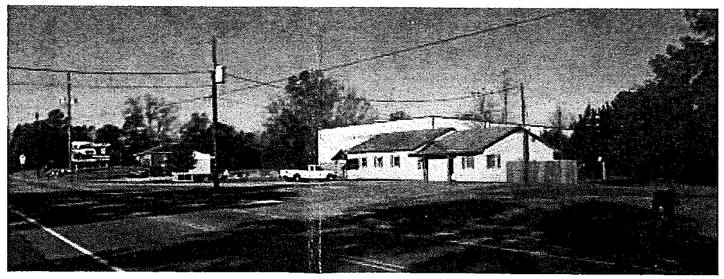
Parcel 80 - Walter McCain Property



Parcel 99 - Leon Wall Property



Parcel 117 - James Porter Property



Parcel 126 - John Evans Property

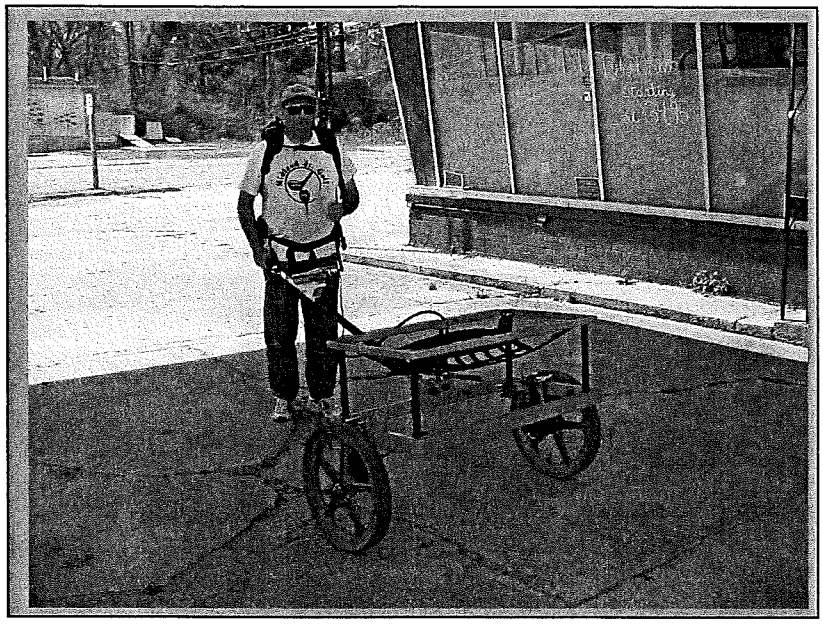
FIGURE 1

SITE PHOTOS

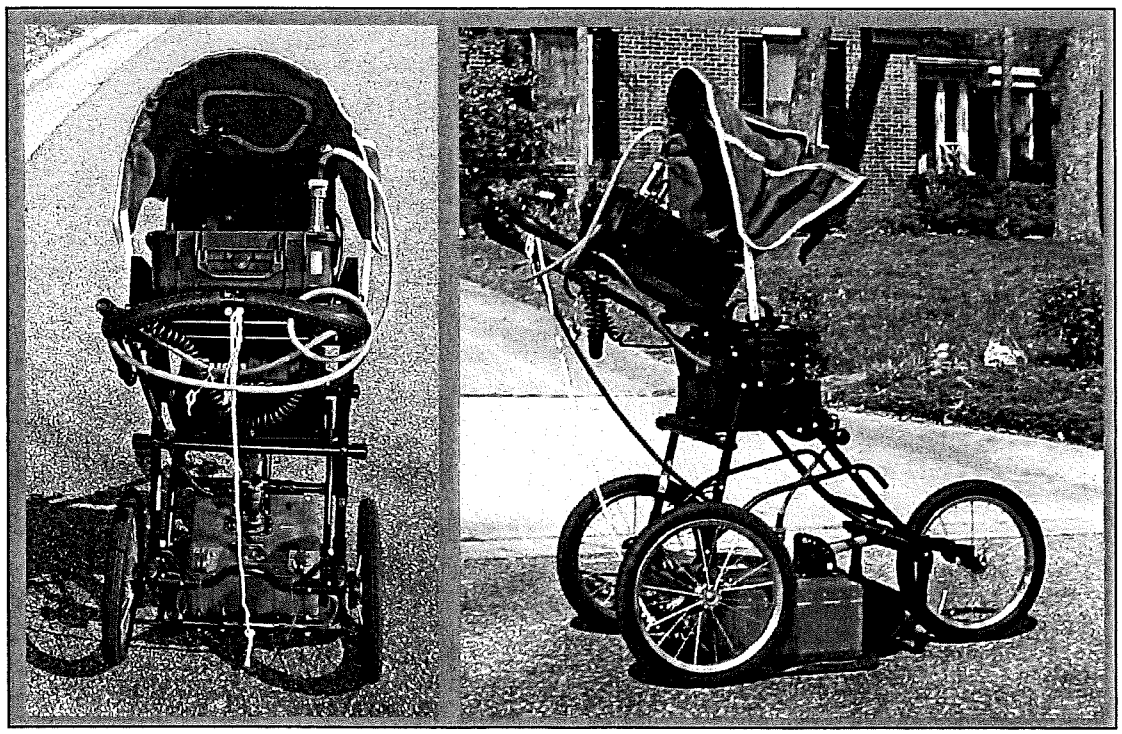
GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/28/05 |
| SITE | ROCKINGHAM SITES | LAY | |
| CITY | ROCKINGHAM | DWG | |
| TITLE | GEOPHYSICAL RESULTS | J.NO. | 2005-292 |
| | | DRWN | MJD |
| | | CHKD | |
| | | FIGURE | |

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



The Geonics EM61 metal detector was used to conduct the metal detection surveys at the Rockingham sites in November 2005.



The SIR-2000 GPR system equipped with a 400 MHz antenna that was used at the Rockingham sites in November 2005.

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

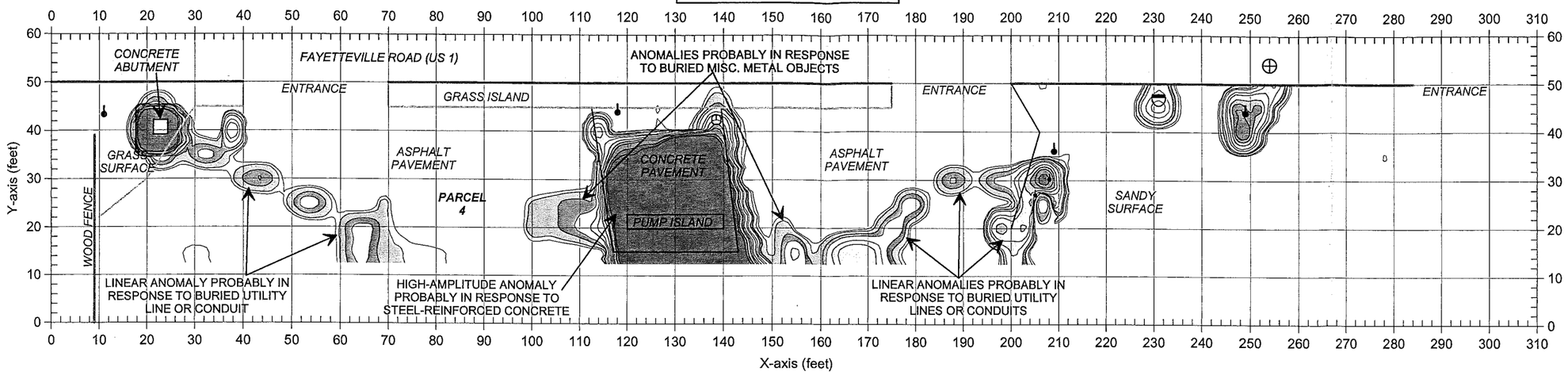
| | | | | | |
|---|---|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE | 11/28/05 | DRWN |
| SITE | ROCKINGHAM SITES | | LAY | | CKRD |
| CITY | ROCKINGHAM | STATE NORTH CAROLINA | DWG | | |
| TITLE | GEOPHYSICAL RESULTS | | JAND. | 2005-292 | FOLDE |

GRAPHIC SCALE IN METERS

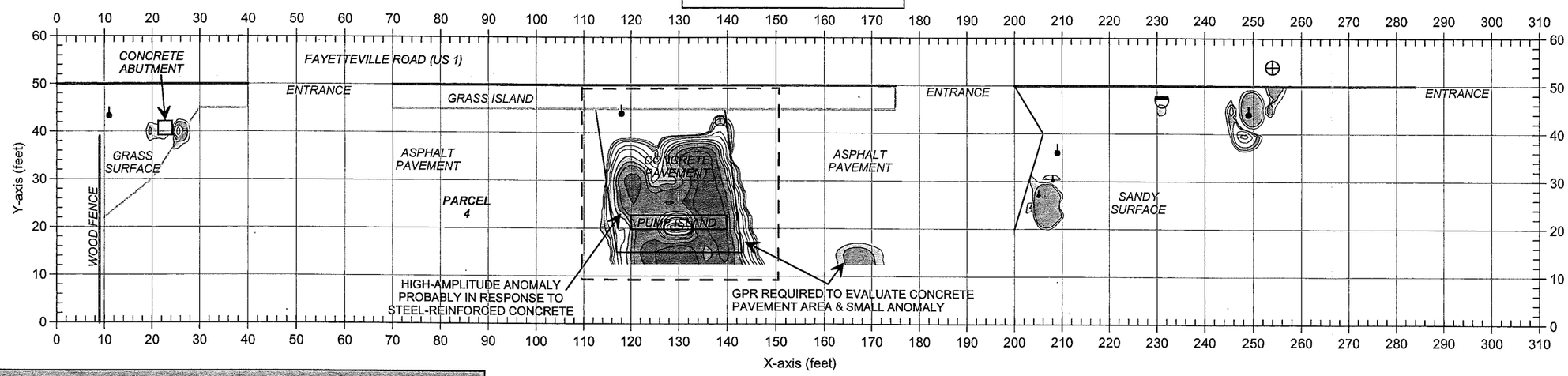
GEOPHYSICAL EQUIPMENT

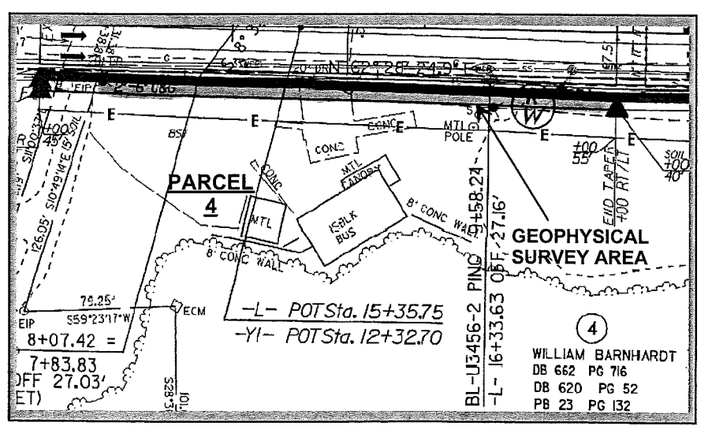
FIGURE 2

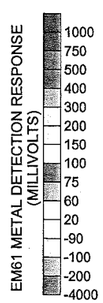
## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE OR LIGHT POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY AREA

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 3

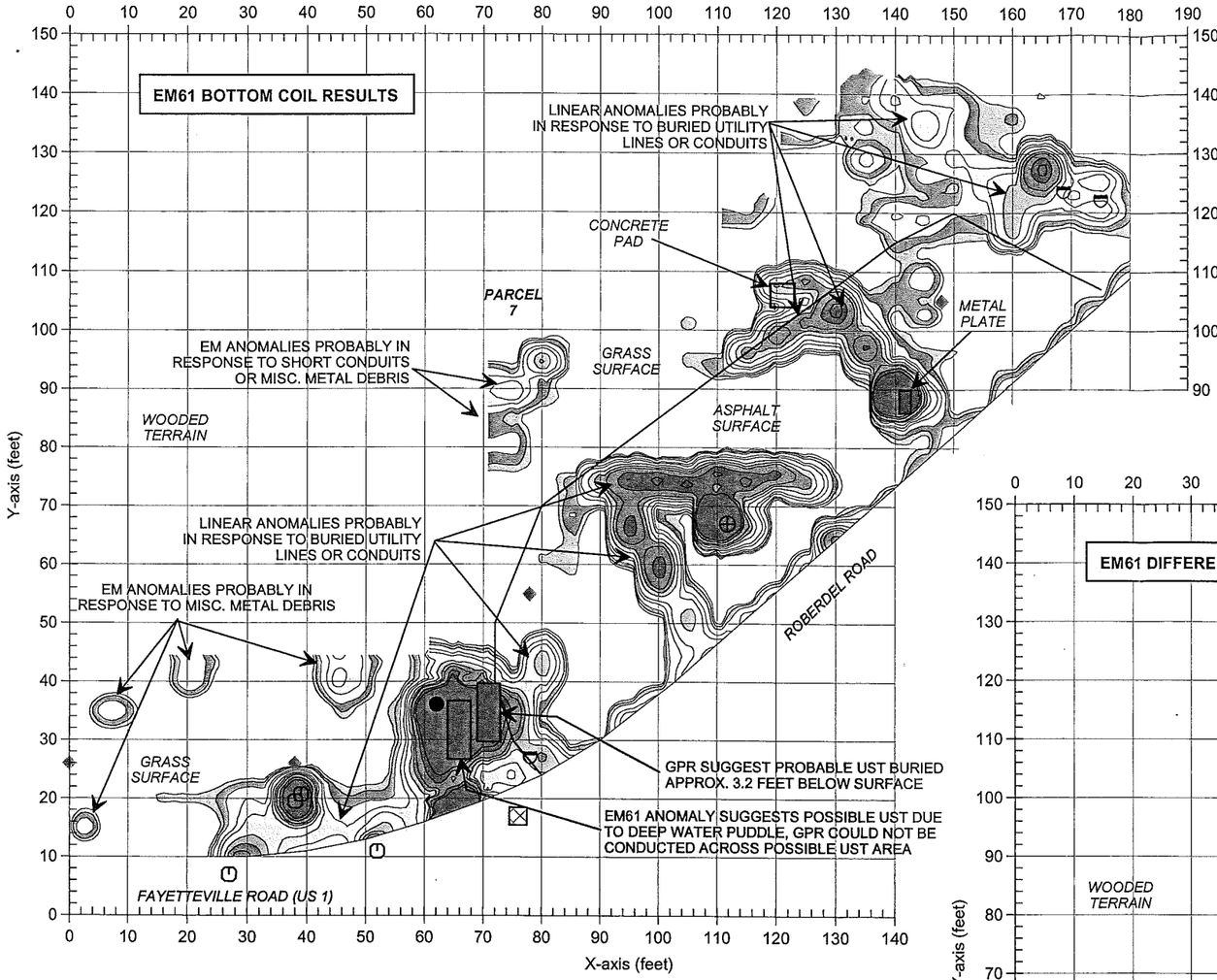
EM61
METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | J.NO. | 2005-292 |
| DATE | 11/26/05 | | |
| LAY | | | |
| DWG | | | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: W. J. BARNHART PROPERTY (PARCEL 4)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

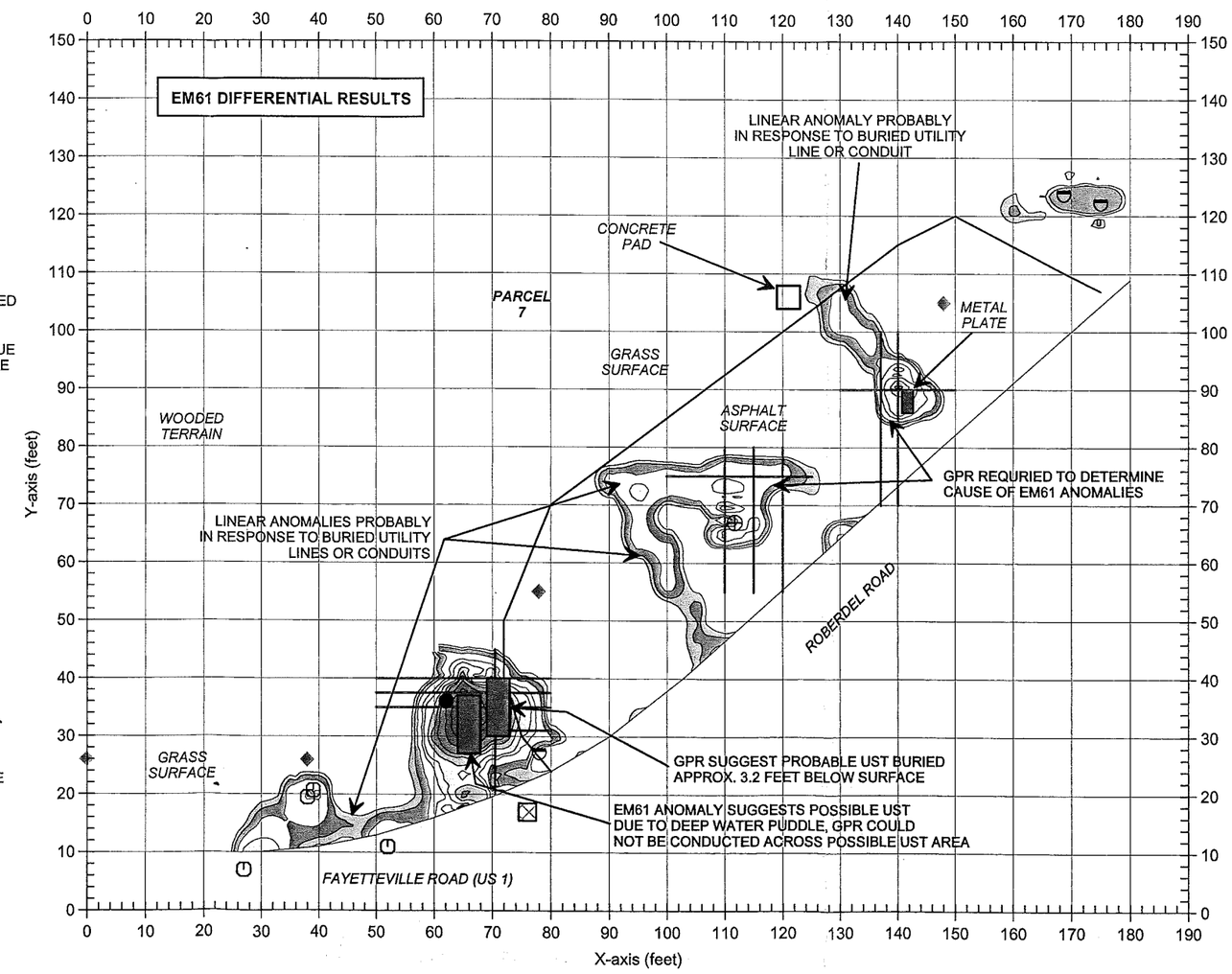
- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH & EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

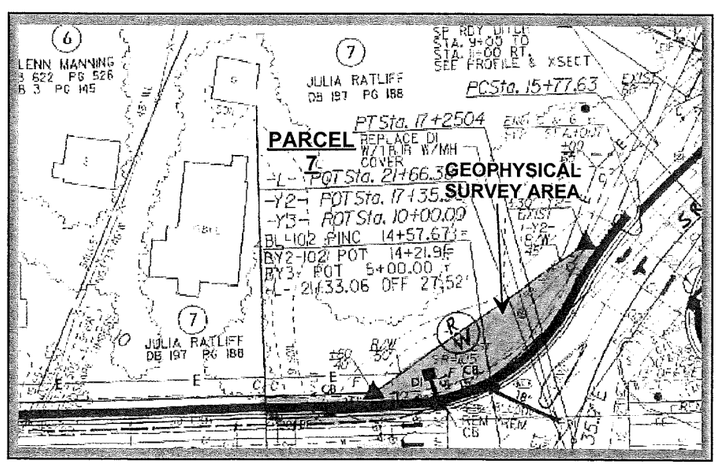
Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -90 50 60 75 100 150 200 300 400 500 750 1000



APPROXIMATE NORTH

FIGURE 4

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

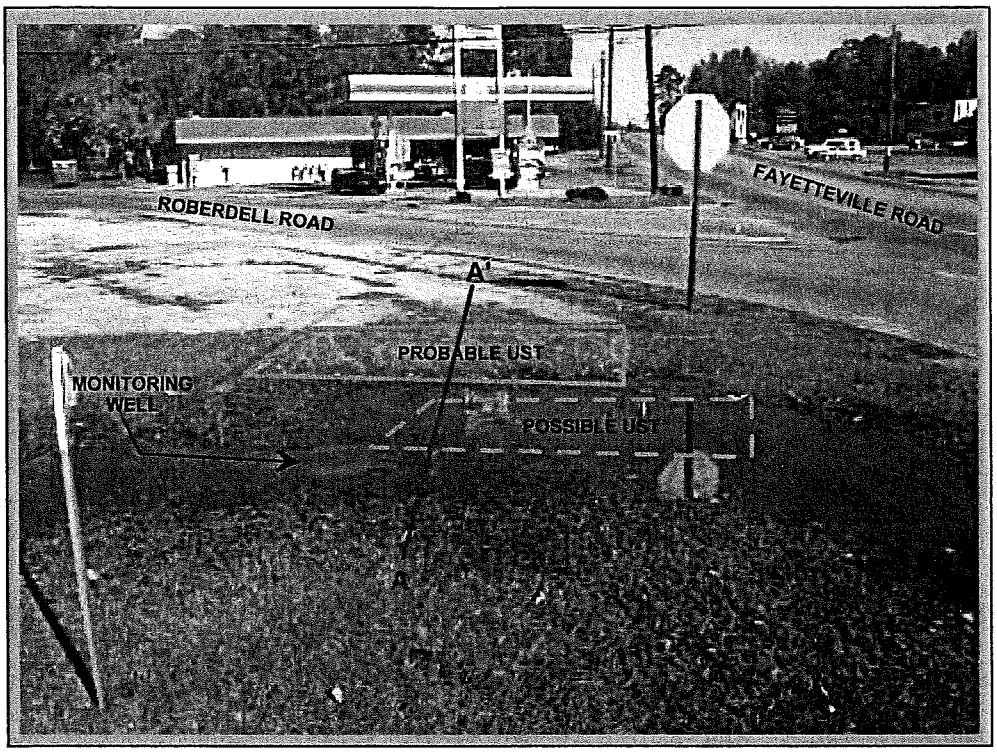
SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7)

CITY: ROCKINGHAM

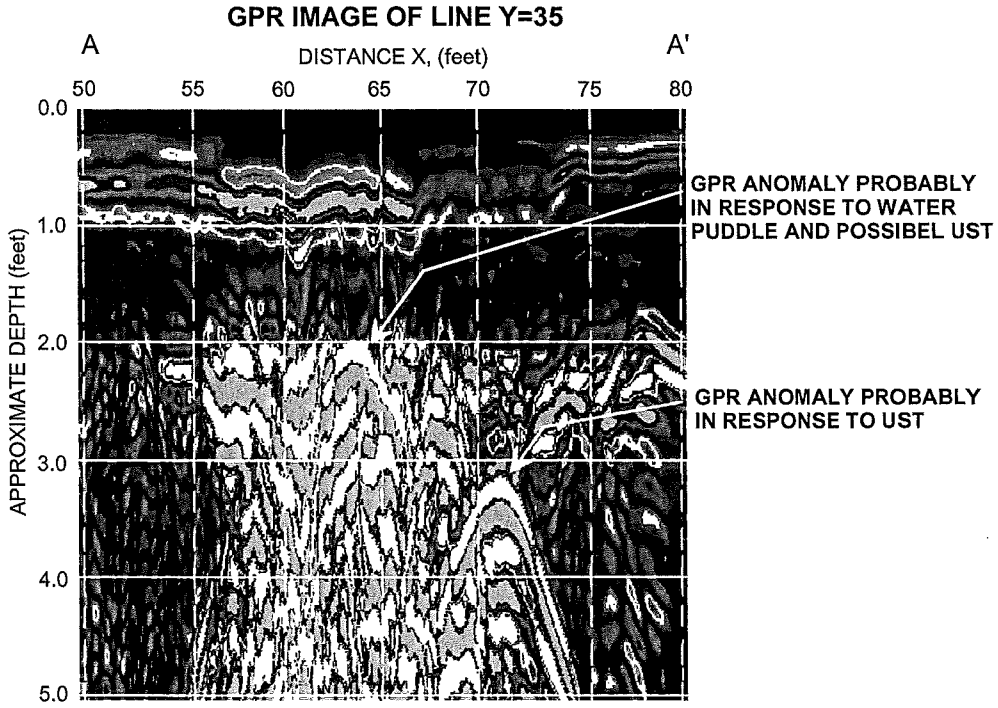
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



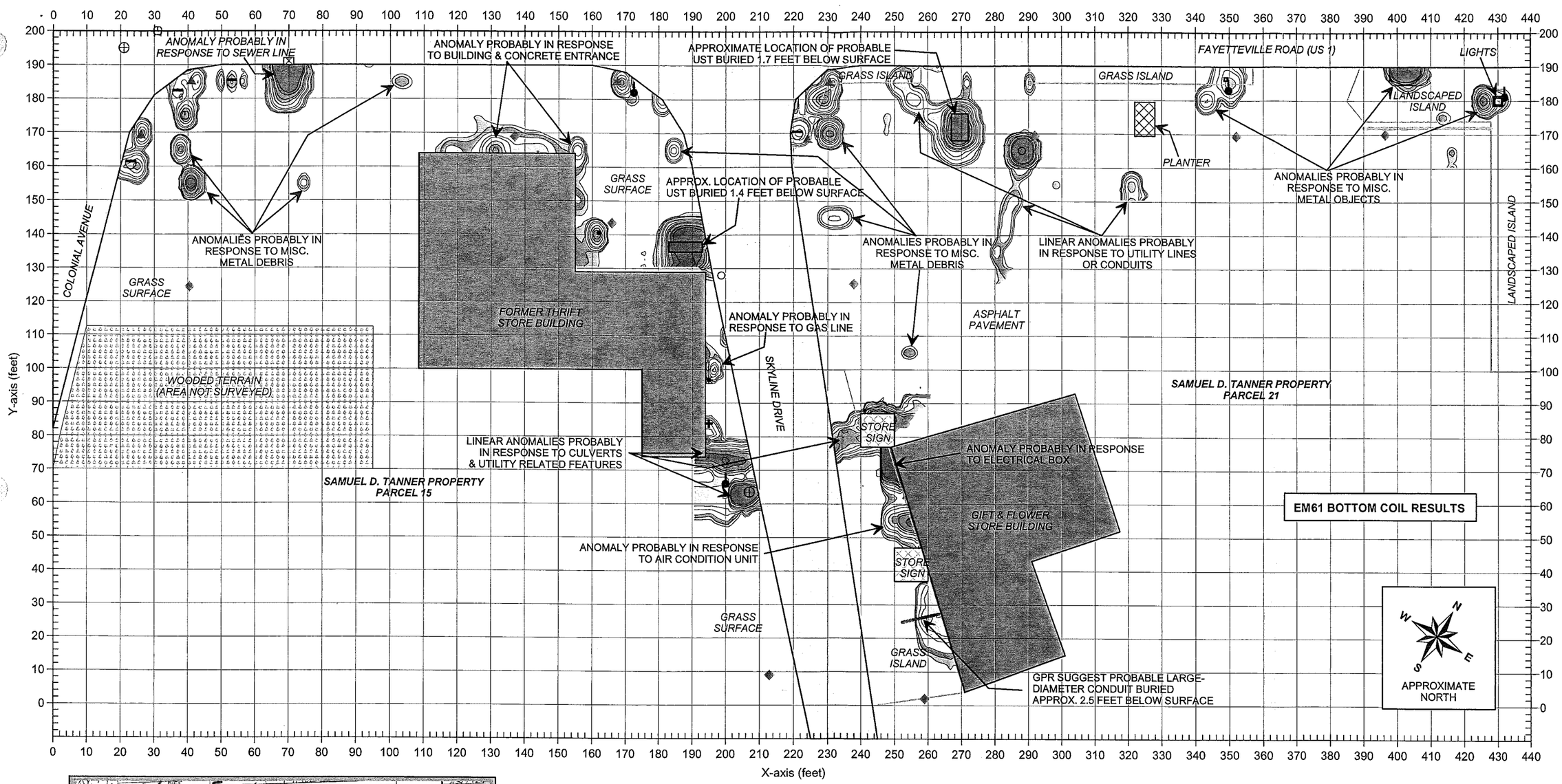

The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

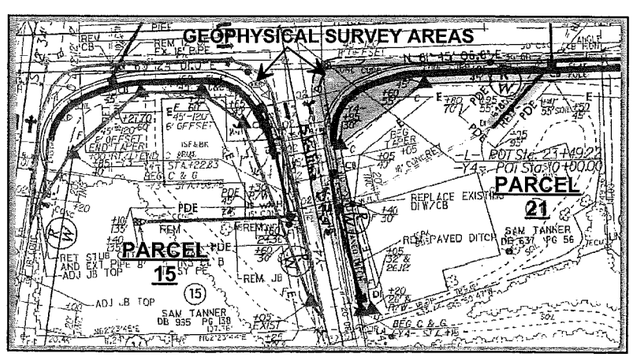



The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 5 |

GRAPHIC SCALE IN METERS




EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

1000, 750, 500, 400, 300, 200, 150, 100, 75, 60, 20, -90, -100, -200, -400

## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 6

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J-NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

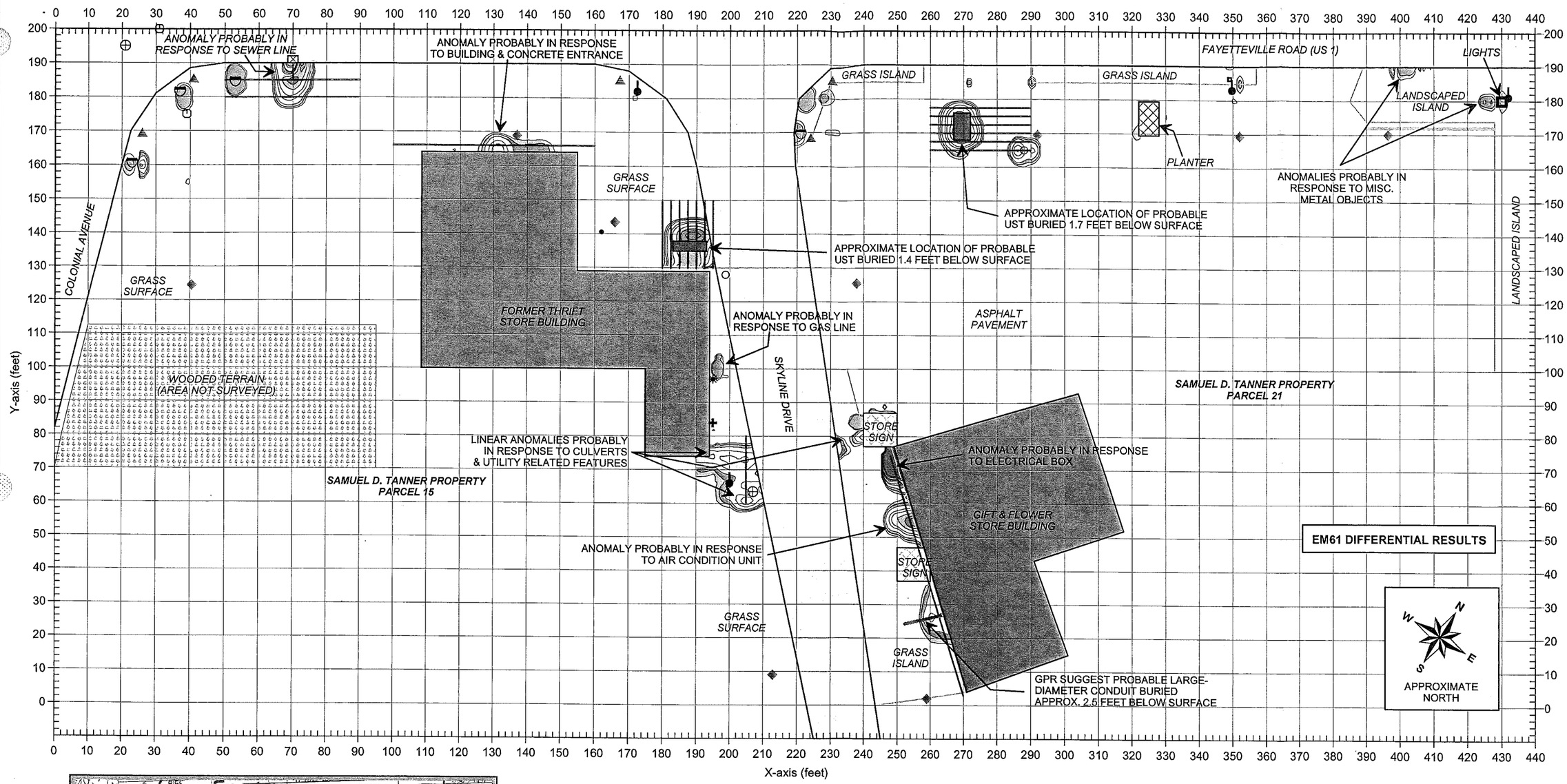
SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

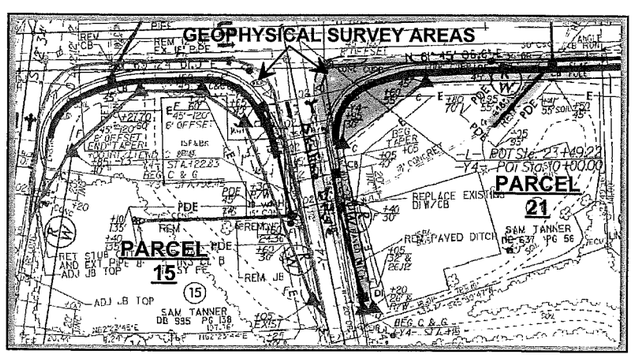
CITY: ROCKINGHAM

STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

1000
750
500
400
300
200
150
100
75
60
50
-90
-100
-200
-4000

## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 7

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

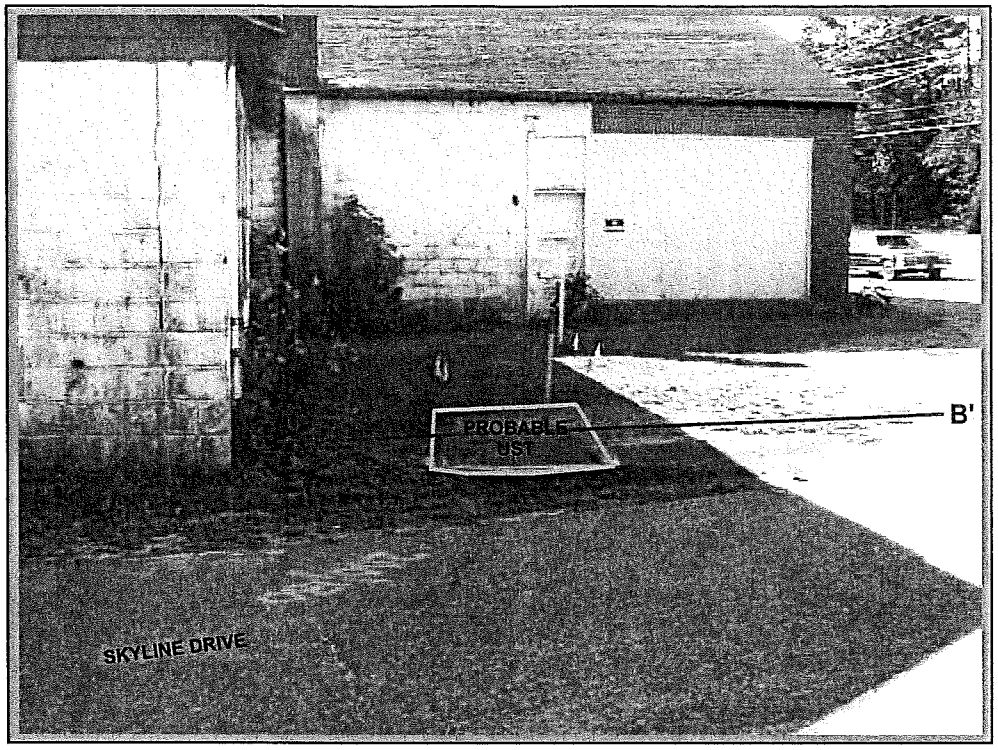
SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

NORTH CAROLINA

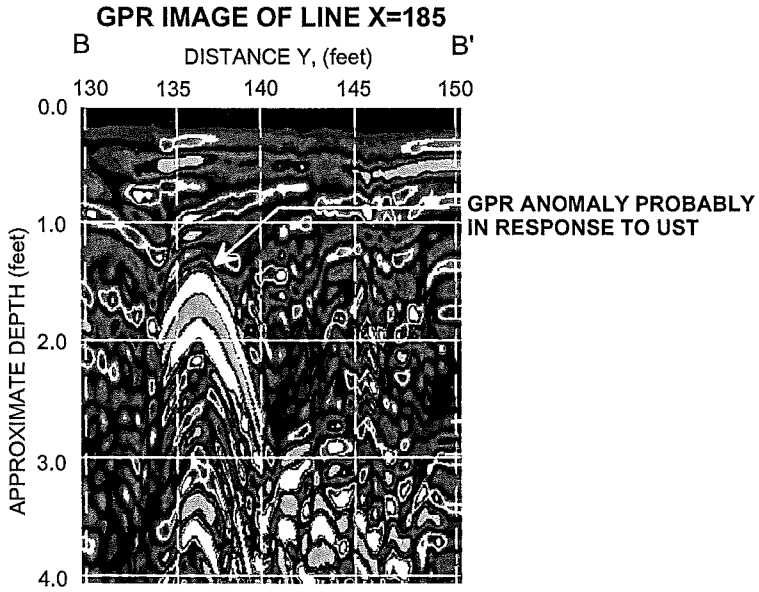
ROCKINGHAM

GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



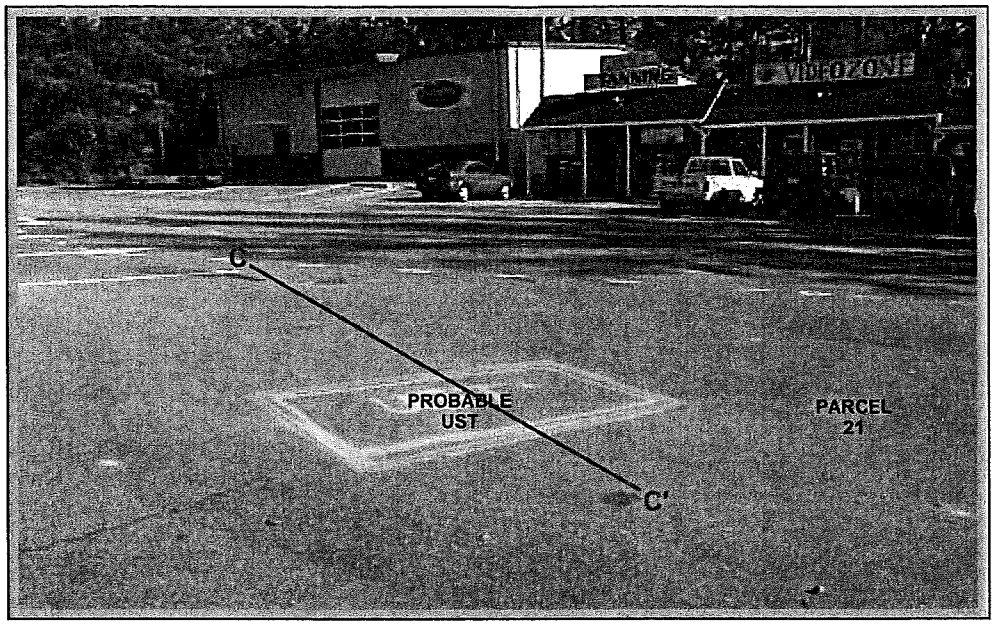

The photo shows the location of the probable UST, as suggested by the geophysical results at Parcel 15.



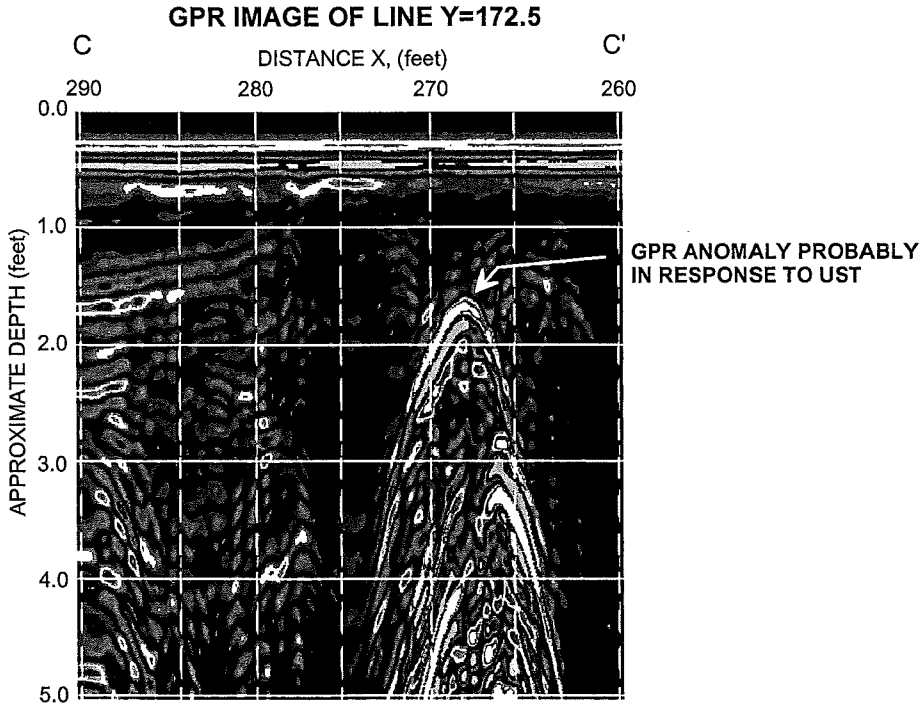

The GPR image obtained along a portion of survey line X=185 shows the anomaly that is probably in response to a UST near Y=137 and buried approximately 1.4 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 15) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J.NO.: 2005-292 | FIGURE: | FIGURE 8 |

GRAPHIC SCALE IN METERS



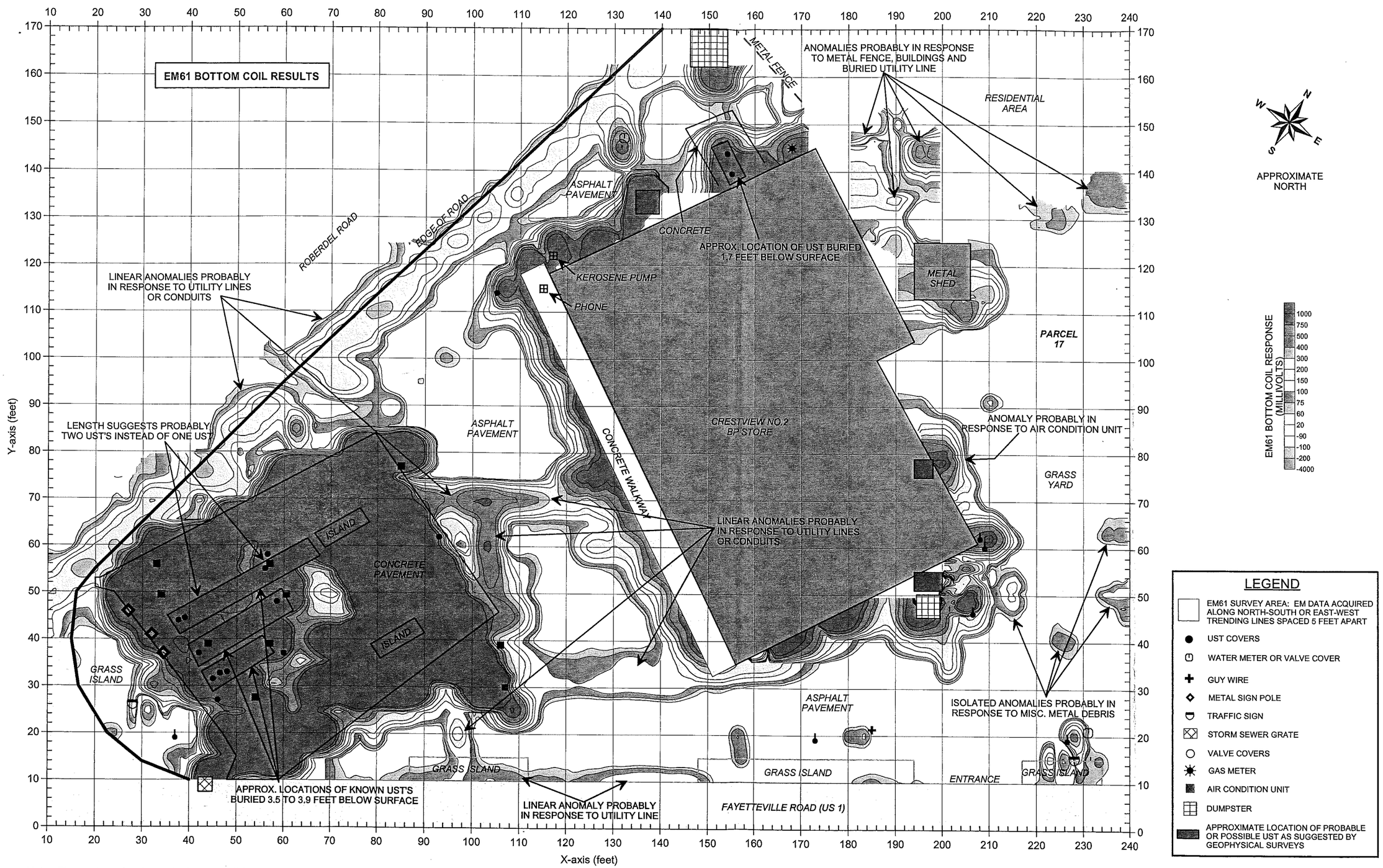

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 21.




The GPR image obtained along a portion of survey line Y=172.5 shows the anomaly that is probably in response to a UST near X=268 and buried approximately 1.7 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 21) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 9 |

GRAPHIC SCALE IN METERS




Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 10

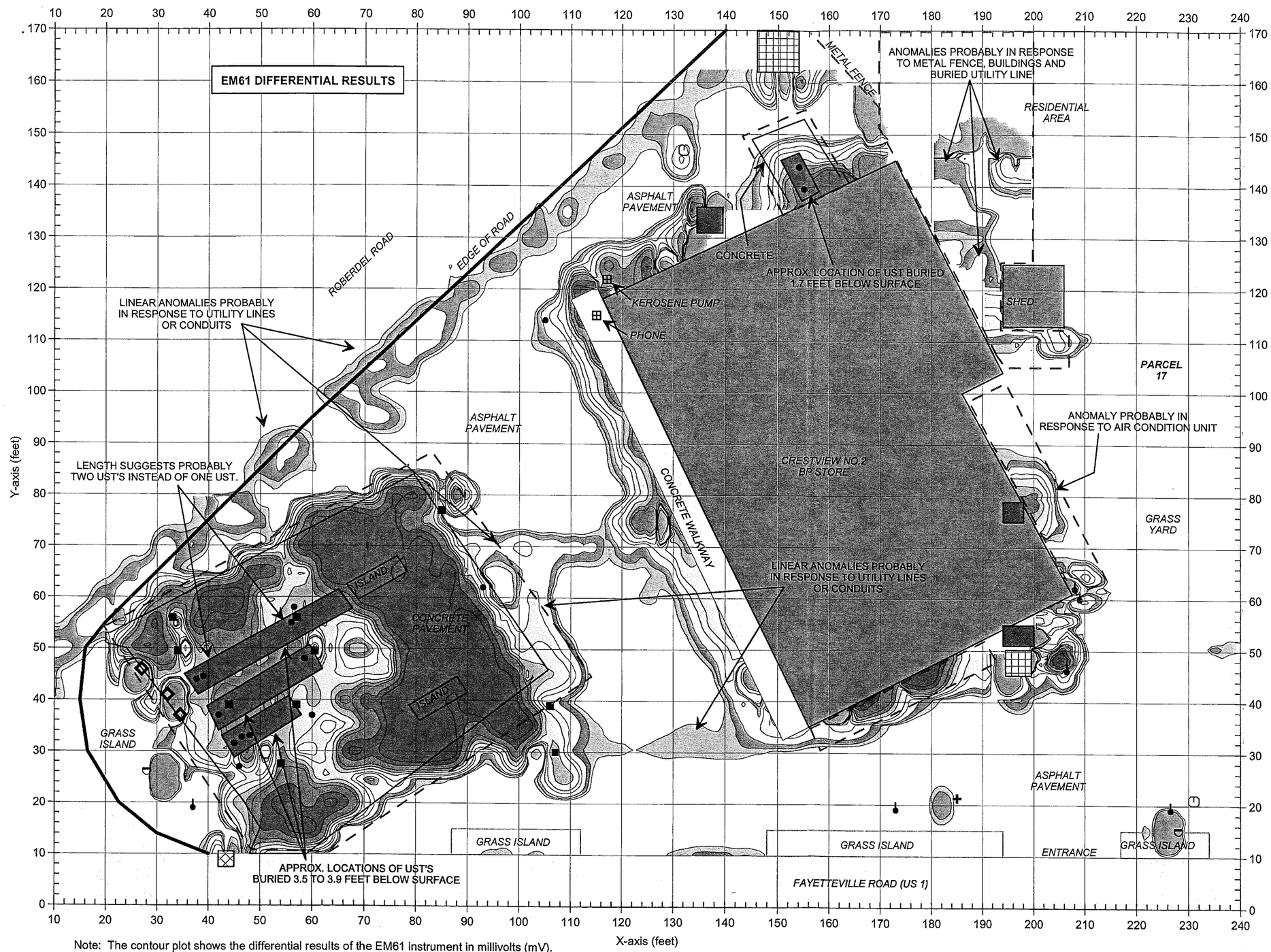
EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

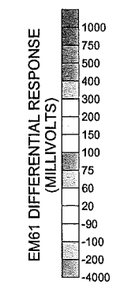
| DRAWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |
| DATE | LAY | DWG | J.NO. |
| 11/25/05 | | | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: HARVEY E. MELTON PROPERTY (PARCEL 17)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- UST COVERS
- WATER METER OR VALVE COVER
- GUY WIRE
- METAL SIGN POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVERS
- GAS METER
- AIR CONDITION UNIT
- DUMPSTER
- GPR SURVEY AREA
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 11

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J-NO. | 2005-292 |
| FIGURE | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

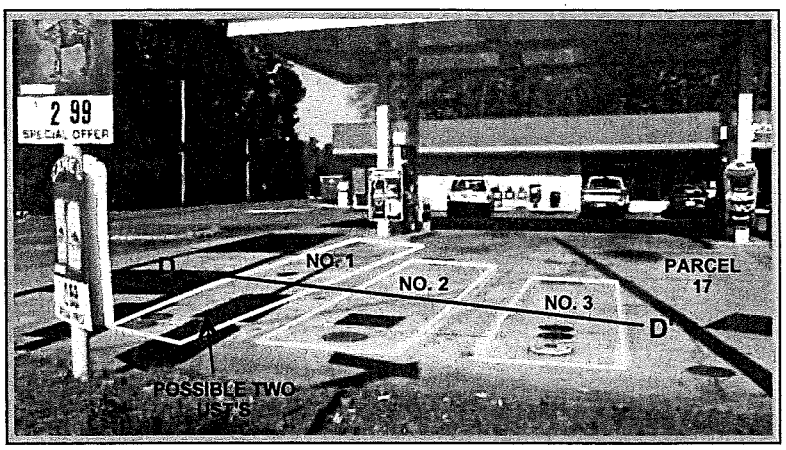
SITE: HARVEY E. MELTON PROPERTY (PARCEL 17)

CITY: ROCKINGHAM

STATE: NORTH CAROLINA

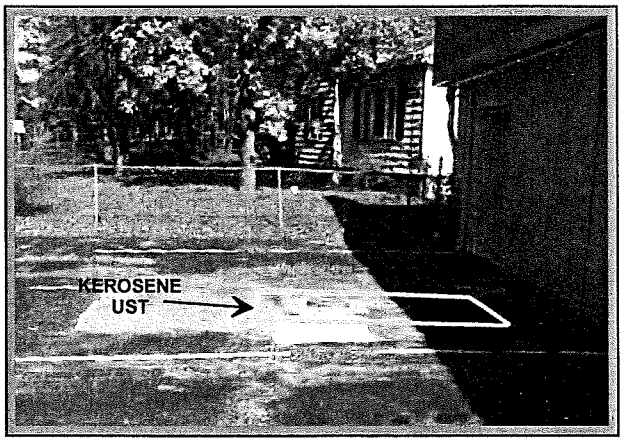
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

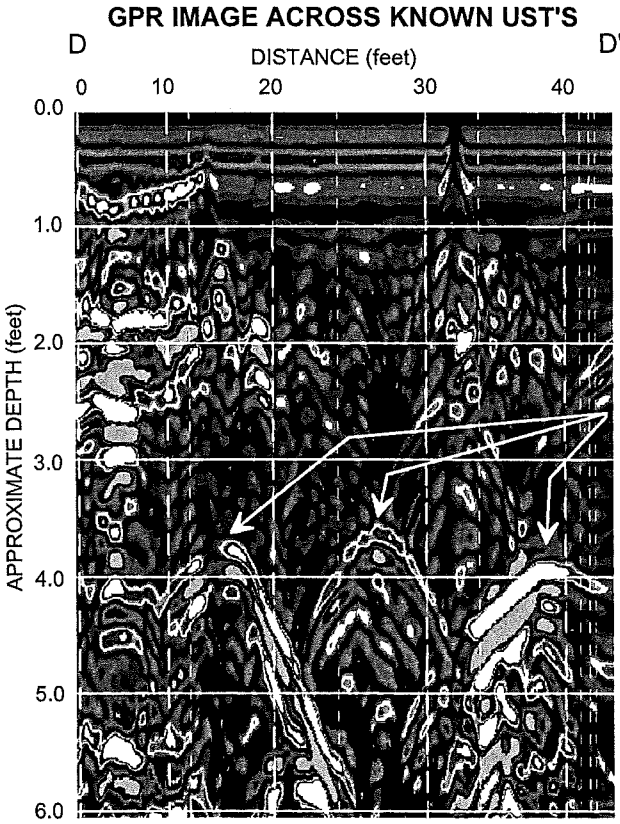



The photo shows the approxiamte location of the three or four known and active UST's, as suggested by the geophysical results, at Parcel 17. The UST's appear to be approximately 3.5 to 3.9 feet below surface.

The photo shows the approximate location of the kerosene UST, as suggested by the geophysical results, at Parcel 17. The UST is located along the northwest wall of the store and is buried approximately 2.4 feet below surface.




## GPR IMAGE ACROSS KNOWN UST'S




**GPR ANOMALIES PROBABLY IN RESPONSE TO THREE UST'S BURIED 3.5 TO 3.9 FEET BELOW SURFACE**

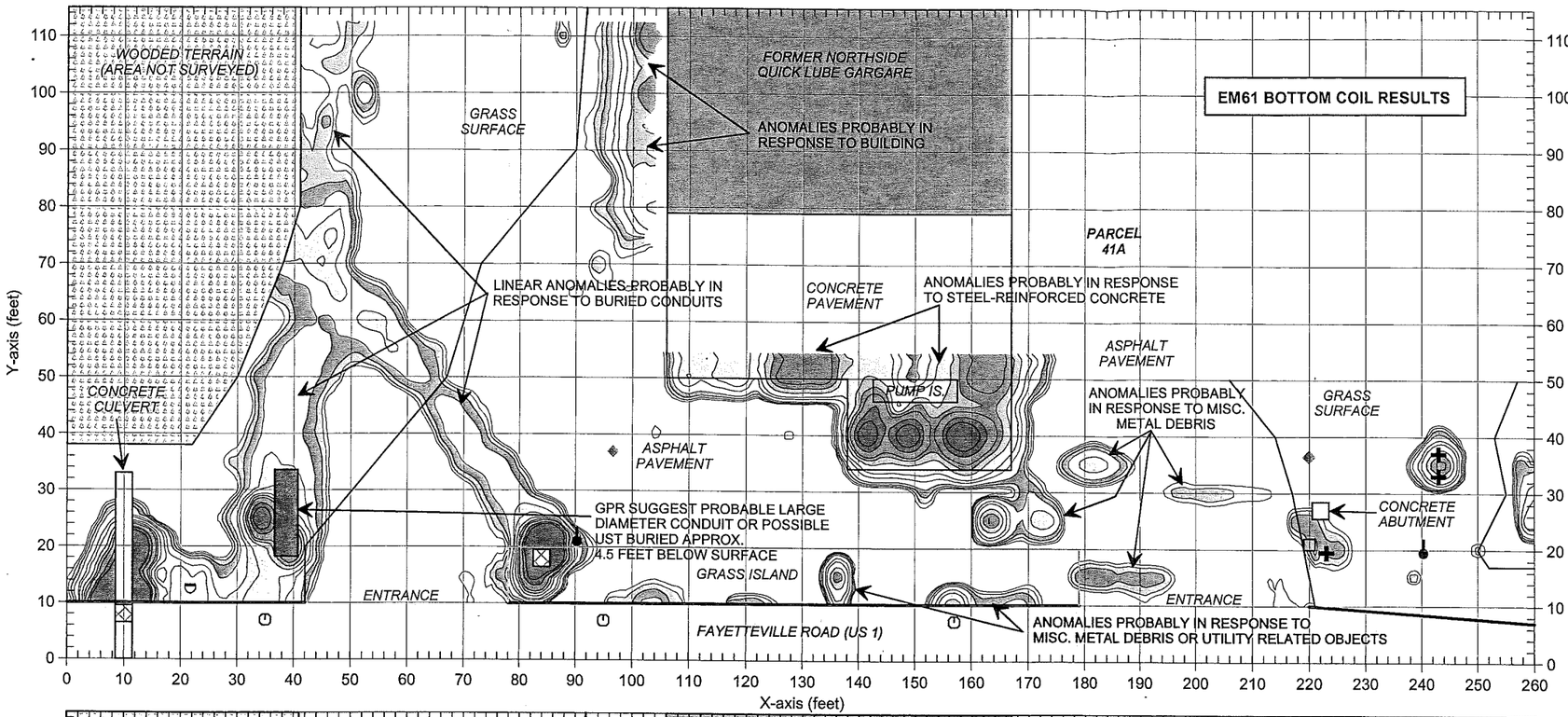
The GPR image is obtained along a traverse line oriented perpendicular to the axis of the UST's. The three GPR anomalies in response to the probable UST's suggest that the UST's are buried approximately 3.5 to 3.9 feet below surface.

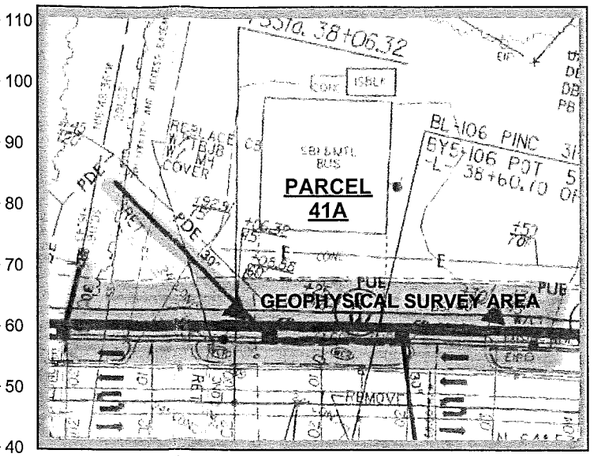
**PYRAMID**
ENVIRONMENTAL & ENGINEERING, P.C.

| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/28/05 |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | LAY | |
| CITY | ROCKINGHAM | STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS | LAND | 2005-292 |

PHOTOS & GPR IMAGE OF UST LOCATIONS

FIGURE 12

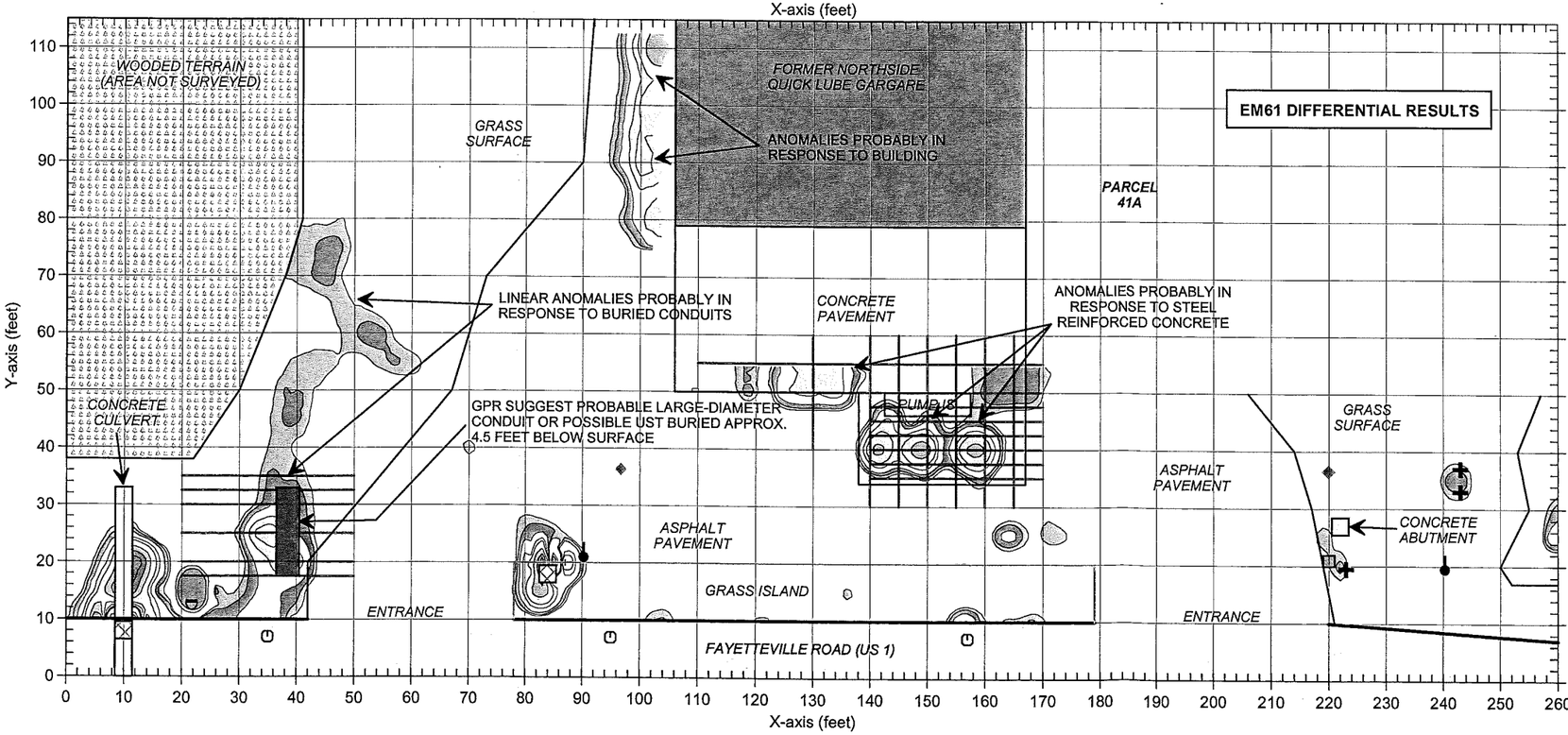



APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MAIL BOX
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE LARGE DIAMETER CONDUIT OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 13

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/26/05 |
| LAY | |
| DWG | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

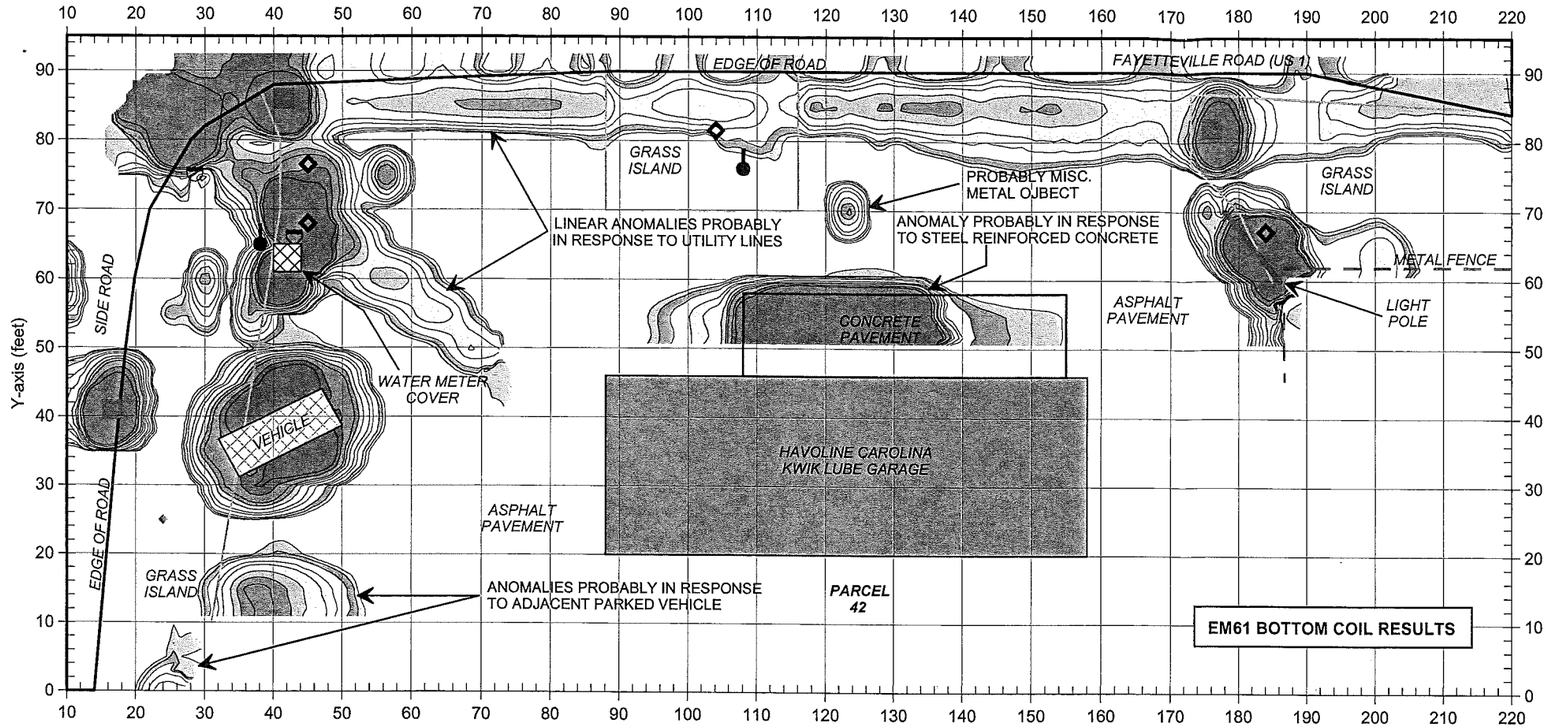
SITE: W.J. BARNHART PROPERTY (PARCEL 41A)

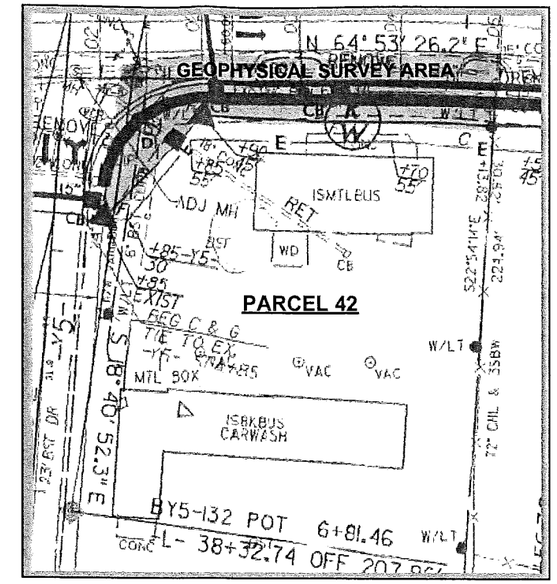
CITY: ROCKINGHAM

STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

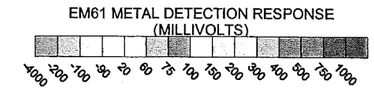
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

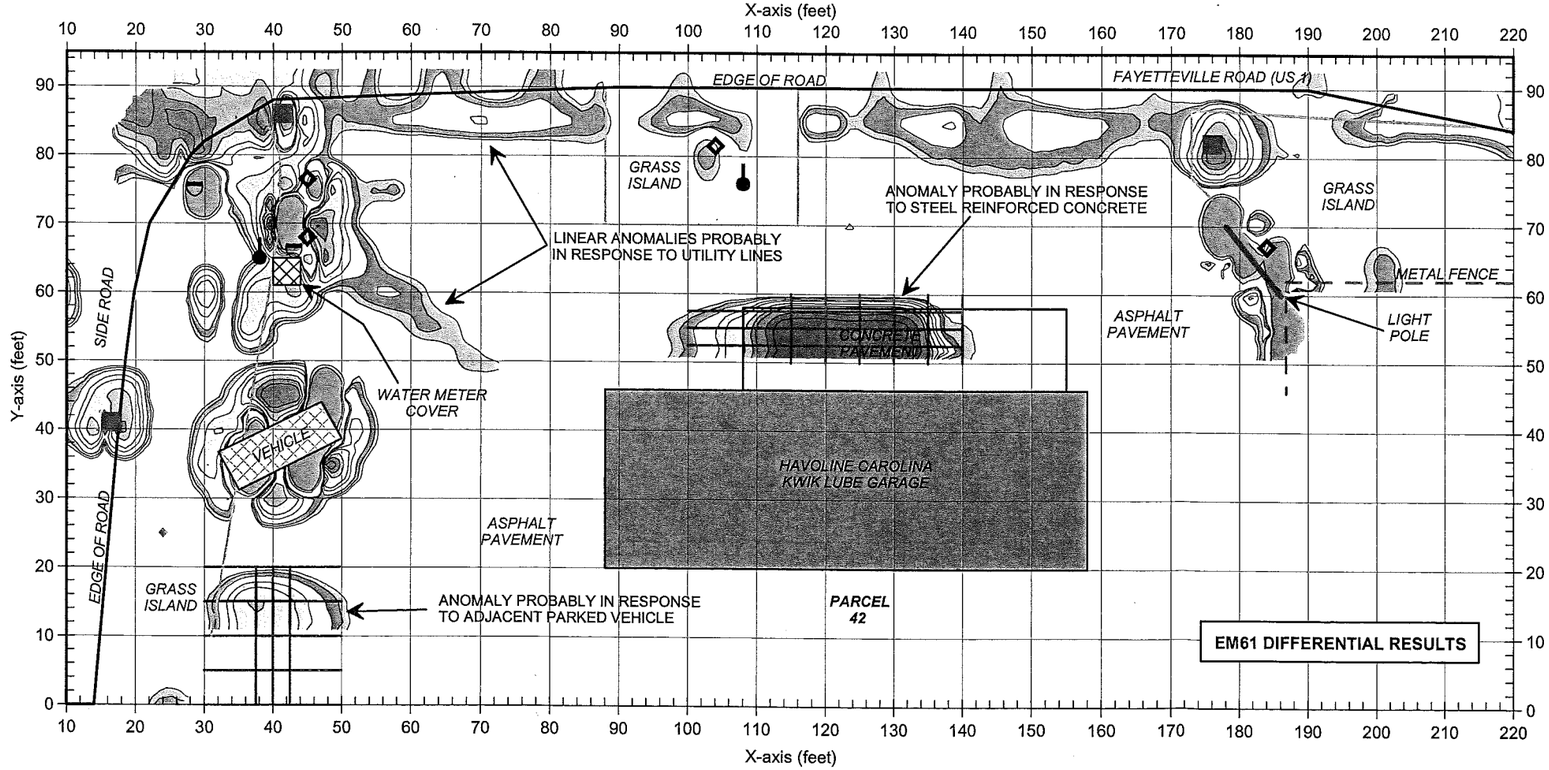


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- METAL SIGN POLE
- STORM SEWER GRATE
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 15, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 14

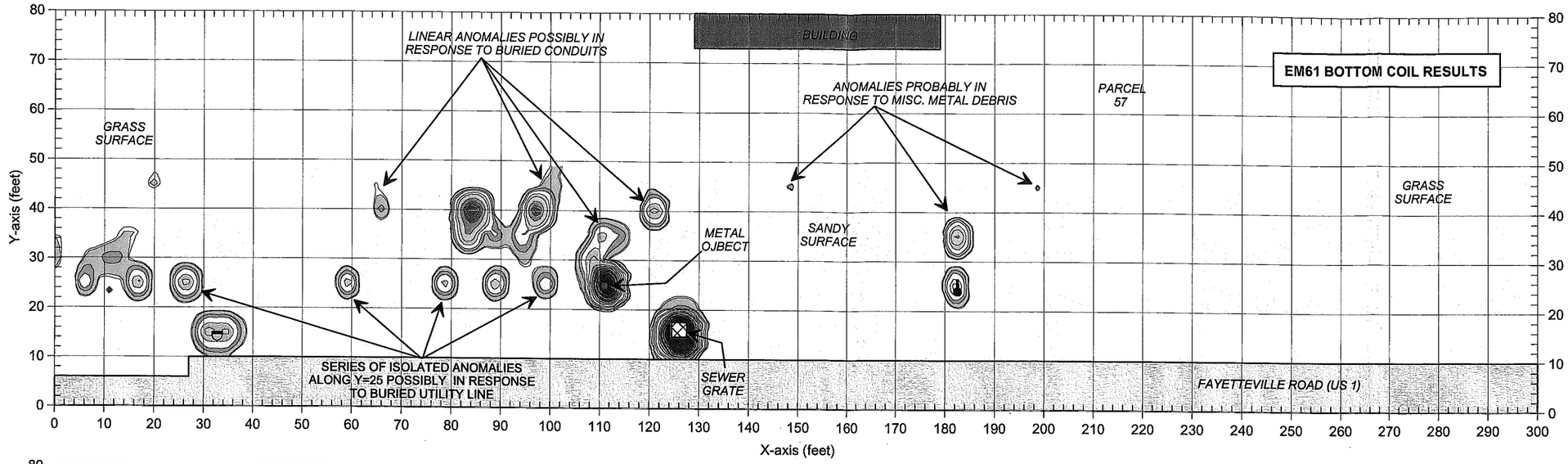
EM61
METAL DETECTION
RESULTS

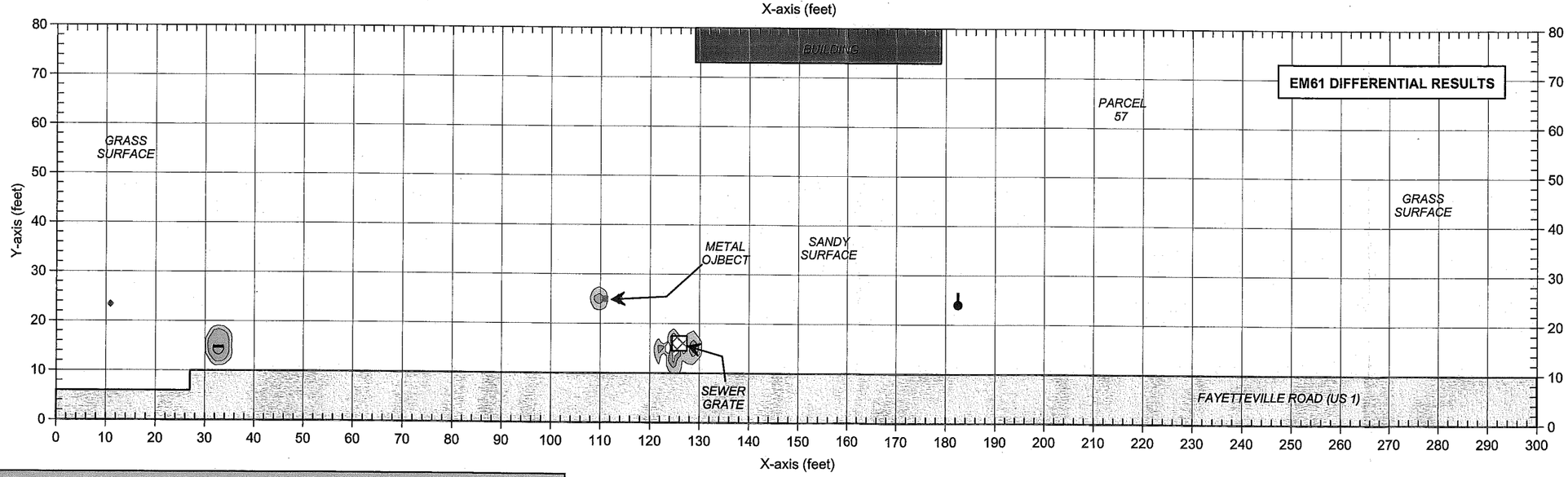
GRAPHIC SCALE IN METERS

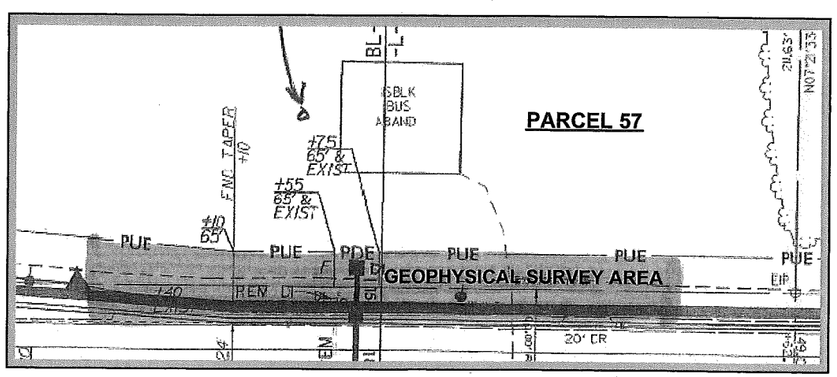
| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| JOB NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WESLEY DENHAM PROPERTY (PARCEL 42)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

4000 200 100 80 45 50 75 100 150 200 300 400 500 750 1000

N W E S

APPROXIMATE NORTH

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) surveys were not conducted at this site.

FIGURE 15

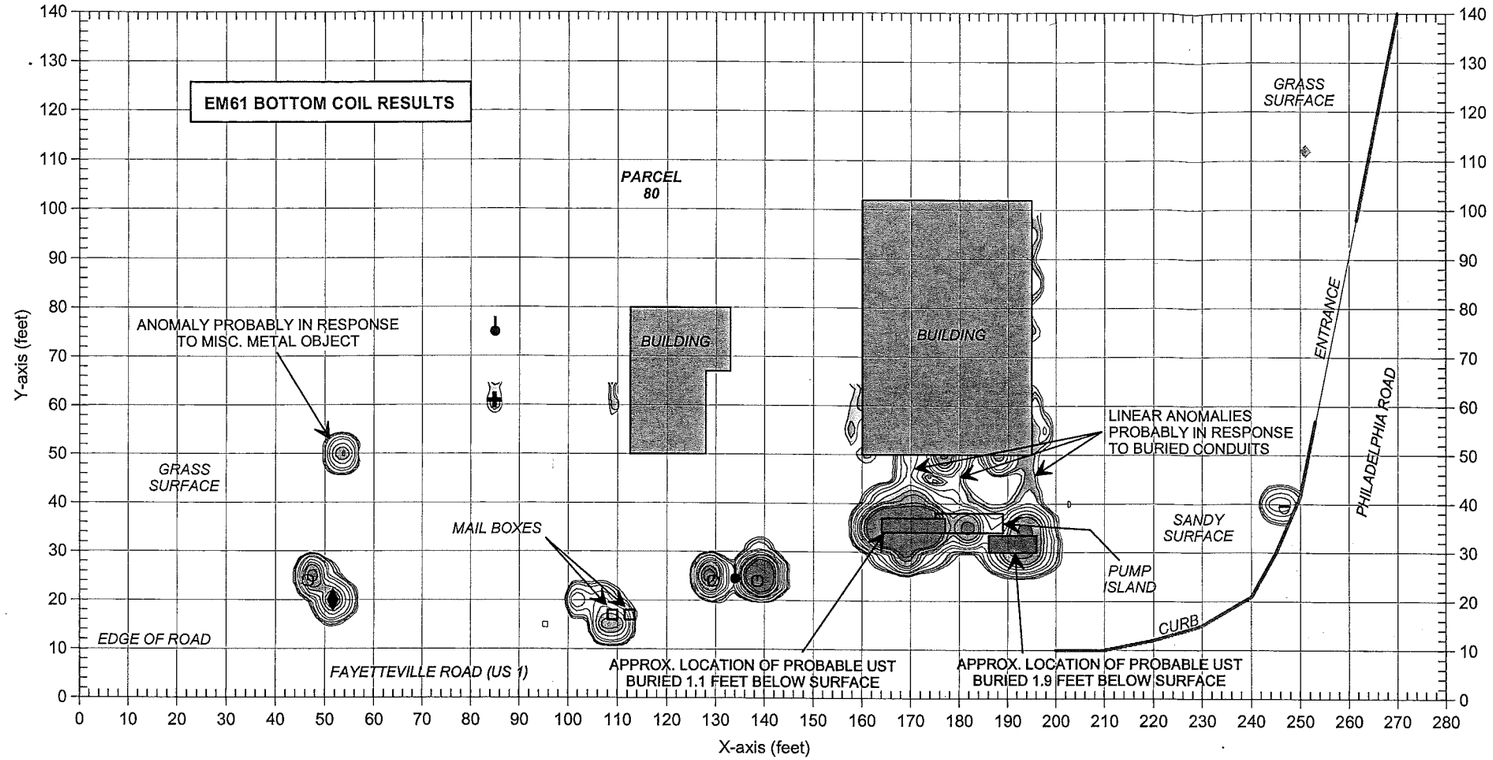
EM61
METAL DETECTION
RESULTS

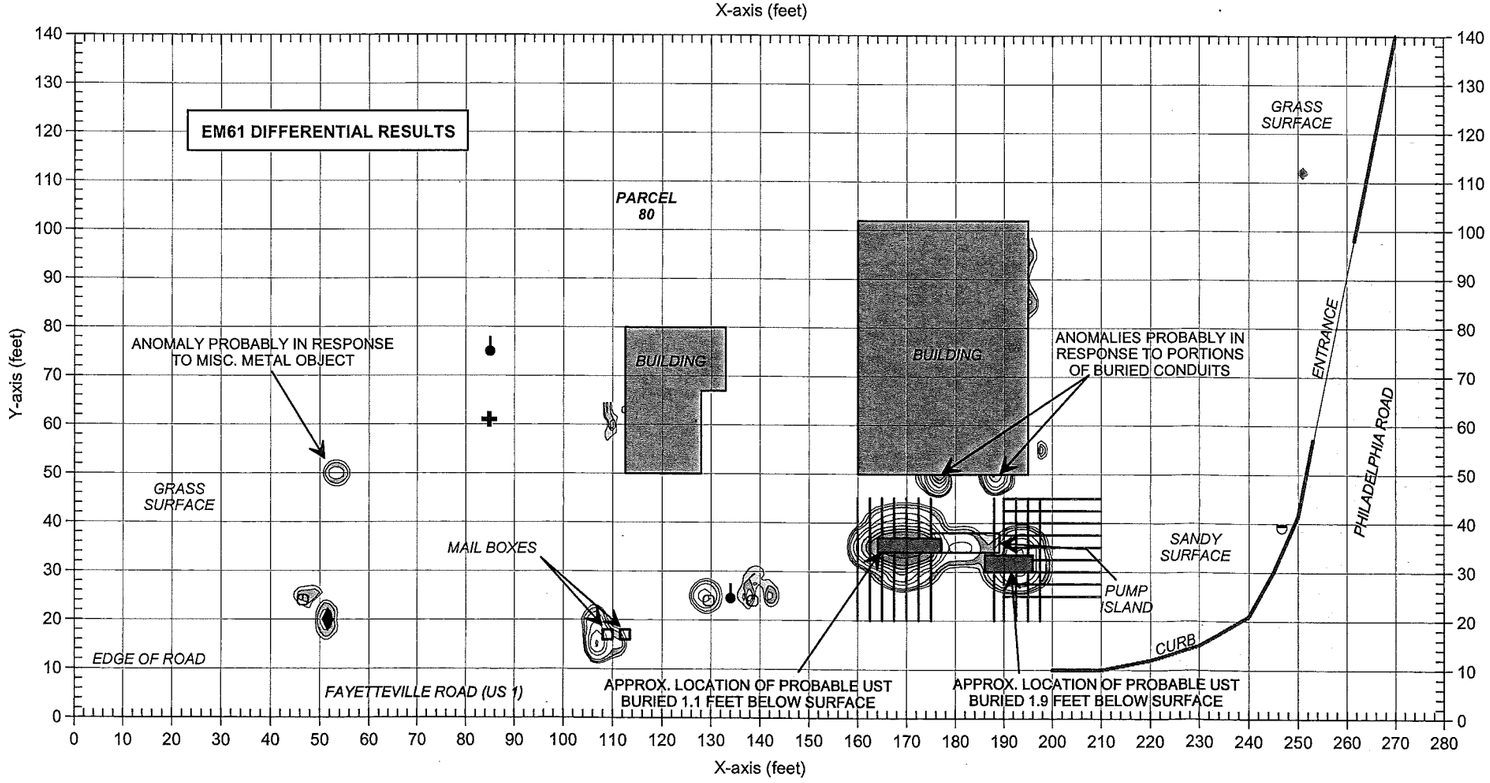
GRAPHIC SCALE IN METERS

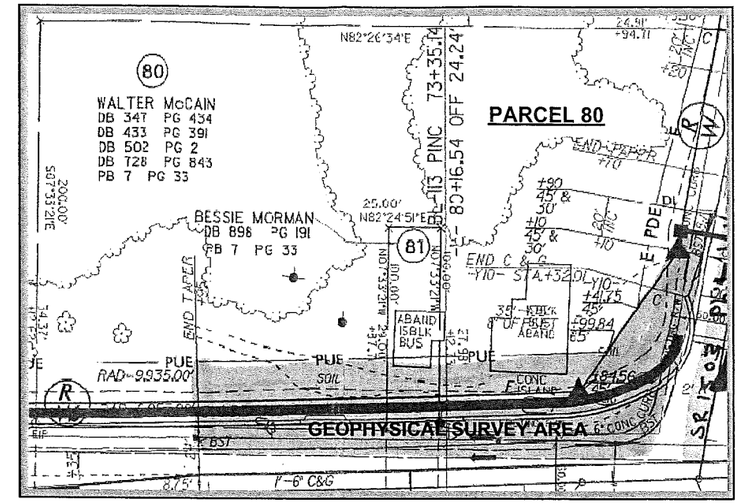
| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/18/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

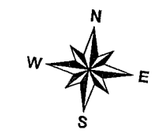
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WILLIAM USSERY PROPERTY (PARCEL 57)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



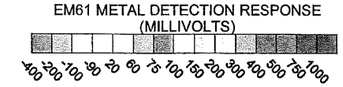




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- FIRE HYDRANT
- TRAFFIC SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 16

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

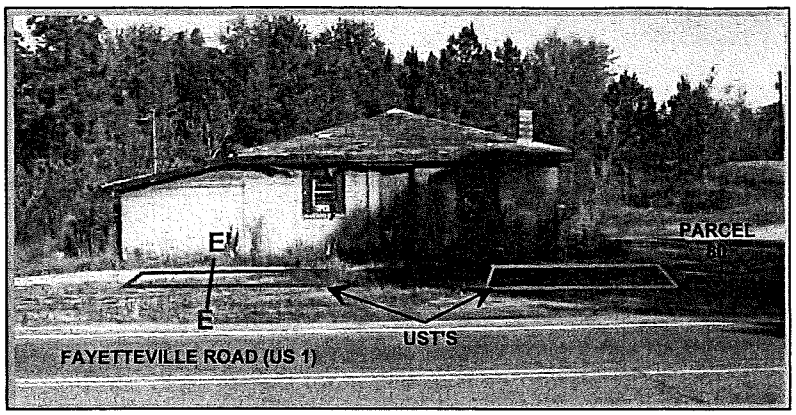
SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

WALTER McCAIN PROPERTY (PARCEL 80)

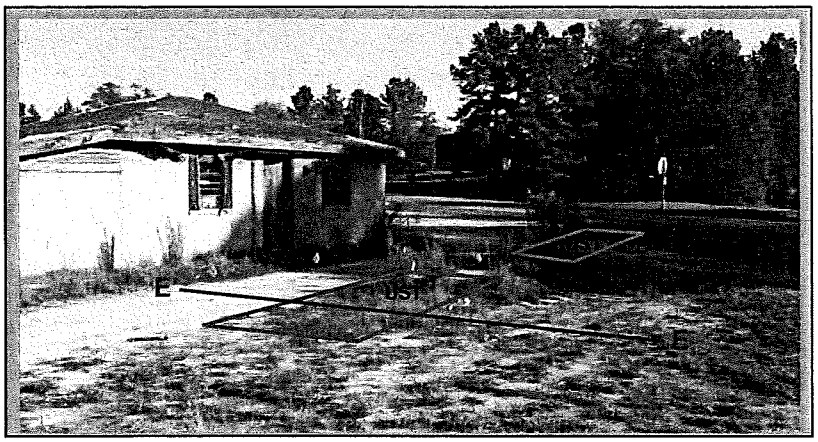
ROCKINGHAM — NORTH CAROLINA

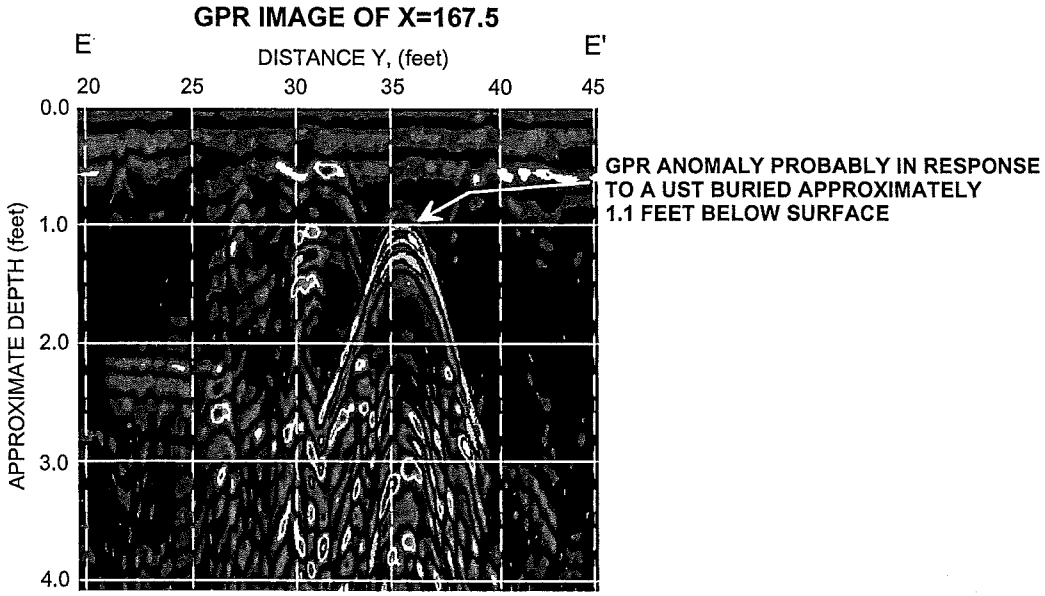
GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



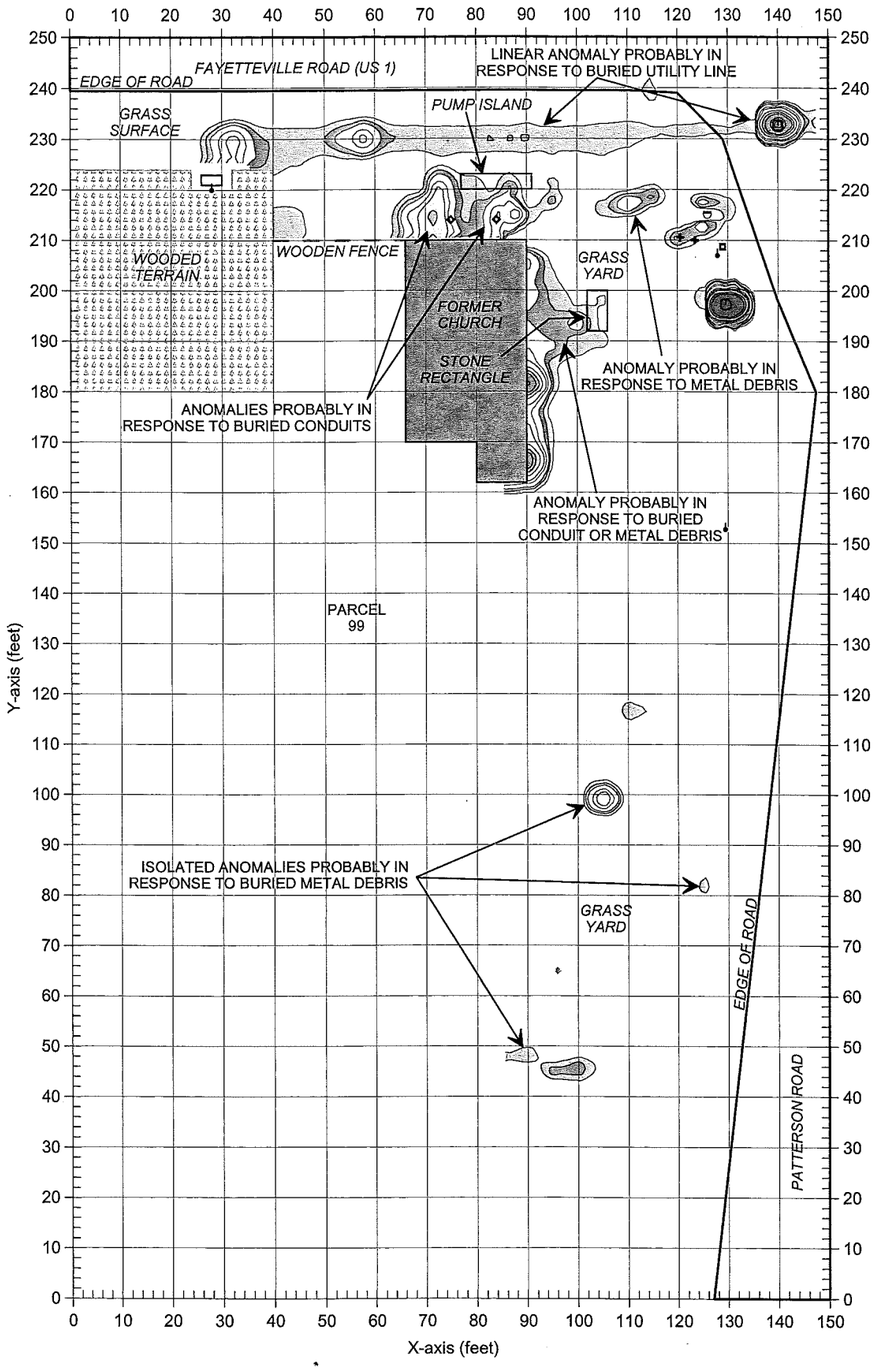

The two photos show the approximate locations of the two probable UST's at Parcel 80, as suggested by the geophysical results. The UST's appear to be buried approximately 1 to 2 feet below surface. A former pump island lies between the two probable UST's.



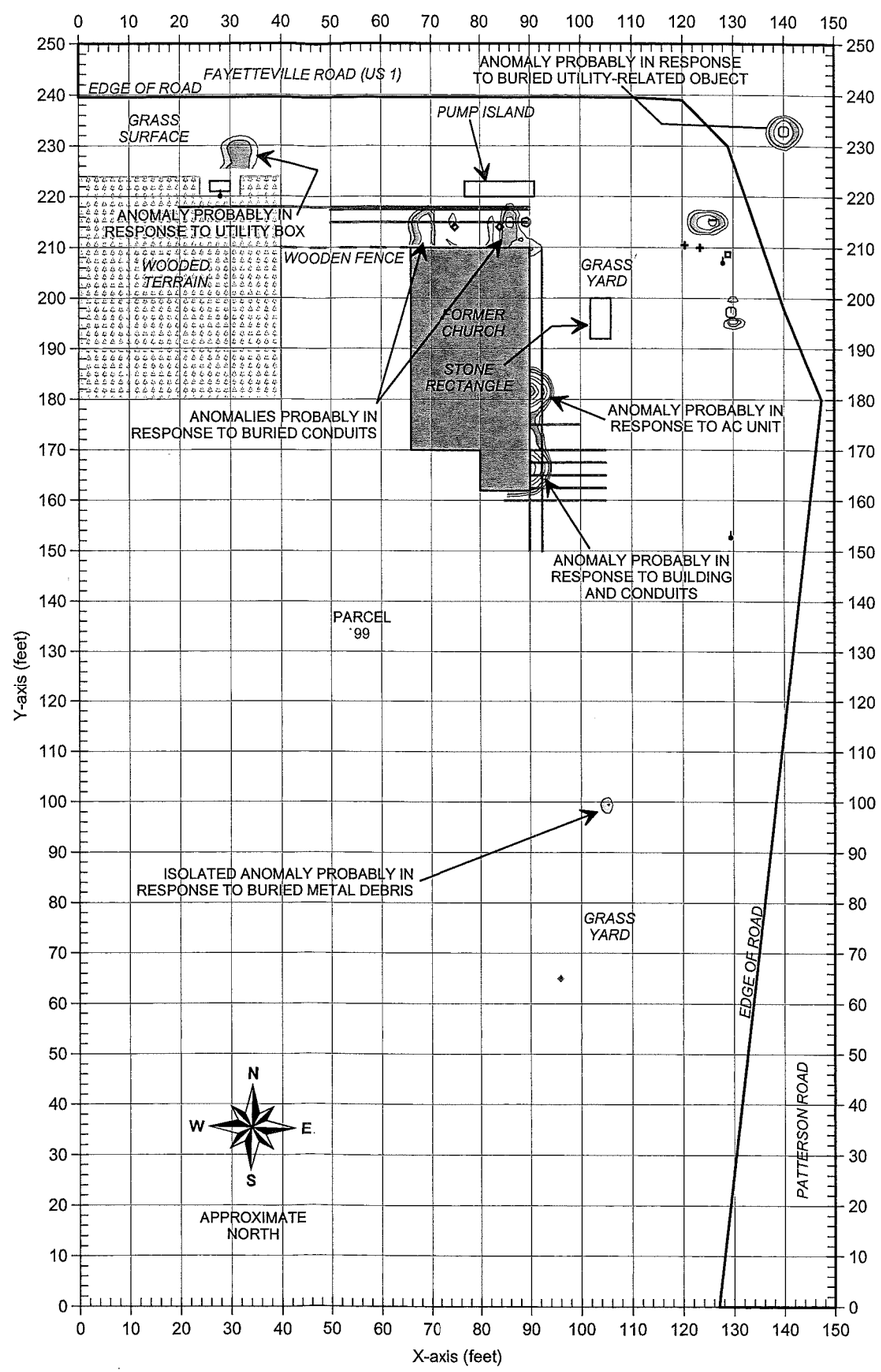



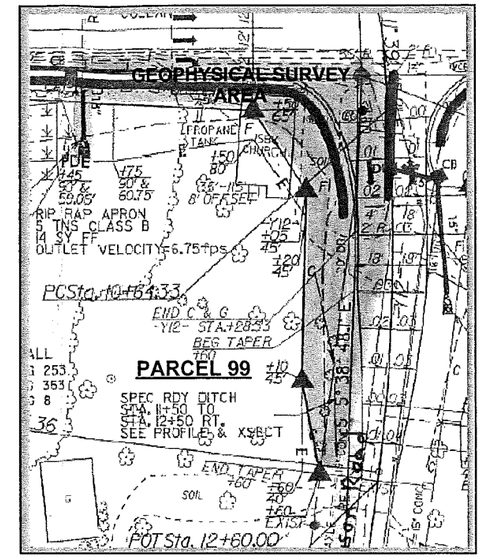

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE: 11/28/05 | DRWN: | GRAPHIC SCALE IN METERS | PHOTOS & GPR IMAGE OF UST LOCATIONS |
| | SITE: WALTER McCAIN PROPERTY (PARCEL 80) | LAY: | CHKD: | | |
| | CITY: ROCKINGHAM STATE: NORTH CAROLINA | DWG: | | | |
| | TITLE: GEOPHYSICAL RESULTS | JNO: 2005-292 | FIGURE: | | FIGURE 17 |

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -20 -5 5 20 50 75 100 150 200 300 400 500 750 1000

## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CANOPY POLE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

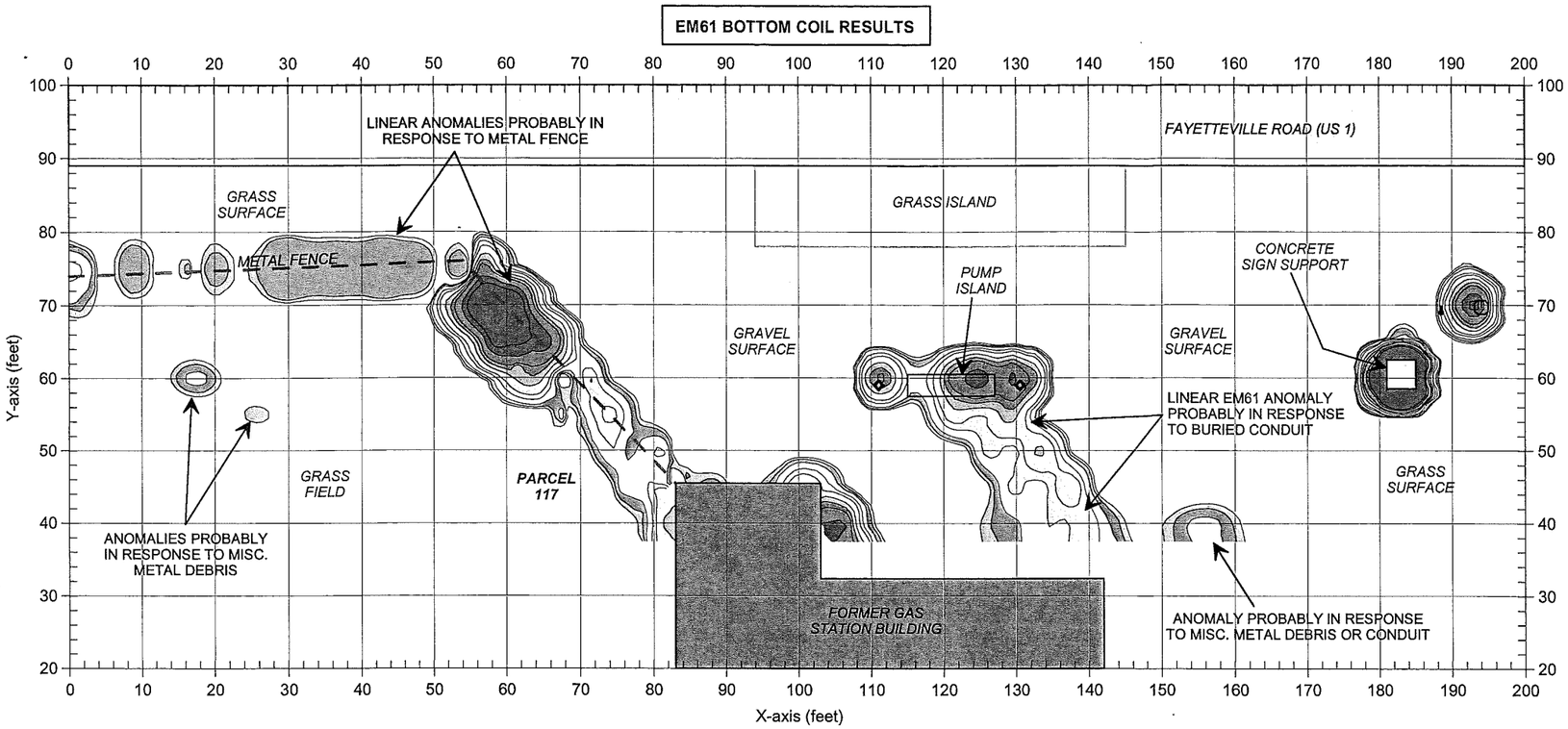
FIGURE 18

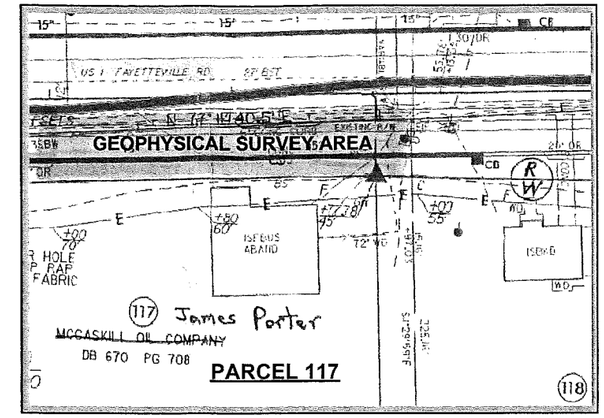
EM61 METAL DETECTION RESULTS

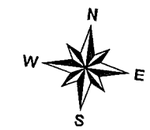
| | |
|---|---|
| GRAPHIC SCALE IN METERS | |
| DRWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J-NO. | 2005-292 |
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | LEON WALL PROPERTY (PARCEL 99) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

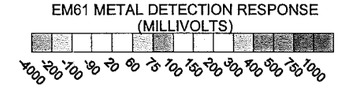


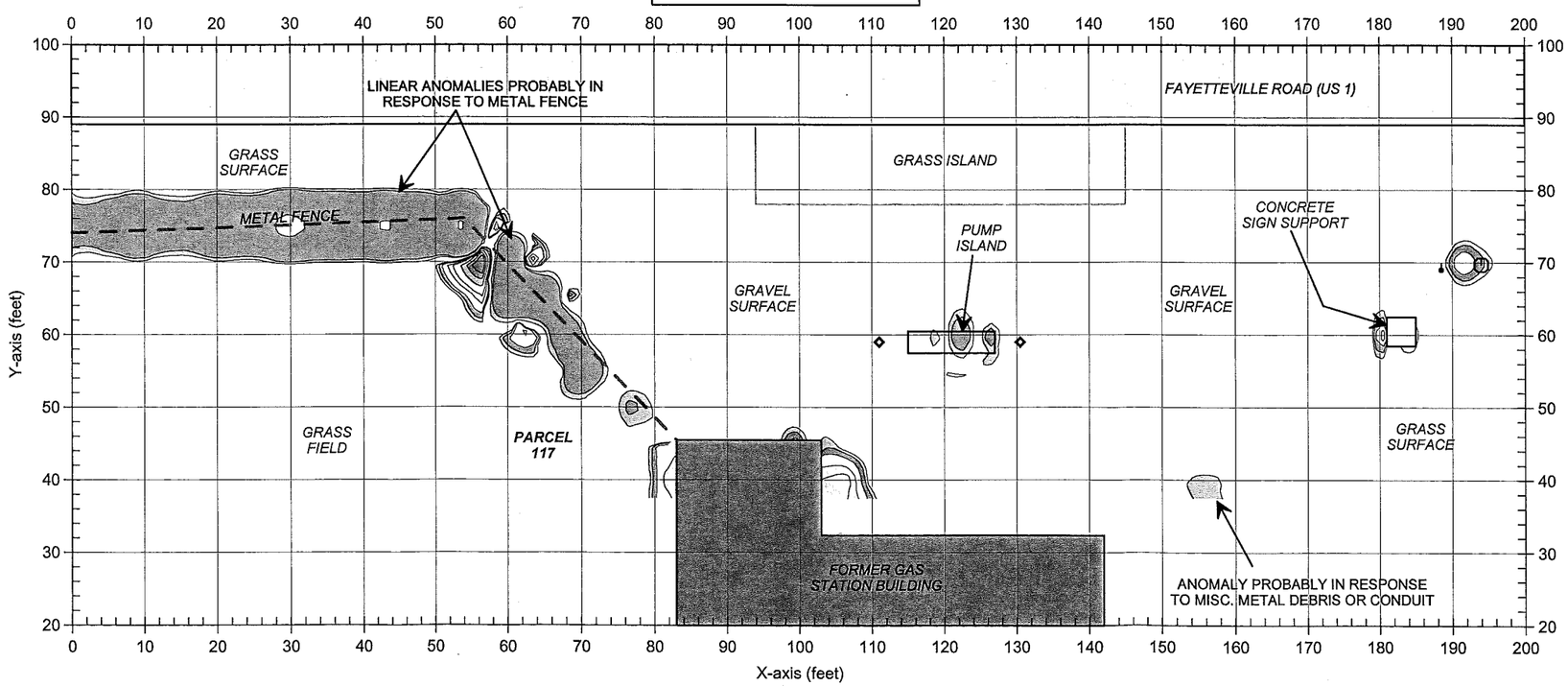




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SUPPORT POLE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar surveys were not conducted at this site.

EM61
METAL DETECTION
RESULTS

FIGURE 19

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: JAMES PORTER PROPERTY (PARCEL 117)

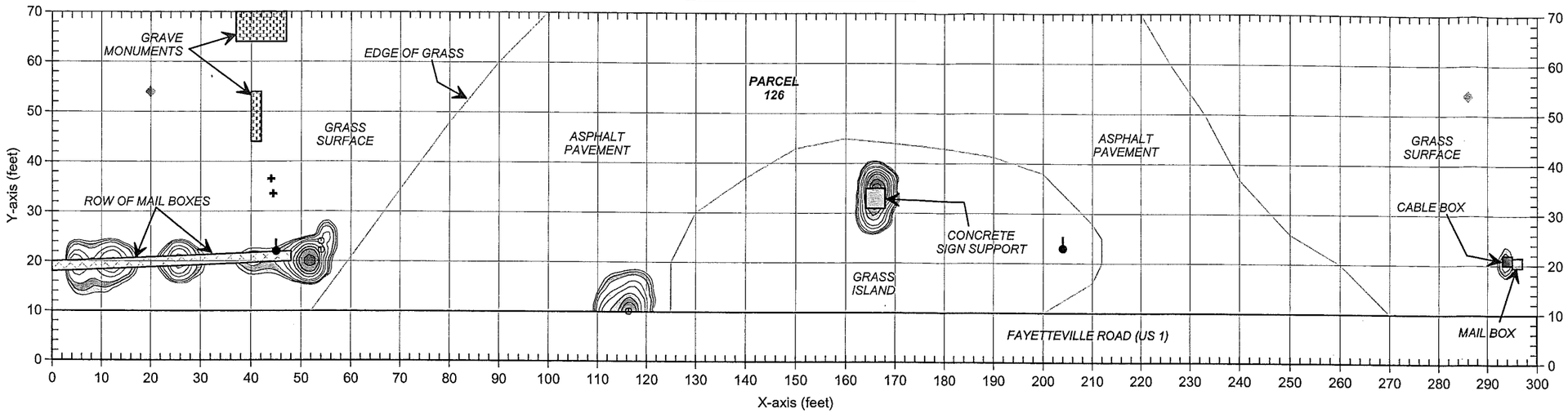
CITY: ROCKINGHAM

STATE: NORTH CAROLINA

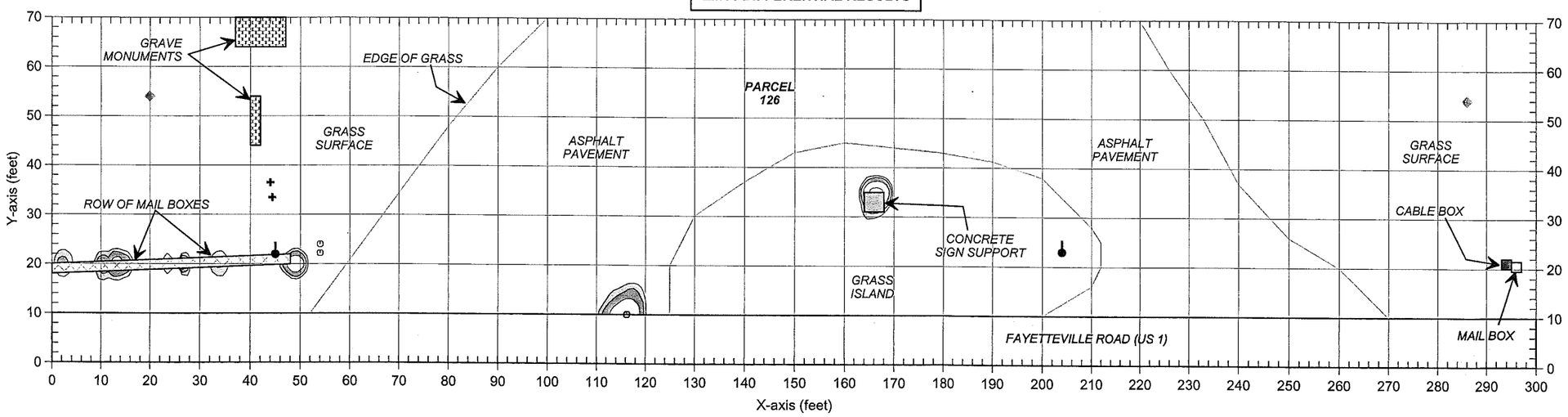
TITLE: GEOPHYSICAL RESULTS

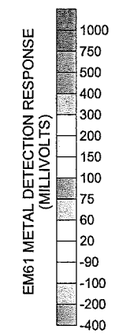
PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

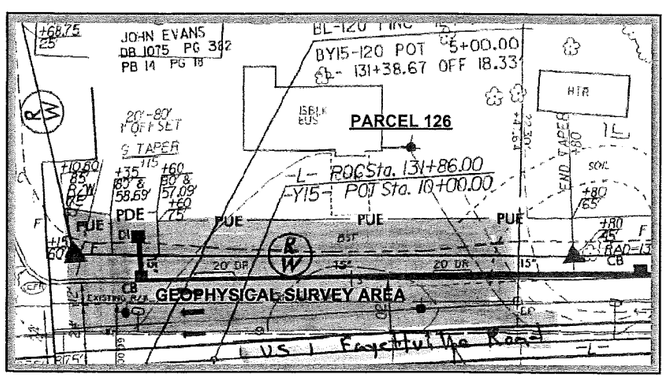
## EM61 BOTTOM COIL RESULTS



## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- UTILITY POLE
- WATER METER OR VALVE COVER
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- GUY WIRE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data surveys were not conducted at this site

EM61
METAL DETECTION
RESULTS

FIGURE 20

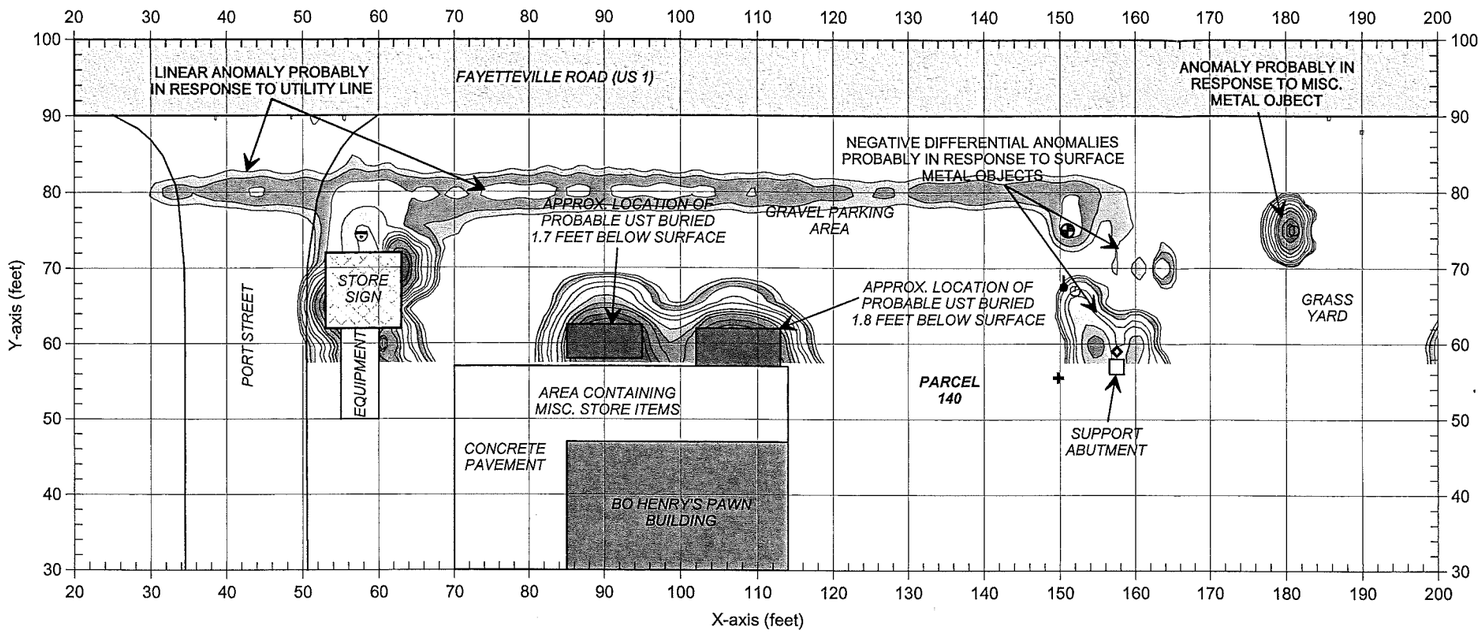
GRAPHIC SCALE IN METERS

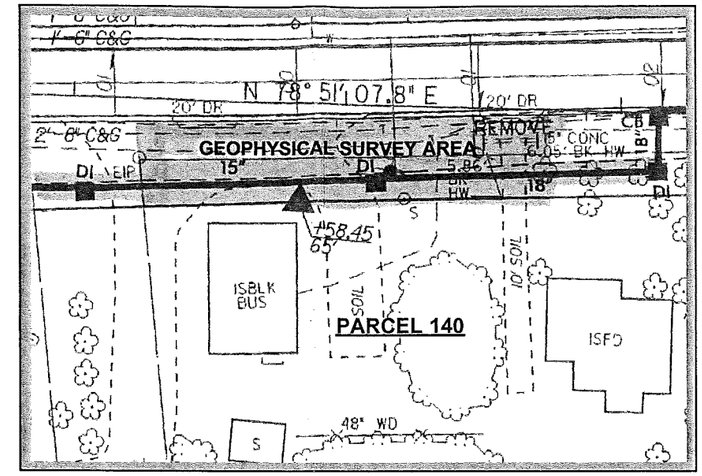
| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| FIGURE | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| J-NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: JOHN EVANS PROPERTY (PARCEL 126)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

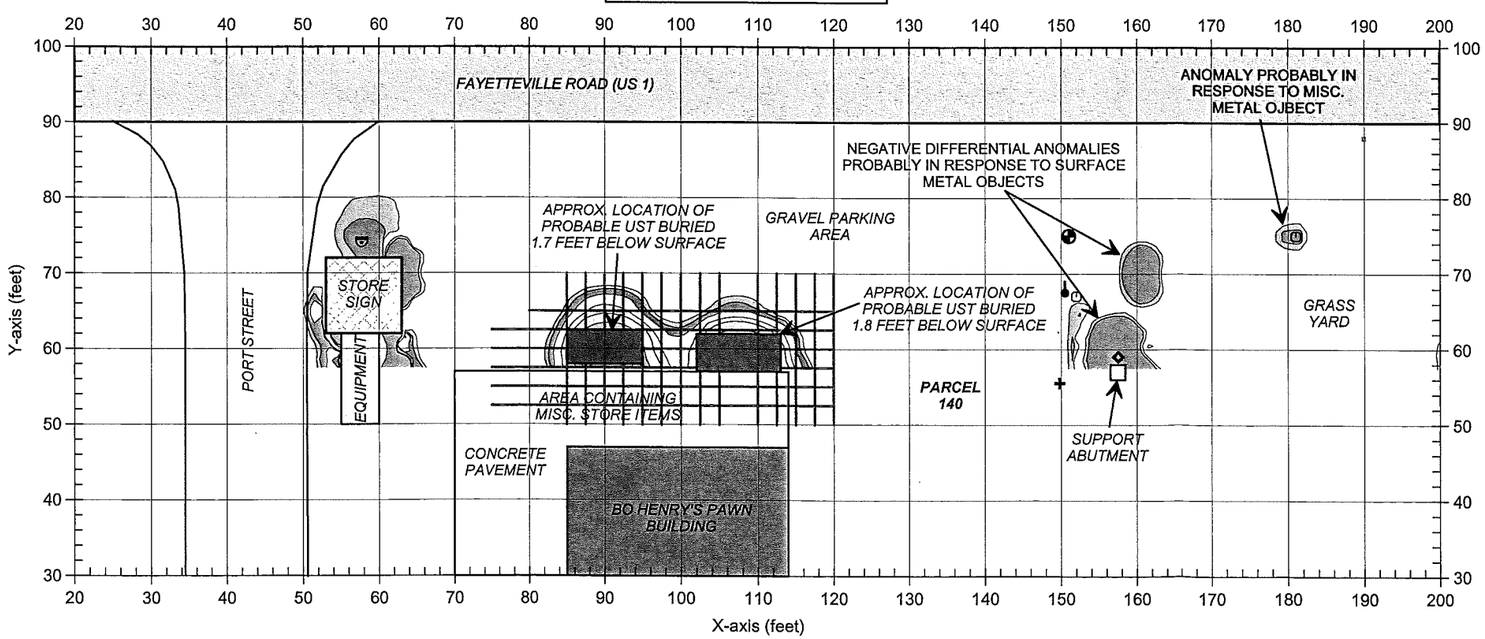



EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -50 20 60 75 100 150 200 300 400 500 750 1000

## EM61 DIFFERENTIAL RESULTS




N
W E
S

APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- FIBER OPTIC LINE SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 21

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J-NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

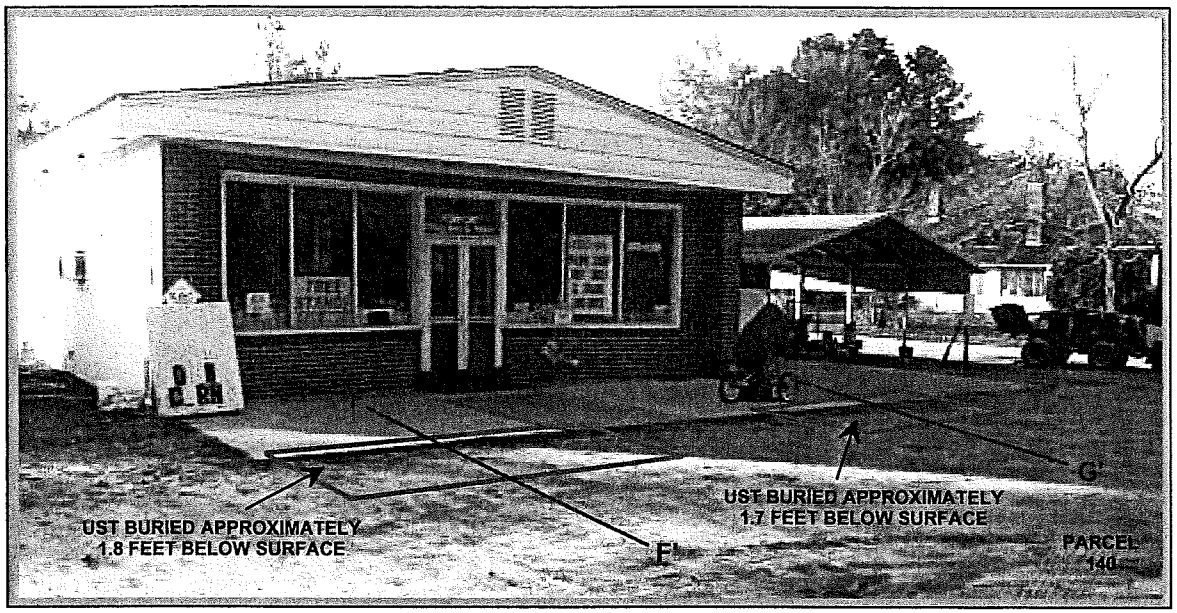
SITE: HENRY USSERY PROPERTY (PARCEL 140)

CITY: ROCKINGHAM

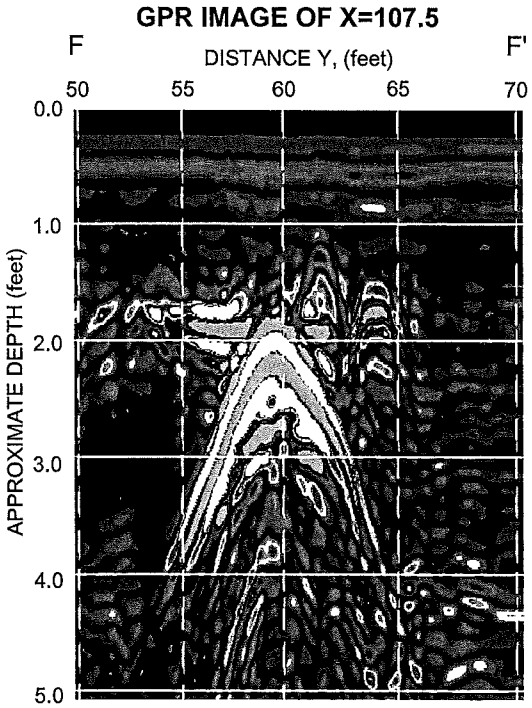
STATE: NORTH CAROLINA

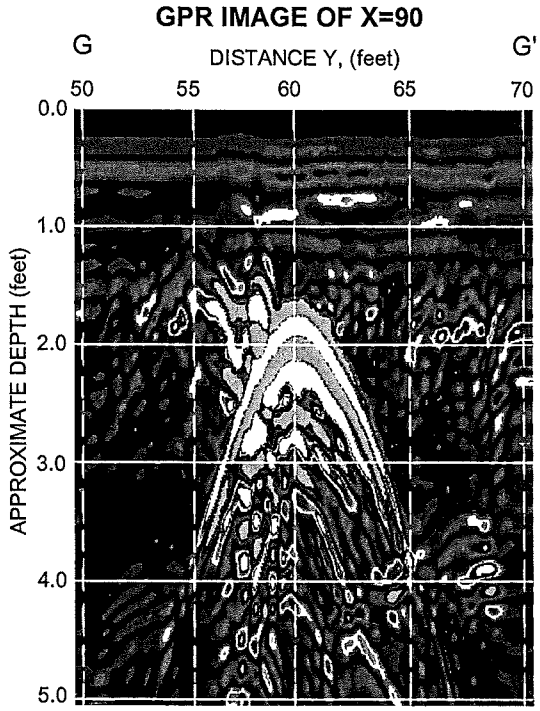
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approximate locations of the two UST's, as suggested by the geophysical results at Parcel 140. The UST's appear to be approximately 1.8 and 1.7 feet below surface.




The GPR images obtained along survey lines X=107.5 and X=90 show the anomalies that are probably in response to the two UST's buried at Parcel 140. The GPR data suggest the UST's are buried approximately 1.8 feet and 1.7 feet below surface, respectively.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGES OF UST LOCATIONS |
| | SITE: HENRY USSERY PROPERTY (PARCEL 140) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 22 |

GRAPHIC SCALE IN METERS

# APPENDIX C

# BORING LOGS

# Log of Soil Boring 57-1

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-1
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) | FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | | |
| 0–1 | | ***SP*** Dry, tan, fine sand | | MC | 75 | 0 | | | |
| 1–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | | |
| 2–3 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | | |
| 3–4 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | | |
| 4–5 | | Boring terminated at 8 feet. | | | | | | | |

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# Log of Soil Boring 57-2

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-2
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* *Total Depth of Boring:* 8 feet

| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) | FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|---|
| | | Ground Surface | | | | | | | |
| 0–1 | | ***SP*** Dry, tan, fine sand | | MC | 75 | 0 | | | |
| 1–3 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | | |
| 3–5 | | ***SP*** Dry, tan/white, fine sand | | MC | 100 | 1 | | | |
| 5–7 | | ***SP*** Dry, tan/white, fine sand | | MC | 100 | 0 | | | |
| 7–8 | | Boring terminated at 8 feet. | | | | | | | |

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# Log of Soil Boring 57-3

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-3
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* *Total Depth of Boring:* 8 feet

| Depth (ft) | Depth (m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm) 250 500 750 | FID Field Screen (ppm) 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ground Surface | | | | | | | |
| 0–1 | 0 | | ***SP*** Damp, tan, fine sand | | MC | 75 | | 0 | | |
| 2–3 | 1 | | ***SP*** Damp, tan, fine sand | | MC | 100 | | 0 | | |
| 4–5 | | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | | 0 | | |
| 6–7 | 2 | | ***SP*** Dry, tan/white, fine sand | | MC | 100 | | 0 | | |
| 8 | | | Boring terminated at 8 feet. | | | | | | | |
| 9–15 | 3–4 | | | | | | | | | |

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# Log of Soil Boring 57-4

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-4
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DLH *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–1 | SP | Dry, tan, fine sand | | MC | 75 | 0 | | |
| 1–2 | SP | Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–3 | SP | Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3–4 | SP | Dry, tan, fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 57-5

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-5
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–1 | | ***SP*** Dry, tan/orange, fine sand | | MC | 75 | 0 | | |
| 1–2 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 2–3 | | ***SP*** Dry, tan/white, fine sand | | MC | 100 | 0 | | |
| 3–4 | | ***SP*** Dry, tan/white, fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 57-6

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-6
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DHH *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0 | | ***SP*** Dry, tan/orange fine sand, possible fill | | MC | 100 | 0 | | |
| 1 | | ***SP*** Dry, tan/orange, fine sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3 (1) | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 4 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 5 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 6 (2) | | Boring terminated at 8 feet. | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 (3) | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 (4) | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 57-7

*Project:* Rockingham Sites (Parcel 057) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 57-7
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* 7.50' bgs
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DRH *Total Depth of Boring:* 8 feet

| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm) 250 500 750 / FID Field Screen (ppm) 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| 0 / 0 | | Ground Surface | | | | | | |
| 0–1.5 | | **SC** Dry, tan, clayey fine sand, | | MC | 100 | 0 | | |
| 1.5–2.5 | | **SC** Dry, orange, clayey fine sand | | | | | | |
| 2.5–4 | | **SC** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | **SC** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 6–8 | | **SC** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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**Raleigh, NC 27607**
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# APPENDIX D

# LABORATORY ANALYTICAL REPORTS

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875:9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

December 15, 2005

Ms. Sheri Knox
Solutions-IES
1101 Nowell Road
Raleigh, NC 27607

RE: Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

Dear Ms. Knox:

Enclosed are the analytical results for sample(s) received by the laboratory on December 1, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

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Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

Solid results are reported on a dry weight basis

Lab Sample No: 926398819 Project Sample Number: 92108546-001 Date Collected: 11/28/05 13:20
Client Sample ID: 57-1(6-8) Matrix: Soil Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 6.7 | % | | 12/01/05 16:29 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.4 | 12/09/05 10:41 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 60 | % | | 12/09/05 10:41 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.8 | 12/06/05 04:38 | DHW | | | |
| 4-Bromofluorobenzene (S) | 82 | % | | 12/06/05 04:38 | DHW | 460-00-4 | | |



Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC 99030
FL NELAP E87648

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Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

Lab Sample No: 926398827 | Project Sample Number: 92108546-002 | Date Collected: 11/28/05 13:25
Client Sample ID: 57-2(4-6) | Matrix: Soil | Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 3.4 | % | | 12/01/05 16:29 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.2 | 12/08/05 22:45 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 94 | % | | 12/08/05 22:45 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.6 | 12/06/05 05:08 | DHW | | | |
| 4-Bromofluorobenzene (S) | 79 | % | | 12/06/05 05:08 | DHW | 460-00-4 | | |



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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

## PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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2225 Riverside Drive
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Fax: 828.252.4618

# QUALITY CONTROL DATA

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

QC Batch: 144394 Analysis Method: EPA 8015
QC Batch Method: EPA 3545 Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926398819 926398827

METHOD BLANK: 926413055
Associated Lab Samples: 926398819 926398827

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 88 | | |

LABORATORY CONTROL SAMPLE: 926413063

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 143.9 | 86 | |
| n-Pentacosane (S) | | | | 116 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926413071 926413089

| Parameter | Units | 926398934 Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | RPD | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 2.124 | 172.30 | 144.5 | 131.5 | 83 | 75 | 9 | |
| n-Pentacosane (S) | | | | | | 120 | 110 | | |



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Fax: 828.252.4618

# QUALITY CONTROL DATA

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

QC Batch: 144145 Analysis Method: EPA 8015
QC Batch Method: EPA 8015 Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926398819 926398827

METHOD BLANK: 926402280
Associated Lab Samples: 926398819 926398827

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 72 | | |

LABORATORY CONTROL SAMPLE: 926402298

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 27.64 | 111 | |
| 4-Bromofluorobenzene (S) | | | | 74 | |

MATRIX SPIKE: 926402306

| Parameter | Units | 926400300 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 1.154 | 30.64 | 38.17 | 121 | |
| 4-Bromofluorobenzene (S) | | | | | 76 | |

SAMPLE DUPLICATE: 926402314

| Parameter | Units | 926400318 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 6.300 | 8.900 | 34 | 1 |
| 4-Bromofluorobenzene (S) | % | 96 | 111 | | |



Asheville Certification IDs
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NC Drinking Water 37712
SC 99030
FL NELAP E87648

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**Pace Analytical Services, Inc.**
*2225 Riverside Drive*
*Asheville, NC 28804*
*Phone: 828.254.7176*
*Fax: 828.252.4618*

# QUALITY CONTROL DATA

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

QC Batch: 144072 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926398819 926398827

SAMPLE DUPLICATE: 926399494

| Parameter | Units | 926399072 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 15.60 | 15.50 | 0 | |



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Fax: 828.252.4618

Lab Project Number: 92108546
Client Project ID: NCDOT 34950.1.1 Parcel #57

## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |
| [1] | Sample re-analysis confirmed the sample is not homogeneous. |



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# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical®

Page: 1 of 1

897913

**Section A** Required Client Information:

| | |
|---|---|
| Company | Solutions - IES |
| Address | 1101 Nowell Rd. Raleigh, NC 27607 |
| Email To: | sknox@solutions-ies.com |
| Phone | 919 873 1060 |
| Fax | 919 873 1074 |
| Requested Due Date/TAT: | Standard |

**Section B** Required Project Information:

| | |
|---|---|
| Report To: | Sheri Knox |
| Copy To: | |
| Purchase Order No. | WBS 34950.1.1 |
| Project Name: | NCDOT Parcel 57 |
| Project Number: | 2730.05A2.NDOT |

**Section C** Invoice Information:

| | |
|---|---|
| Attention: | ~~Mary Howard~~ |
| Company Name: | ~~Solutions IES~~ |
| Address: | NCDOT |
| Pace Quote Reference: | |
| Pace Project Manager: | BKM |
| Pace Profile #: | 3869-6 |

**REGULATORY AGENCY**

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☒ UST ☐ RCRA ☐ Other _____

**SITE LOCATION** ☐GA ☐IL ☐IN ☐MI ☐MN ☒NC ☐OH ☐SC ☐WI ☐OTHER _____

**Section D** Required Client Information

**SAMPLE ID**

One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE G=GRAB C=COMP | COLLECTED 2005 COMPOSITE START DATE | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | Filtered (Y/N) GRO 5030/8015 | Filtered (Y/N) DRO 3545/8015 | Residual Chlorine (Y/N) | Pace Project Number 92109546 Lab I.D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 57-1(6-8) | SL | G | 11/28 | 1320 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 926398919 |
| 2 | 57-2(4-6) | SL | G | 11/28 | 1325 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 8827 |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

Requested Analysis: GRO 5030/8015; DRO 3545/8015

**Additional Comments:**

| RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME |
|---|---|---|---|---|---|
| D. Hirth / Solutions IES | 12/1 | 1030 | [signature] - PAL | 12-1-05 | 1100 |
| [signature] | 12-1-05 | 1315 | [signature] | 12/1 | 1315 |
| | | | | | |
| | | | | | |

**SAMPLE CONDITION**

| Temp in °C | Received on Ice | Custody Sealed Cooler | Samples Intact |
|---|---|---|---|
| 2.1 | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: Daniel K Hirth

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY) [illegible]

SEE REVERSE SIDE FOR INSTRUCTIONS

RECEIVED
JAN 17 2006
NCDOT - Geotechnical Engineering Unit

# PRELIMINARY SITE ASSESSMENT
# PARCEL 080, WALTER McCAIN PROPERTY
# 1069 FAYETTEVILLE ROAD (US HIGHWAY 1)
# ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
# NC DOT PROJECT: U-3456
# WBS ELEMENT: 34950.1.1

**Prepared for:**
**NC Department of Transportation**
**Geotechnical Engineering Unit**
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

**Prepared by:**
**Solutions-IES**
1101 Nowell Road
Raleigh, North Carolina 27607

**Solutions-IES Project No. 2730.05A2.NDOT**

NORTH CAROLINA PROFESSIONAL SEAL 022585 1/13/06 ENGINEER SHERI LANE KNOX

Daniel K. Hirth
Hydrogeologist

Sheri L. Knox, P.E.
Project Manager

**January 13, 2006**

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3.0 FIELD ACTIVITIES ..... 1

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APPENDIX B – GEOPHYSICAL INVESTIGATION REPORT

APPENDIX C – BORING LOGS

APPENDIX D – LABORATORY ANALYTICAL REPORT

## 1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening Fayetteville Road (US-1) in Rockingham, Richmond County, North Carolina. The project may require the NCDOT to acquire additional property for new roadway construction. On November 3, 2005, Solutions-IES submitted a proposal to conduct Preliminary Site Assessments (PSAs) for 14 parcels of land that contain or reportedly contained underground storage tanks (USTs) or areas of interest identified by NCDOT. This report summarizes the results of field and laboratory activities conducted during the PSA of a portion of the Walter McCain property located at 1069 Fayetteville Road. The location of the parcel is shown on Figures 1 and 2. The scope of work was performed as outlined in Solutions-IES proposal NC05449P, and initiated based on a Notice to Proceed issued by NCDOT on November 7, 2205 under contract 7000005553, dated May 9, 2005.

## 2.0 BACKGROUND AND SITE DESCRIPTION

Parcel 080 is located on the northwest quadrant of the Fayetteville Road and Philadelphia Road (SR 1503) intersection. According to NCDOT, a former gas station was located within Parcel 080, and reportedly, that gas station has not operated for at least 20 years. After speaking with people near the site, Solutions-IES also determined that the former gas station also housed a lounge, and that a vacant barbershop is located on Parcel 080. In addition, it appears that a fuel dispenser pump island (identified as a concrete island on Figures 2 and 3) is located within the Study Area of Parcel 080, but the associated dispensers have been removed. Monitoring wells or evidence of ongoing remediation were not observed by NCDOT, and information regarding potential USTs could not be located within the NCDENR UST registry. Photographs of the site are included in Appendix A.

## 3.0 FIELD ACTIVITIES

Prior to beginning subsurface sampling, Solutions-IES contacted the North Carolina One Call Center to locate underground utilities at the site. Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electromagnetic survey of the subsurface in the proposed right-of-way and easement area. The electromagnetic survey was performed on November 12, 2005, and the survey identified anomalies within the Study Area (Appendix B: Figure 16). Pyramid returned to Parcel 080 on November 22, 2005 to perform ground penetrating radar (GPR) survey. According the Geophysical Investigation Report, the GPR image suggests the presence of two potential USTs located on each side of a former fuel dispenser pump island. A GPR image is provided in Appendix B: Figure 17.

After reviewing the geophysical report, Solutions-IES mobilized to the site on November 30, 2005 to collect soil samples in the proposed right-of-way in the vicinity of the potential USTs and near a proposed drainage line. Ten soil borings were advanced at the site to a depth of 8 feet below ground surface (ft bgs) using a Geoprobe®. Six of the borings were located in close proximity to the potential USTs (80-1 through 80-6) and the remaining four borings (80-7 through 80-10) were located along the drainage line spaced approximately 50 feet apart (Figure 3).

A MacroCore® sampler fitted with a single-use, disposable polyvinyl chloride (PVC) liner was used to collect samples at 4-foot intervals. Each soil sample was split into two aliquots. Each aliquot was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the other bag was held at ambient temperature for field screening volatile vapors with a flame ionization detector (FID). After approximately 20 minutes to allow accumulation of volatile organic compounds (VOCs) in the headspace of the latter bag, the headspace was scanned with the FID. The FID readings were rounded to the nearest whole number and entered on the boring logs along with the soil description and any indications of petroleum staining or odor (Appendix C).

The subsurface soil at the site consisted primarily of fine sand (Unified Soil Classification SP) or fine sand underlain by clayey fine sand (Unified Soil Classification SC) to boring termination. However, clayey fine sand was encountered in Boring 80-10 to 4 feet bgs, underlain by fine sand and clayey fine sand. Moist to wet soil was encountered in borings 80-1, 80-6, and 80-10. Although there was evidence of soil moisture in these borings, the groundwater table was not encountered.

As shown in Table 1, the headspace screening of the soils from the site ranged from not detected (0) to 7.2 parts per million (ppm). The FID readings were difficult to distinguish from background concentrations, however, the two soil samples with the highest FID readings were submitted for laboratory analysis (80-5 and 80-10). Boring 80-5 was located in close proximity to one of the potential USTs identified by the geophysical investigation, and boring 80-10 was located near a proposed drop inlet (Figure 3). A FID reading of 7.2 ppm was measured in the soil sample collected from boring 80-5 (4 to 6 feet bgs) and a FID reading of 1.0 was measured in the sample collected from Boring 80-10 (4-6 ft bgs). The soil samples were placed in laboratory-supplied containers and stored on ice pending shipment to Pace Analytical Services, Inc. (Pace) in Huntersville, NC under chain-of-custody control. The samples were submitted for analysis of gasoline range organics (GRO) and diesel range organics (DRO) total petroleum hydrocarbons (TPH) by EPA Modified Method 8015 with preparation methods 5030 and 3545, respectively. A groundwater sample was not collected from the Study Area at Parcel 080.

## 4.0 LABORATORY RESULTS

According to the laboratory analytical results, concentrations of TPH (GRO and DRO) were not detected above the method detection limit in either of the soil samples. The analytical results are summarized in Table 2, and the laboratory reports for the soil samples are included in Appendix D.

## 5.0 DISCUSSION AND CONCLUSIONS

Solutions-IES advanced ten soil borings in the proposed right-of-way area near the potential USTs and near a proposed drainage line located on a portion of Parcel 080. Laboratory data and field observations do not indicate a release of petroleum hydrocarbons at the site. Therefore, Solutions-IES does not recommend additional assessment activities at this time.

# TABLES

**TABLE 1**
**SUMMARY OF FIELD SCREENING RESULTS FOR SOIL**
**Parcel 080 – Walter McCain Property**
**1069 Fayetteville Road (US Highway 1)**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**Sample Collection Date: November 30, 2005**

| Sample Depth Below Ground Surface | Soil Borings | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 80-1 | 80-2 | 80-3 | 80-4 | 80-5 | 80-6 | 80-7 | 80-8 | 80-9 | 80-10 |
| | FID Reading (ppm) | | | | | | | | | |
| 0 - 2 feet | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| 2 - 4 feet | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| 4 - 6 feet | 0.1 | 0.5 | 0.1 | 0 | 7.2 | 0 | 0.1 | 0.1 | 0.1 | 1.0 |
| 6 - 8 feet | 0 | 0.7 | 0.1 | 0 | 1.5 | 0 | 0 | 0.1 | 0.2 | 0.2 |

Notes:

1. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
2. Samples denoted by shaded cells were submitted for laboratory analysis.

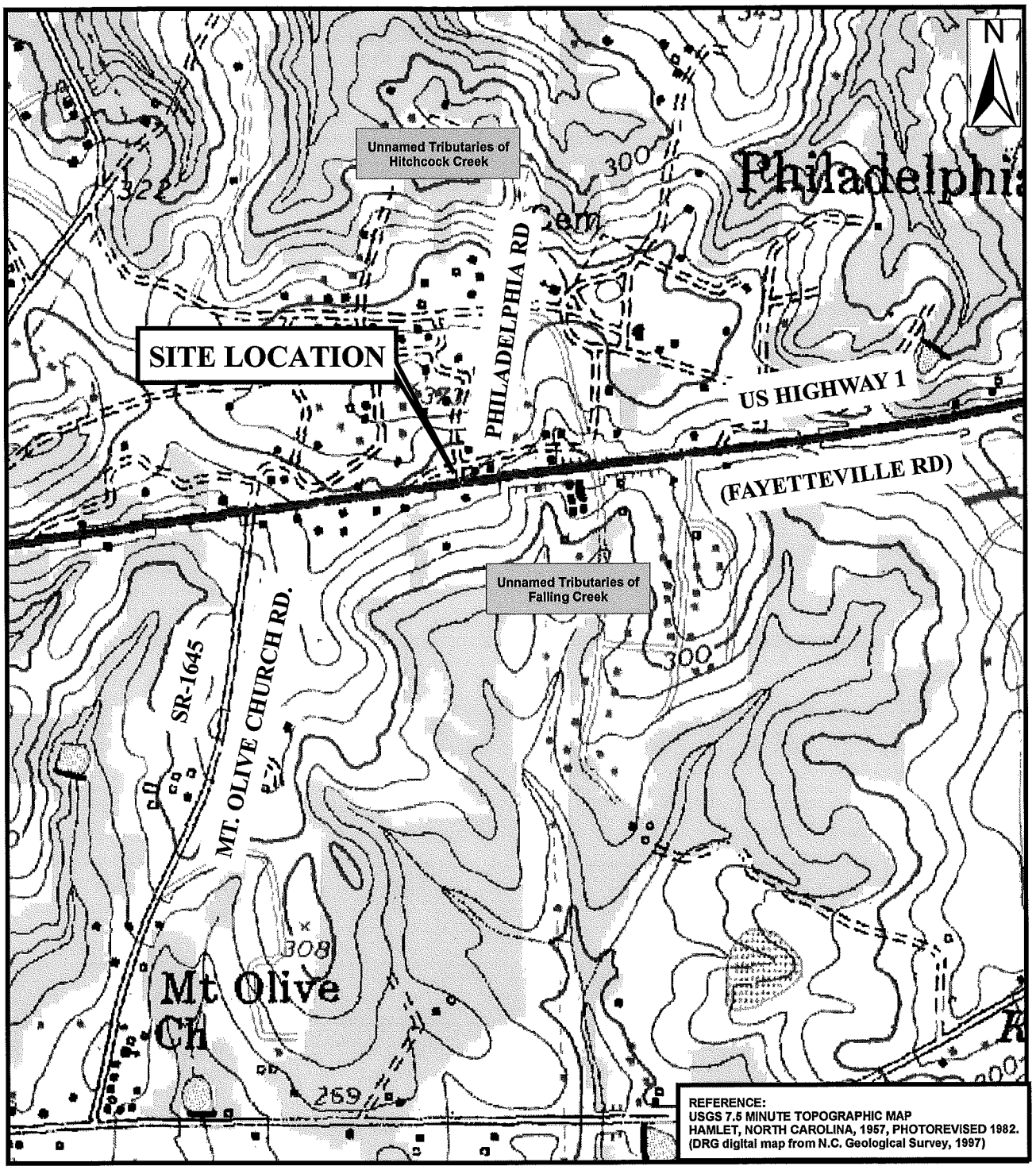
**TABLE 2**
**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 080 – Walter McCain Property**
**1069 Fayetteville Road (US Highway 1)**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**Sample Collection Date: November 30, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 80-5 | 4-6 | <5.0 | <5.4 |
| 80-10 | 4-6 | <4.5 | <5.6 |

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons

# FIGURES



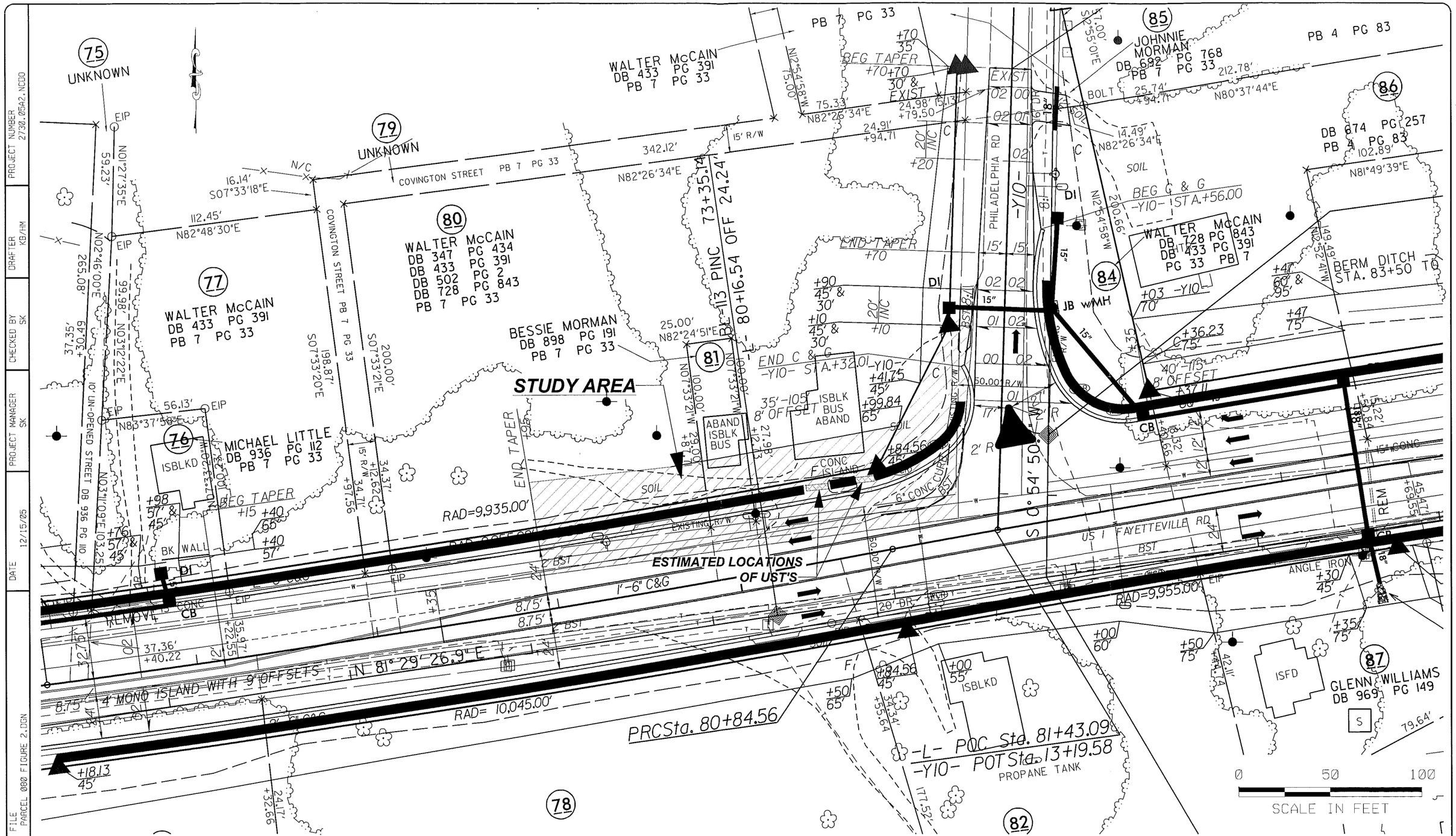

1:10,000

SITE LOCATION MAP
PARCEL 080 - WALTER McCAIN PROPERTY
1069 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1(NCDOT PROJECT: U-3456)

Solutions-IES
Industrial & Environmental Services

1101 Nowell Road, Raleigh, NC 27609
Phone (919) 873-1060, Fax (919) 873-1074

| | | | |
|---|---|---|---|
| Created by: KBB<br>Checked by: BR<br>File: FIG1.mxd<br>Software: ESRI ArcMap 9.0 | | Project: 2730.05A2.NCDO<br>Date: 12/15/05 | |
| | | FIGURE | 1 |




PROJECT NUMBER 2730.05A2.NCDO | DRAFTER KB/HM | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 080 FIGURE 2.DGN


Solutions-IES
Industrial & Environmental Services
1101 NOWELL ROAD
RALEIGH, NORTH CAROLINA 27607
TEL.: (919) 873-1060 FAX.: (919) 873-1074

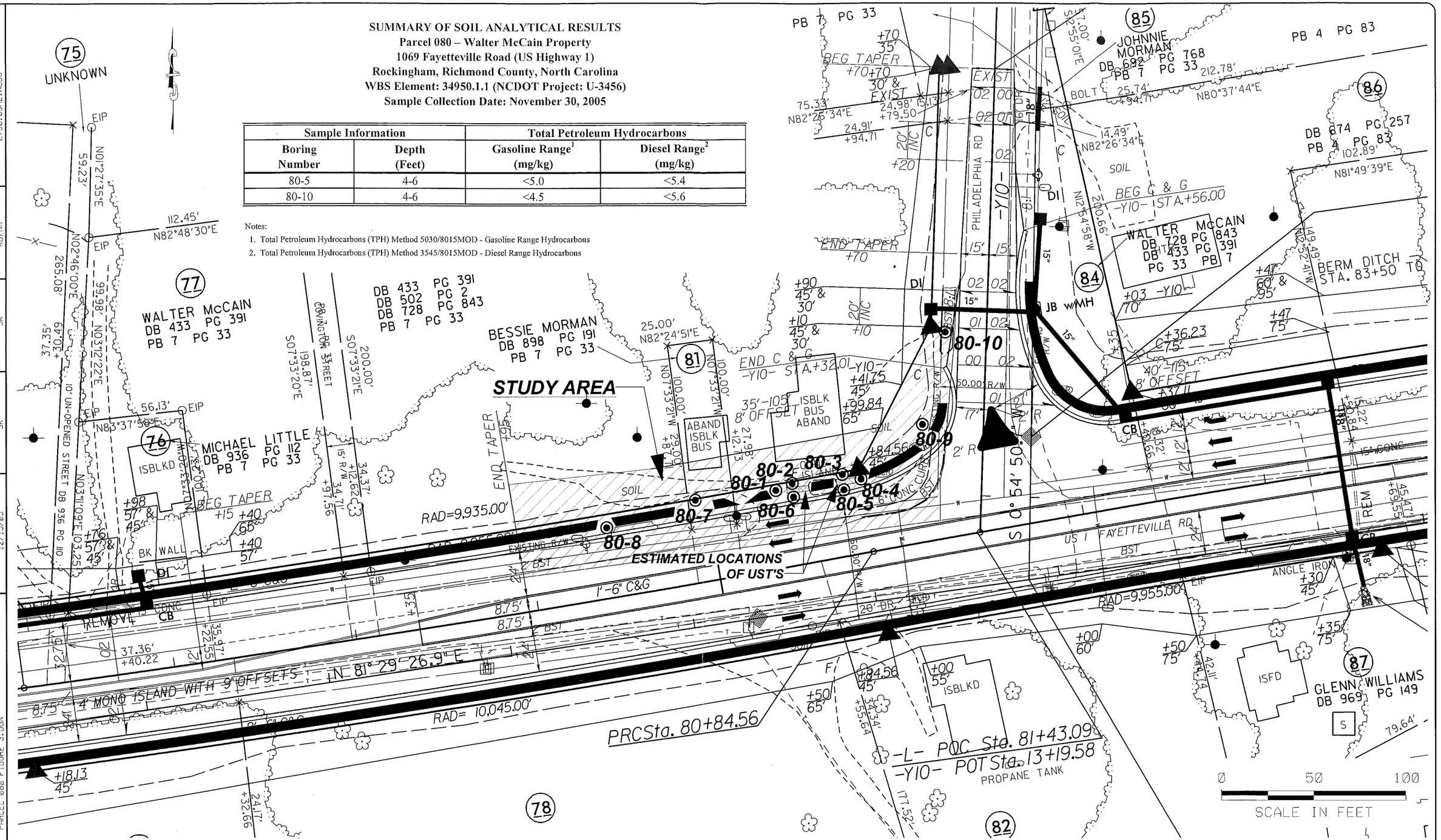

SITE MAP
PARCEL 080 - WALTER MCCAIN PROPERTY
1069 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 2

**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 080 – Walter McCain Property**
**1069 Fayetteville Road (US Highway 1)**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**Sample Collection Date: November 30, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 80-5 | 4-6 | <5.0 | <5.4 |
| 80-10 | 4-6 | <4.5 | <5.6 |

Notes:
1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons





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BORING LOCATIONS
PARCEL 080 - WALTER MCCAIN PROPERTY
1069 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

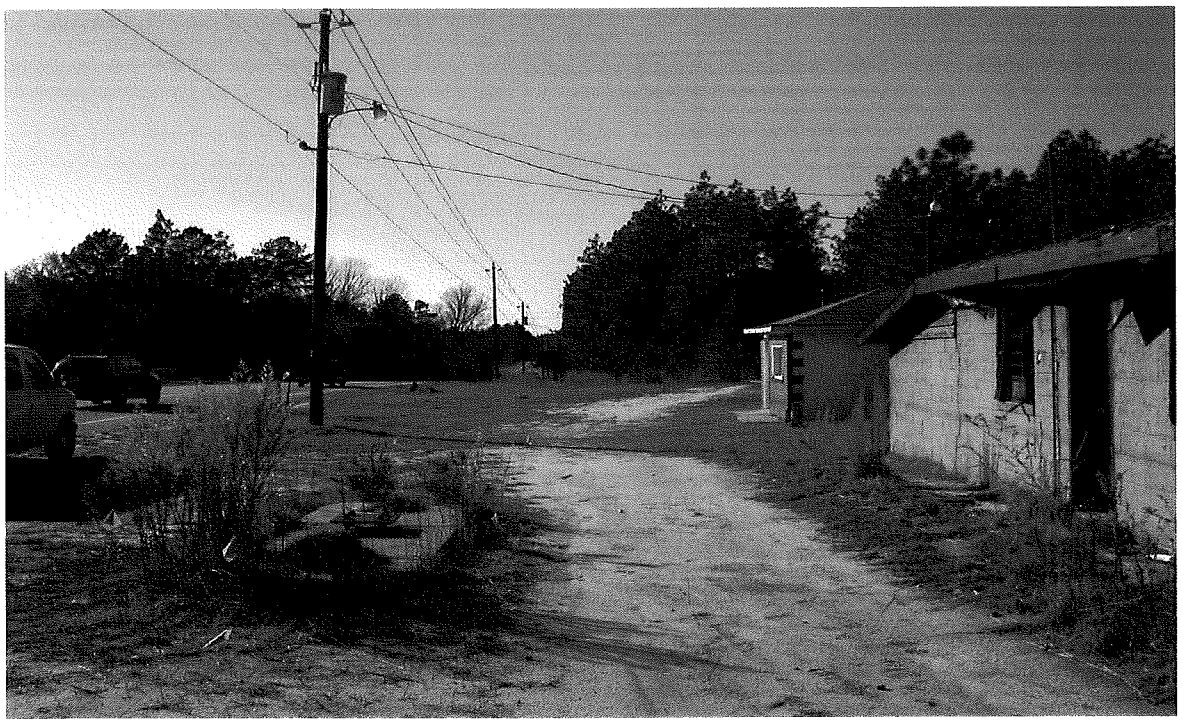
FIGURE: 3

PROJECT NUMBER 2730.05A2.NCDO | DRAFTER KB/HM | CHECKED BY SK | PROJECT MANAGER SK | DATE 12/15/05 | FILE PARCEL 080 FIGURE 3.DGN

# APPENDIX A

# PHOTOGRAPHS

**Photograph 1** - Looking west-north west towards the former barbershop; potential UST locations are marked with pink flags.



**Photograph 2** - Looking west-southwest at Parcel 080; full view of concrete pad (pump island).

# APPENDIX B

# GEOPHYSICAL DATA

Pyramid Project # 2005292

# GEOPHYSICAL INVESTIGATION REPORT

*GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S*

## Rockingham, US 1 (Fayetteville Road) Sites

**Rockingham, North Carolina**
**State Project Number U-3456**

**November 30, 2005**

**Report prepared for:** Sheri Knox & Daniel Hirth
Solutions Industrial & Environmental Services Inc.
1101 Nowell Rd.
Raleigh, NC 27607

**Prepared by:** Doug Canavello
Douglas Canavello, PG

**Reviewed by:** Brett S. Higgins
Brett S. Higgins


**PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.**
**700 NORTH EUGENE ST.**
**GREENSBORO, NC 27401**
**(336) 335-3174**

**Solutions Industrial & Environmental Services Inc.**
**GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S**
**Rockingham, US 1 (Fayetteville Road) Sites**
**State Project Number U-3456**

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- 3.2 Parcel 7 – Julia M. Ratliff Property
- 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties
- 3.4 Parcel 17 – Harvey E. Melton Property
- 3.5 Parcel 41A – W. J. Barnhart Property
- 3.6 Parcel 42 – Wesly Denham Property
- 3.7 Parcel 57 – William Ussery Property
- 3.8 Parcel 80 – Walter McCain Property
- 3.9 Parcel 99 – Leon Wall Property
- 3.10 Parcel 117 – James Porter Property
- 3.11 Parcel 126 – John Evans Property
- 3.12 Parcel 140 – Henry Ussery Property

4.0 SUMMARY & CONCLUSIONS

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| Figure 14 | Parcel 42, Wesly Denham Property – EM61 Metal Detection Results |
| Figure 15 | Parcel 57, William Ussery Property – EM61 Metal Detection Results |

FIGURES (continued)


| | |
|---|---|
| Figure 16 | Parcel 80, Walter McCain Property – EM61 Metal Detection Results |
| Figure 17 | Parcel 80, McCain Property – Photos & GPR Image of UST Locations |
| Figure 18 | Parcel 99, Leon Wall Property – EM61 Metal Detection Results |
| Figure 19 | Parcel 117, James Porter Property – EM61 Metal Detection Results |
| Figure 20 | Parcel 126, John Evans Property – EM61 Metal Detection Results |
| Figure 21 | Parcel 140, Henry Ussery Property – EM61 Metal Detection Results |
| Figure 22 | Parcel 140, Ussery Property – Photo & GPR Images of UST Locations |

## 1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions Industrial & Environmental Services, Inc. during the period of November 11-23, 2005, within the proposed Right-of-Way (ROW) areas at 13 sites in Rockingham, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3456 and WBS Element 34950.1.1. The sites are located along the north or south sides of US 1 (Fayetteville Road) from 0.25 miles west of SR-1424 (Roberdell Road) to 0.25 miles west of SR 1640 (Wiregrass Road). The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Mr. Walt Beckwith, PG provided maps during the week of November 1, 2005 that outlined the geophysical survey areas of each site. Solutions IES representatives, Ms. Sheri Knox, PE and Mr. Daniel Hirth, PG provided guidance during the geophysical investigations. Geophysical surveys were conducted at the following 13 sites:

| Property Owner | Parcel | Present Use of Property |
|---|---|---|
| W. J. Barnhart Property | (Parcel 4) | Used Car Lot & Auto Repair Garage |
| Julia M. Ratliff Property | (Parcel 7) | Vacant Lot |
| Samuel D. Tanner Property | (Parcel 15) | Vacant Building & Lot |
| Harvey E. Melton Property | (Parcel 17) | BP Gas Station |
| Samuel D. Tanner Property | (Parcel 21) | Strip Mall |
| W. J. Barnhart Property | (Parcel 41A) | Vacant Building & Lot |
| Wesly Denham Property | (Parcel 42) | Havoline Carolina Quick Lube |
| William Ussery Property | (Parcel 57) | Vacant Building & Lot |
| Walter McCain Property | (Parcel 80) | Vacant Buildings & Lot |
| Leon Wall Property | (Parcel 99) | Vacant Building & Lot |
| James Porter Property | (Parcel 117) | Vacant Building & Lot |
| John Evans Property | (Parcel 126) | Custom Monument Company |
| Henry Ussery Property | (Parcel 140) | Bo Henry's Pawn Shop |

Photos of the above sites are presented in **Figure 1**.

## 2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot survey grid was established across the proposed ROW areas of the 13 sites using water-based marking paint. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the manufacture's specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST's and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 24 scans per second. A 110 MHz high pass filter and an 800 MHz low pass filter were used during data

acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately seven feet, based on an estimated two-way travel time of 7 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint software. The locations of GPR survey areas or individual GPR survey lines are shown as dashed, purple rectangles or solid purple lines, respectively on the EM61 differential contour plots. Photos of the EM61 and GPR instruments are shown in **Figure 2**. The approximate perimeters of probable or possible UST's , based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags when possible. The approximate locations of probable or possible UST's are shown on the EM61 contour plots as magenta-shaded rectangles.

During the weeks of November 14 and November 23, 2005, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox and Mr. Hirth.

## 3.0 DISCUSSION OF RESULTS

### 3.1 Parcel 4 - W. J. Barnhart Property

Parcel 4 is located on the southern side of Fayetteville Road and contains an active used car lot and auto repair garage. The western portion of the ROW area consists of asphalt with a concrete pad and the eastern portion of the ROW area consists of a sandy surface.

The bottom coil results and the differential results are presented in **Figure 3**. The linear anomaly intersecting grid coordinates X=50 Y=26, is probably in response to a buried utility line or conduit. The high amplitude anomaly centered near the former pump island area is probably in response to the steel-reinforced concrete pad. GPR surveys conducted across the steel-reinforced concrete pad did not detect any large metal objects. The geophysical results suggest that the ROW area at Parcel 4 does not contain metallic UST's.

### 3.2 Parcel 7 - Julia M. Ratliff Property

The Ratliff property is located northwest of the Fayetteville Road and Roberdell Road intersection. The parcel consists of an open, asphalt and grass-covered lot. The EM61 bottom coil results and the differential results are presented in **Figure 4**. The linear bottom coil, EM61 anomalies, such as the ones intersecting grid coordinates X=100 Y=60, X=110 Y=74, and X=130 Y=104, are probably in response to utility lines or conduits. GPR surveys conducted across a portion of the EM anomaly centered near grid coordinates X=65 Y=35, suggest the presence of at least one UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide.

A large water puddle was present across the western portion of the EM anomaly when the GPR surveys were conducted that prevented GPR data to be collected across the entire anomaly. However, based on the location of the probable UST, the size of the EM61 anomaly suggests that a second UST may be centered near grid coordinates X=64 Y=32. Concrete was encountered approximately three inches below surface across this area, which prevented probing with a steel rod to determine whether a second UST exists. A photo showing the approximate location of the probable and possible UST's along with a GPR image obtained along survey line Y=35 are presented in **Figure 5**.

The geophysical results suggest that the remaining portion of the proposed ROW area at Parcel 7 does not contain metallic UST's.

### 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties

Parcels 15 and 21 are located immediately southwest and southeast, respectively of the Fayetteville Road and Skyline Drive intersection. Parcel 15 consists primarily of grass and gravel surfaces, whereas the front portion of Parcel 21 consists of an asphalt-covered parking area. The EM61 bottom coil results and the differential results are presented in **Figures 6 and 7**, respectively.

GPR surveys across the EM61 anomaly centered near grid coordinates X=188 Y=135, (on Parcel 15) suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below

surface. The surveys also suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

At Parcel 21, GPR surveys acquired across the EM anomaly centered near grid coordinates X=269 Y=173, suggest the presence of a UST buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide. Photos showing the approximate locations of the probable UST's at Parcels 15 and 21, along with corresponding GPR images are presented in Figures **8 and 9**, respectively.

### 3.4 Harvey E. Melton Property (Parcel 17)

The Melton property is an active BP gas station and store located northeast of the Fayetteville Road and Roberdell Road intersection. The pump island area consists of a steel-reinforced concrete surface that overlies the known and active UST's, whereas the parking area adjacent to the store consists of asphalt pavement. A grass yard surrounds the back portion of the site.

The EM61 bottom coil results and the differential results are presented in Figures **10 and 11**, respectively. The linear bottom coil, EM anomalies are probably in response to utility lines or conduits. The majority of non-linear anomalies are probably in response to cultural features such as storm drains, signs, utility-related objects, buildings, metal fence, and steel-reinforced concrete.

GPR surveys were conducted across the concrete pavement and across the area containing the active UST's. The surveys delineated the footprint of the three and possibly four active UST's that are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. A GPR image obtained across the UST area is presented in **Figure 12** and suggests that the tanks lie approximately 3.5 to 3.9 feet below surface.

GPR data acquired across the EM61 anomaly centered near X=155 Y=144, delineated the footprint of the kerosene tank that is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide. A photo showing the location of the

tank is presented in Figure 12. The geophysical results suggest that the remainder of the surveyed area at Parcel 17 does not contain UST's.

### 3.5 W. J. Barnhart Property (Parcel 41A)

Parcel 41A is a former gas station site located on the north side of Fayetteville Road approximately 300 feet west of Lawson Street. The geophysical survey area consists of asphalt and grass-covered surfaces with a concrete pad located around a former pump island. The EM61 bottom coil results and the differential results are presented in **Figure 13**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=40 Y=50, X=45 Y=95, and X=70 Y=40, are probably in response to utility lines or conduits.

GPR surveys conducted across a portion of the linear anomaly centered at X=37 Y=22, suggest the probable presence of a wide-diameter (more than 2.5 feet wide) conduit or possibly a UST that is approximately 15 to 17 feet long and buried approximately 4.5 feet below surface. This probable wide-diameter conduit (centered near X=38 Y=25) is located parallel and contingent with the probable utility line identified by the EM61 survey, suggesting that the probable conduit is a utility-related object. However, the footprint of this probable utility-related conduit or possible UST was marked in the field with spray paint and pin flags.

GPR surveys conducted across the concrete pad adjacent to the pump island suggest that the EM61 anomalies recorded in this area are probable in response to steel-reinforcement in the concrete. With the exception of the probable utility-related feature found at X=38 Y=25, the geophysical findings obtained within the survey area at Parcel 41A suggest that the ROW area does not contain metallic UST's.

### 3.6 Wesly Denham Property (Parcel 42)

The Havoline Carolina Kwik Lube garage operates at Parcel 42, which is located on the south side of Fayetteville Road. Asphalt and grass surfaces cover much of the proposed ROW area with a small concrete pad located in front of the building. The EM61 bottom coil results and the differential

results are presented in **Figure 14**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=60 Y=58, and X=80 Y=85, are probably in response to utility lines or conduits. The high amplitude anomaly centered near grid coordinates X=40 Y=40, is in response to a vehicle that could not be moved for the geophysical investigations. The anomalies centered near X=40 Y=12, and X=120 Y=55, are in response to a nearby vehicle and steel-reinforced concrete, respectively.

The geophysical results obtained within the surveyed portion of Parcel 42 suggest that the proposed ROW area does not contain metallic UST's.

### 3.7 William Ussery Property (Parcel 57)

Parcel 57 is located on the north side of Fayetteville Road approximately 0.2 miles east of Old Aberdeen Road. The EM61 bottom coil results and the differential results are presented in **Figure 15**. A series of small, bottom coil anomalies were recorded along survey line Y=25 from grid coordinate X=5 to X=115, which may be in response to an east-west trending, buried utility line or conduit. Several other bottom coil anomalies were recorded across the survey area that are probably in response to miscellaneous metal debris.

All of the differential anomalies are probably in response to known cultural features or buried debris, suggesting that the proposed ROW area at Parcel 57 does not contain metallic UST's.

### 3.8 Walter McCain Property (Parcel 80)

Parcel 80 is located immediately northwest of the Fayetteville Road and Philadelphia Road intersection and consists of two vacant buildings surrounded by sandy or grass surfaces. A former pump island pad is located south of the eastern-most building. The EM61 bottom coil results and the differential results are presented in **Figure 16**.

GPR surveys conducted across the EM61 anomalies centered near grid coordinates X=170 Y=35, and X=194 Y=32, suggest the presence of two metallic UST's. The probable UST centered near X=170

Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32 appears to be10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by the former pump island pad. Photos of the UST locations along with an image of GPR survey line X=167.5 are presented in **Figure 17.**

Based upon the geophysical results, the remaining portion of the proposed ROW area does not appear to contain metallic UST's.

### 3.9 Leon Wall Property (Parcel 99)

Parcel 99 is located immediately southwest of the Fayetteville Road and Patterson Road intersection and consists mostly of a grass yard surrounding a vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 18** in which a bottom coil, linear anomaly is recorded along survey line Y=230. This linear anomaly is probably in response to a utility line. GPR surveys conducted across the differential EM61 anomaly centered near X=92 Y=165, is probably in response to a water line adjoining the vacant building. GPR surveys were also conducted between the building and the former pump island pad that is centered near coordinates X=84 Y=222. The surveys suggest that the EM anomalies recorded in this portion of the survey area are probably in response to miscellaneous metal debris.

Based upon the geophysical results, the proposed ROW area at Parcel 99 does not appear to contain metallic UST's.

### 3.10 James Porter Property (Parcel 117)

Parcel 117 is a former gas station site located on the south side of Fayetteville Road approximately 0.25 miles west of Locklear Drive. The site consists primarily of grass and asphalt surfaces with a former pump island pad located in front of the vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 19**. The linear, bottom coil anomaly intersecting grid coordinates X=130 Y=54, is probably in response to a buried utility line or conduit. The linear

anomaly intersecting X=40 Y=74, is probably in response to a metal fence. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation across the survey area of Parcel 117 suggests that the proposed ROW area does not appear to contain metallic UST's.

### 3.11 John Evans Property (Parcel 126)

The active Custom Monument Company operates on Parcel 126, which is located immediately northeast of the Fayetteville Road and LockLear Drive intersection. The geophysical survey area consists of grass and asphalt surfaces and the EM61 bottom coil results and the differential results are presented in **Figure 20**. All of the EM61 anomalies recorded across the surveyed portion of the site are probably in response to known cultural features, suggesting that the proposed ROW area does not contain metallic UST's.

### 3.12 Henry Ussery Property (Parcel 140)

Parcel 140 is a former gas station site, which is presently occupied by Bo Henry's Pawn Shop. The property is located immediately southeast of the Fayetteville Road and Port Street intersection. Much of the proposed ROW area consists of sandy or grass-covered surfaces. A concrete pad surrounds the north and west sides of the building. The EM61 bottom coil results and the differential results are presented in **Figure 21**. The linear bottom coil anomaly intersecting grid coordinates X=80 Y=80, is probably in response to a buried utility line.

GPR surveys conducted across the differential anomalies centered near coordinates X=90 Y=60, and X=107 Y=59, suggest the presence of two UST's buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide. Probing with a steel rod across this area suggest the presence of a concrete slab buried approximately 0.3 feet below surface and overlying the UST's. A photo showing the locations of the probable UST along with GPR images are presented in **Figure 22**.

## 4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 13 sites along Fayetteville Road (US 1) in Rockingham, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic UST's within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 13 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results did not detect the presence of unknown metallic UST's within the surveyed portions of the proposed ROW areas at the following sites:

| | |
|---|---|
| W. J. Barnhart Property | (Parcel 4) |
| W. J. Barnhart Property | (Parcel 41A) |
| Wesly Denham Property | (Parcel 42) |
| William Ussery Property | (Parcel 57) |
| Leon Wall Property | (Parcel 99) |
| James Porter Property | (Parcel 117) |
| John Evans Property | (Parcel 126) |

- Julia M. Ratliff Property (Parcel 7): Geophysical results suggest the presence of a UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide. A second UST may be present immediately west of this UST.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

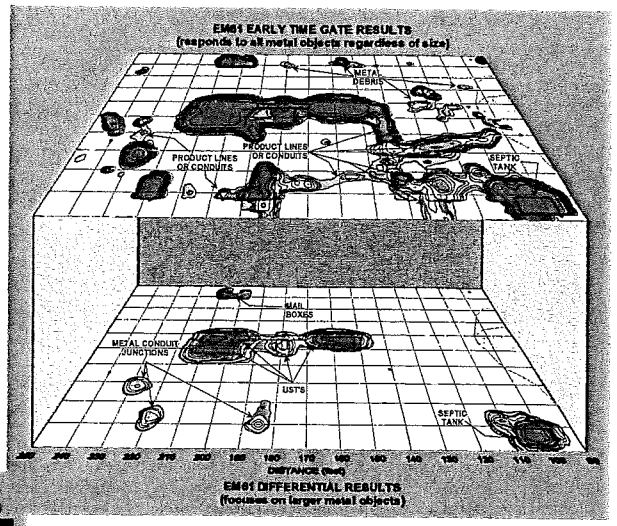
- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

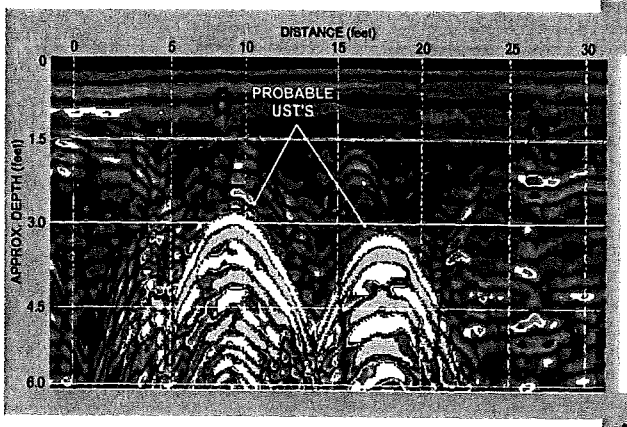
- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

## 5.0 LIMITATIONS

EM61 and GPR surveys have been performed and this report prepared for Solutions Industrial & Environmental Services, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic UST's but only suggest where some of the metallic UST's may be present. The EM61 and GPR anomalies, interpreted as possible UST's or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EM61 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANK
DISTANCE (feet)
EM61 DIFFERENTIAL RESULTS
(focuses on larger metal objects)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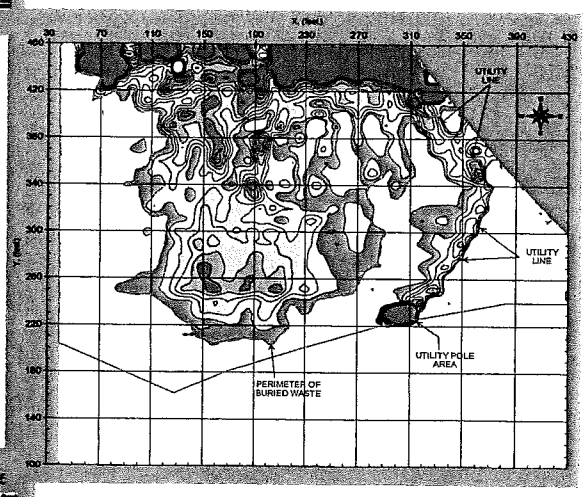
3.0
4.5
6.0

# FIGURES


X (feet)
Y (feet)
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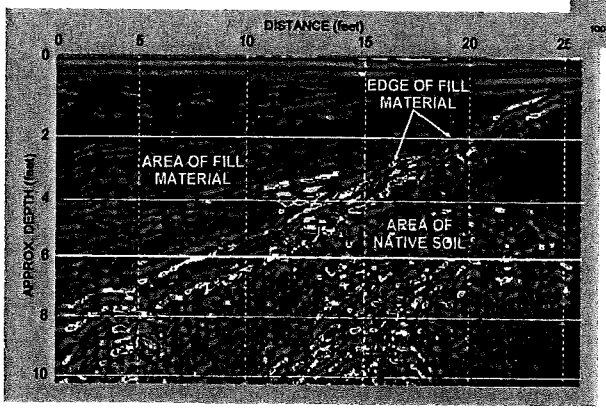
UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE


DISTANCE (feet)
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EDGE OF FILL MATERIAL
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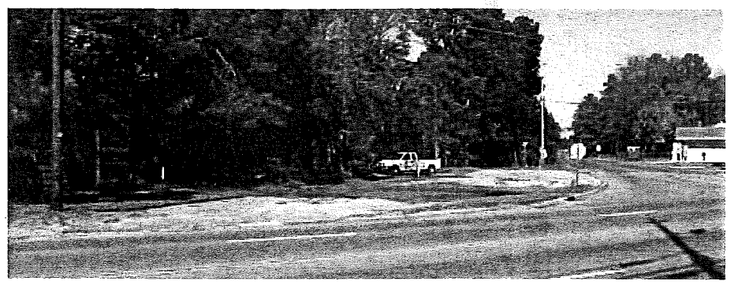
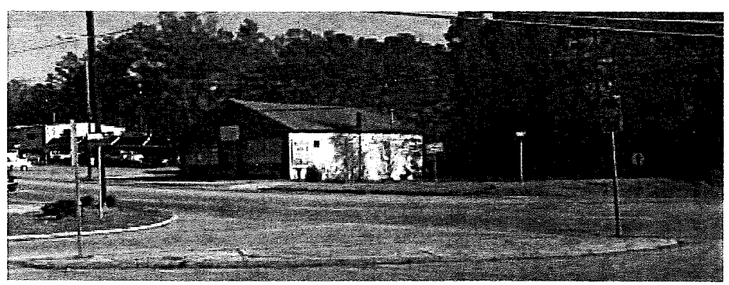
4
6
8
10

Parcel 4 - W. J. Barnhart Property

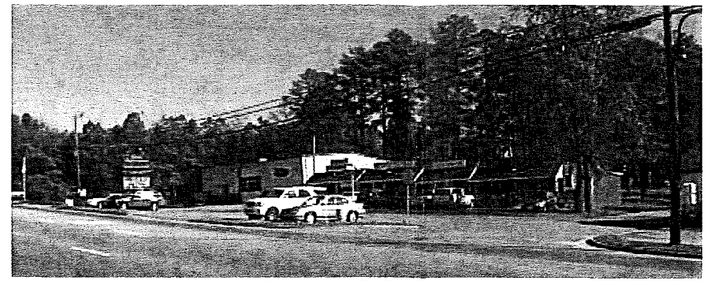


Parcel 7 - Julia M. Ratliff Property



Parcel 15 - Samuel D. Tanner Property

Parcel 17 - Harvey E. Melton Property



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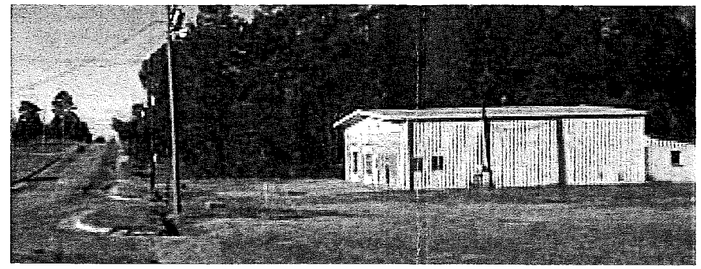
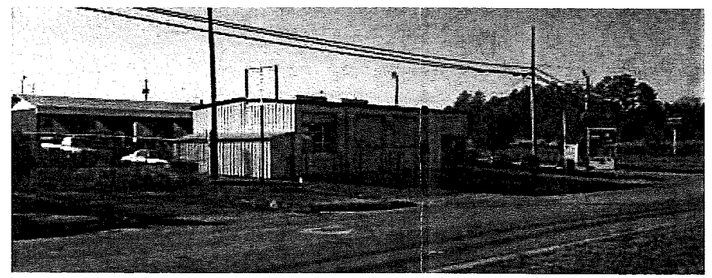
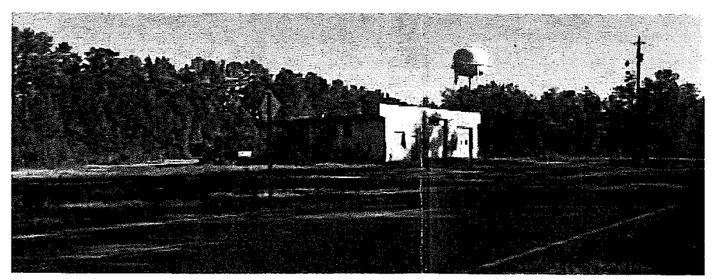


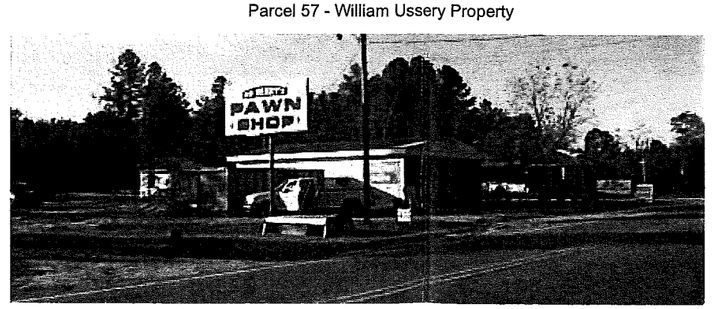
Parcel 41A - W. J. Barnhart Property



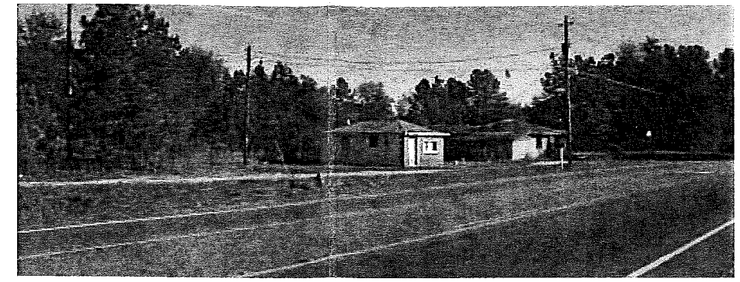
Parcel 42 - Wesly Denham Property



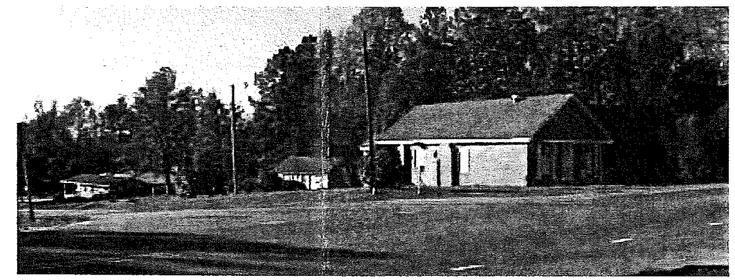
Parcel 57 - William Ussery Property



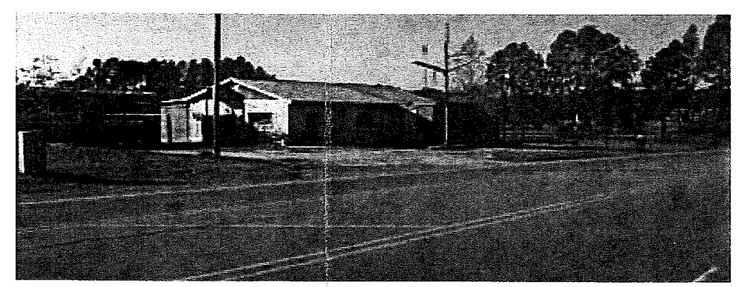

Parcel 140 - Henry Ussery Property



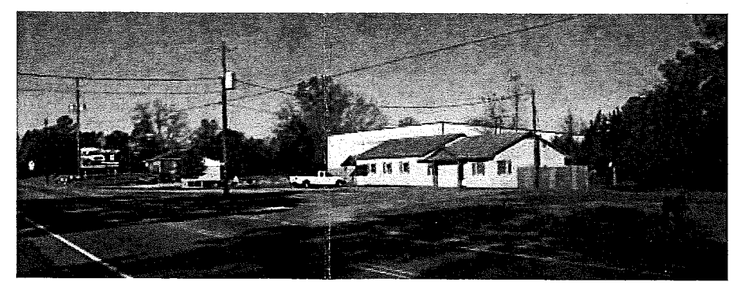
Parcel 80 - Walter McCain Property



Parcel 99 - Leon Wall Property



Parcel 117 - James Porter Property



Parcel 126 - John Evans Property

SITE PHOTOS

FIGURE 1

GRAPHIC SCALE IN METERS

| | | |
|---|---|---|
| DRAWN | CHKD | FIGURE |
| MJD | | |
| DATE | LAY | DWG |
| 11/28/05 | | 2005-292 |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

ROCKINGHAM SITES

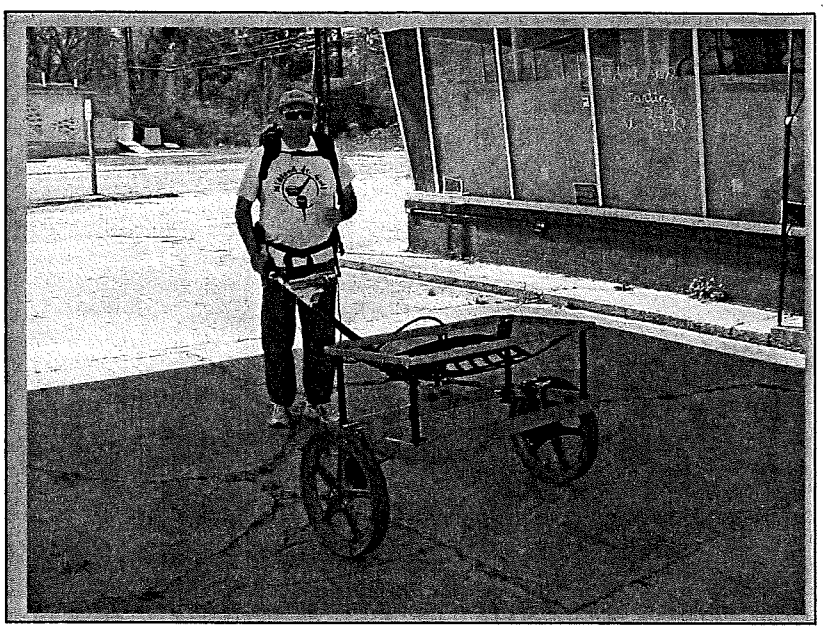
NORTH CAROLINA

ROCKINGHAM

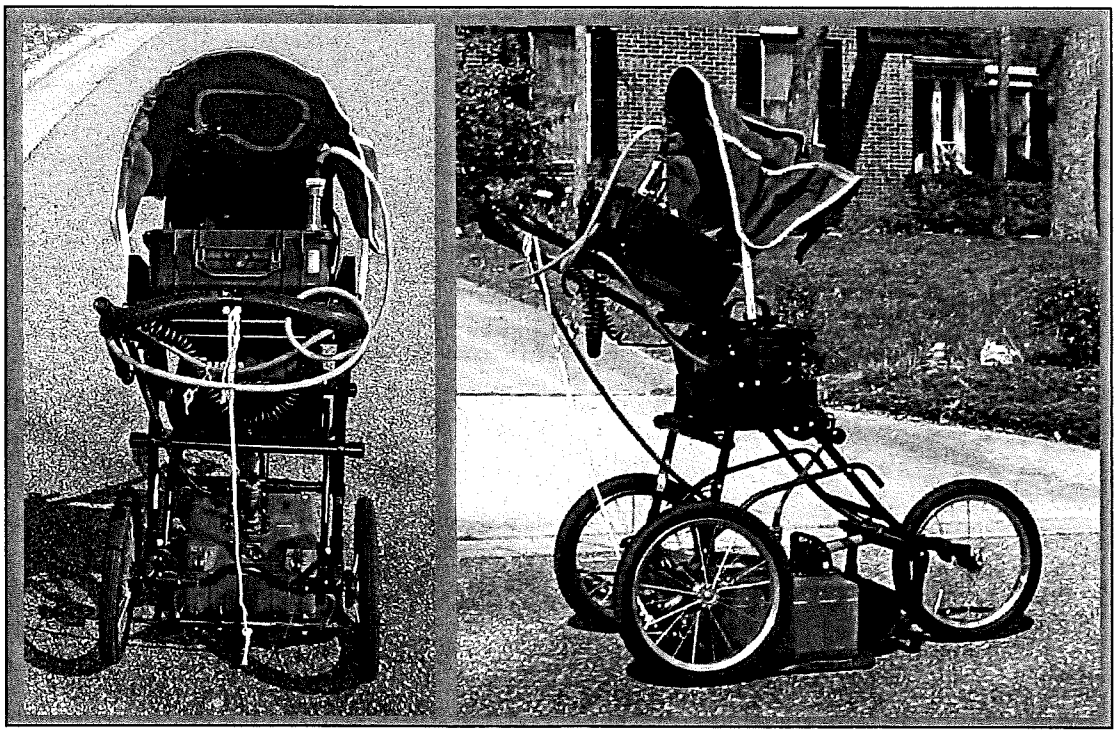
GEOPHYSICAL RESULTS

CLIENT | SITE | STATE | CITY | TITLE

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



The Geonics EM61 metal detector was used to conduct the metal detection surveys at the Rockingham sites in November 2005.

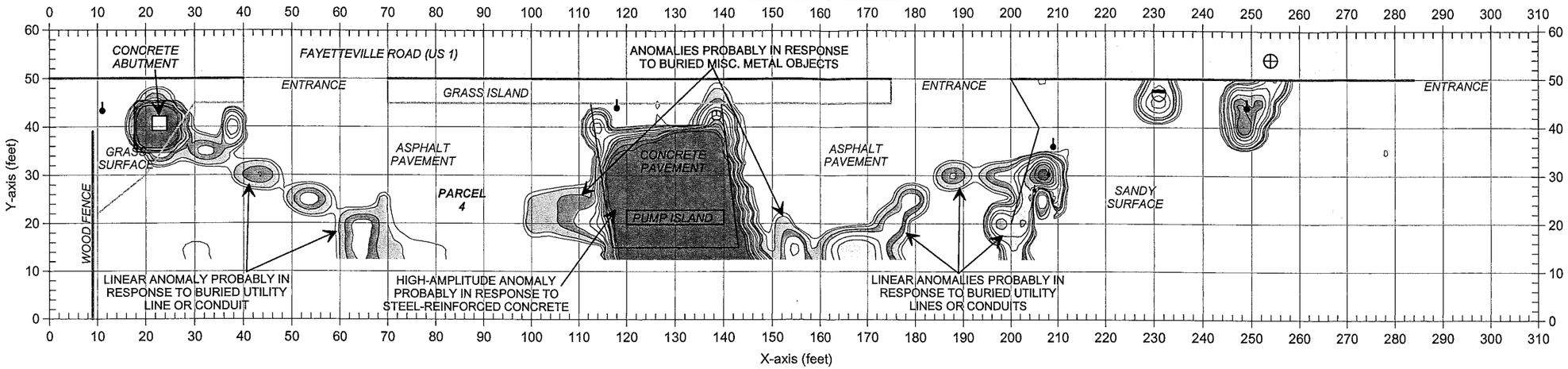


The SIR-2000 GPR system equipped with a 400 MHz antenna that was used at the Rockingham sites in November 2005.

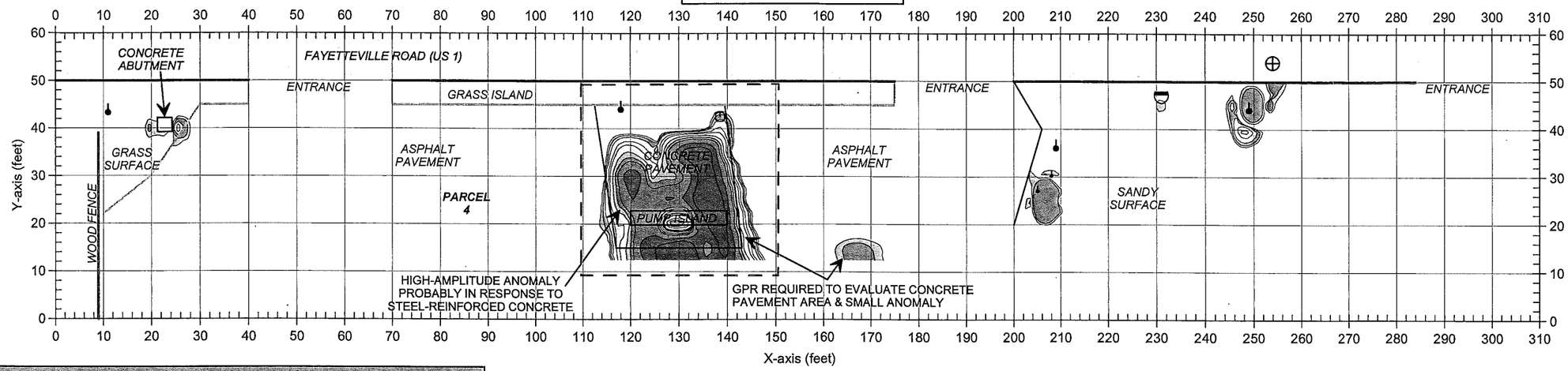
| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | GEOPHYSICAL EQUIPMENT |
| | SITE: ROCKINGHAM SITES | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO.: 2005-292 | FIGURE: | FIGURE 2 |

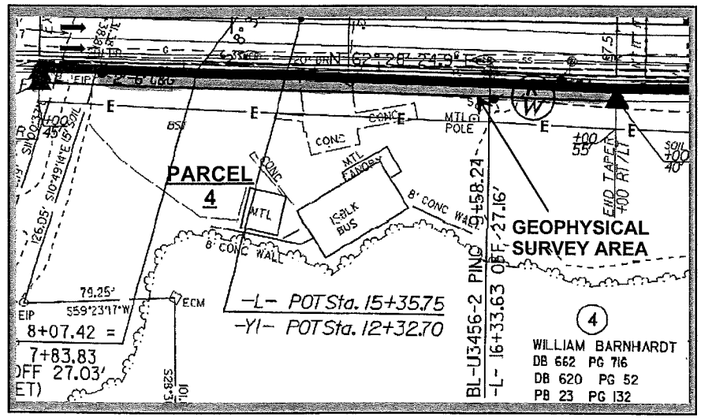
GRAPHIC SCALE IN METERS

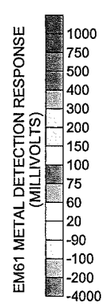
## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE OR LIGHT POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY AREA

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 3

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/26/05 | J-NO. | 2005-292 |
| LAY | | | |
| DWG | | | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

W. J. BARNHART PROPERTY (PARCEL 4)

NORTH CAROLINA

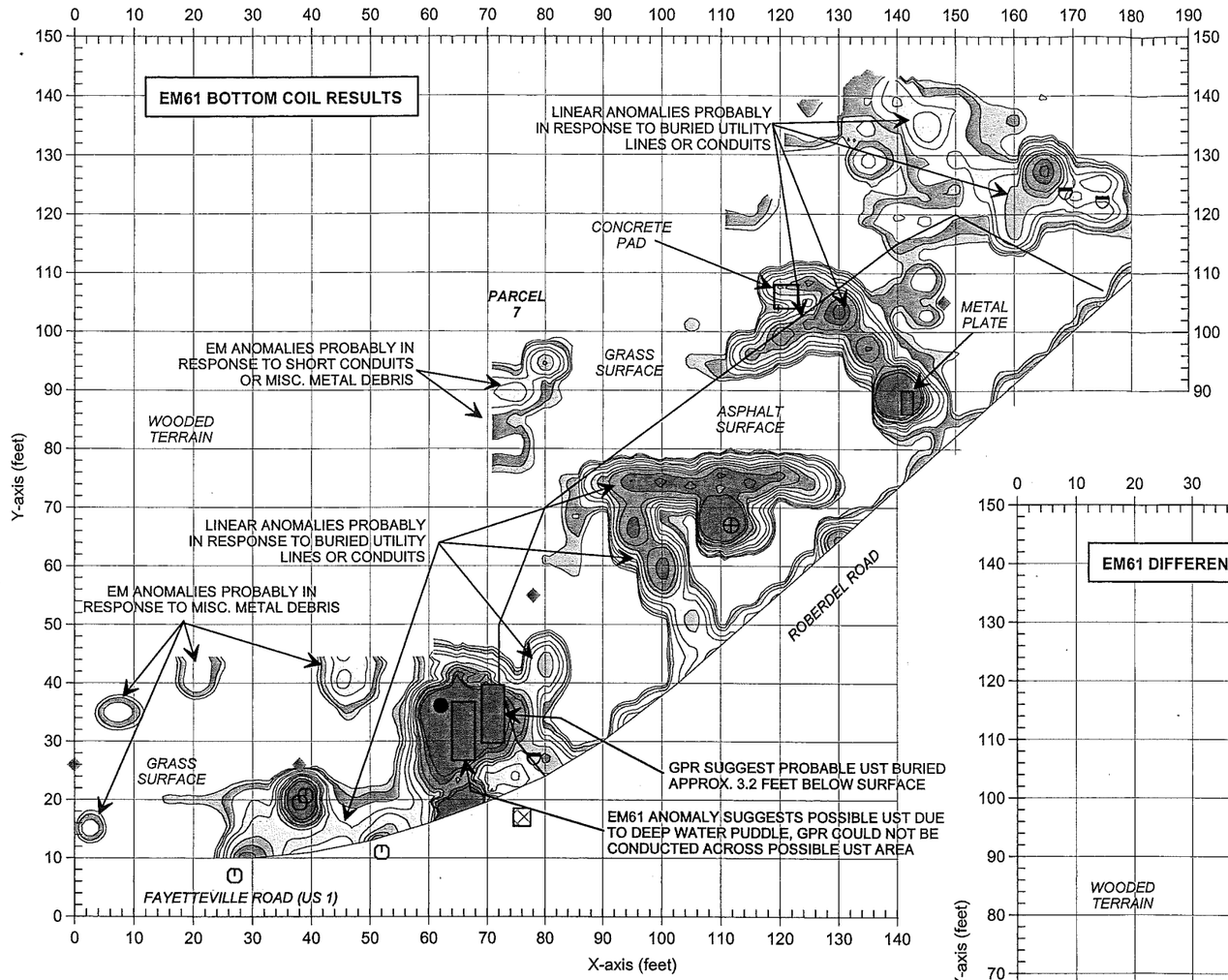
STATE

ROCKINGHAM

GEOPHYSICAL RESULTS

CLIENT | SITE | CITY | TITLE

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

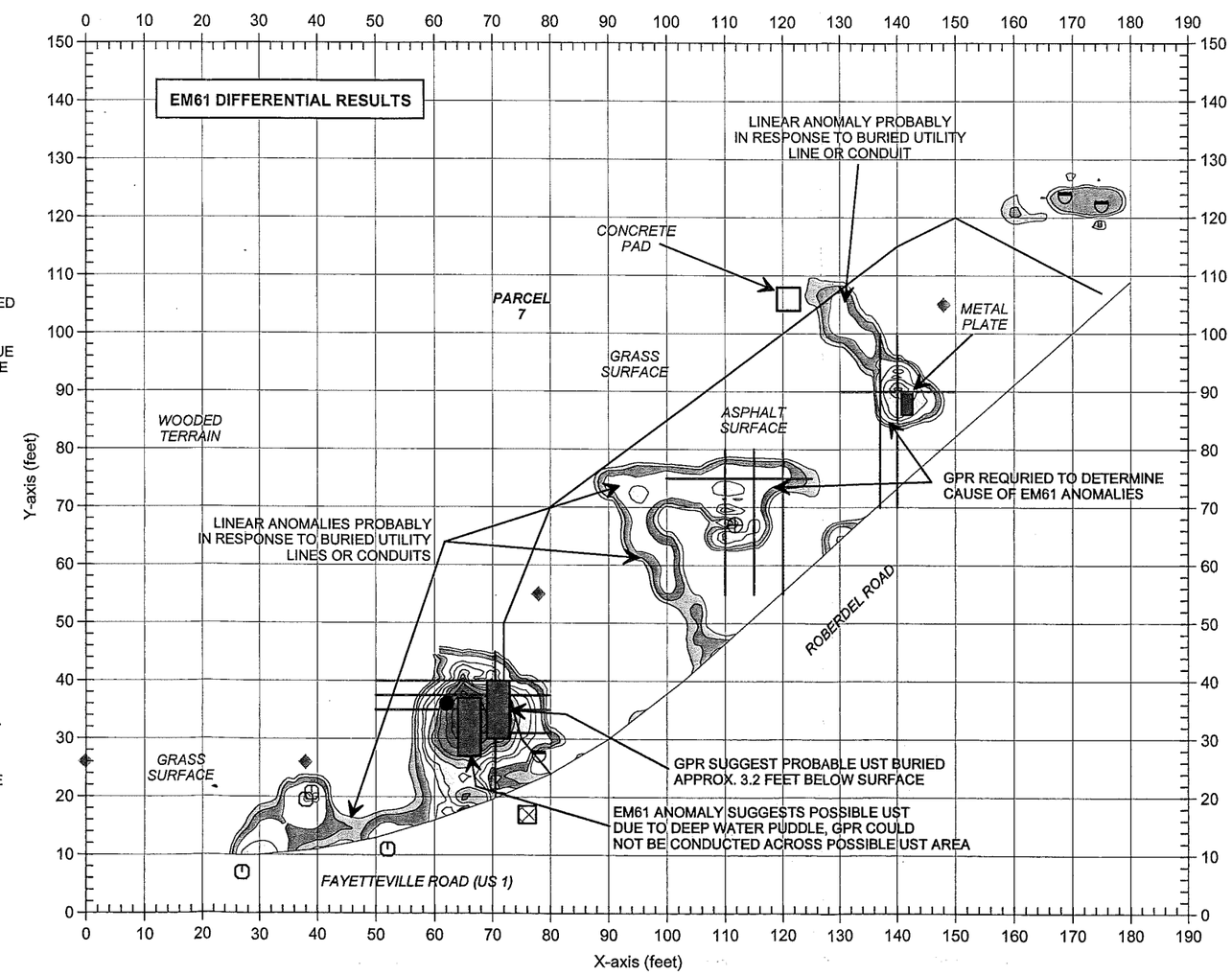
- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH & EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

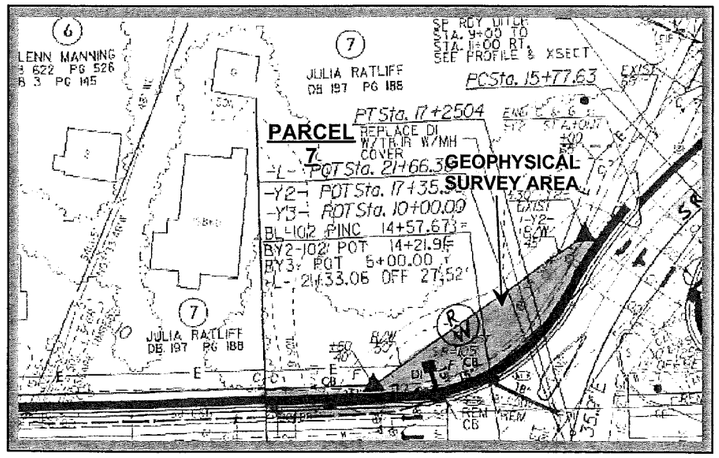
Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -90 -50 -60 -75 100 150 200 300 400 500 750 1000



APPROXIMATE NORTH

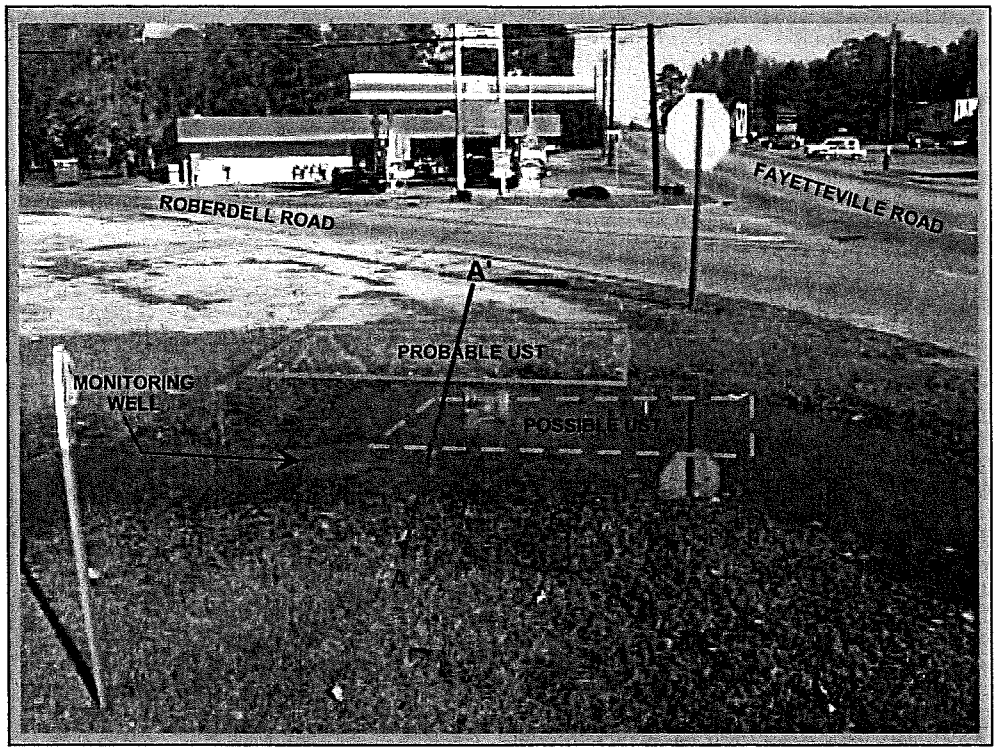
FIGURE 4

EM61
METAL DETECTION RESULTS

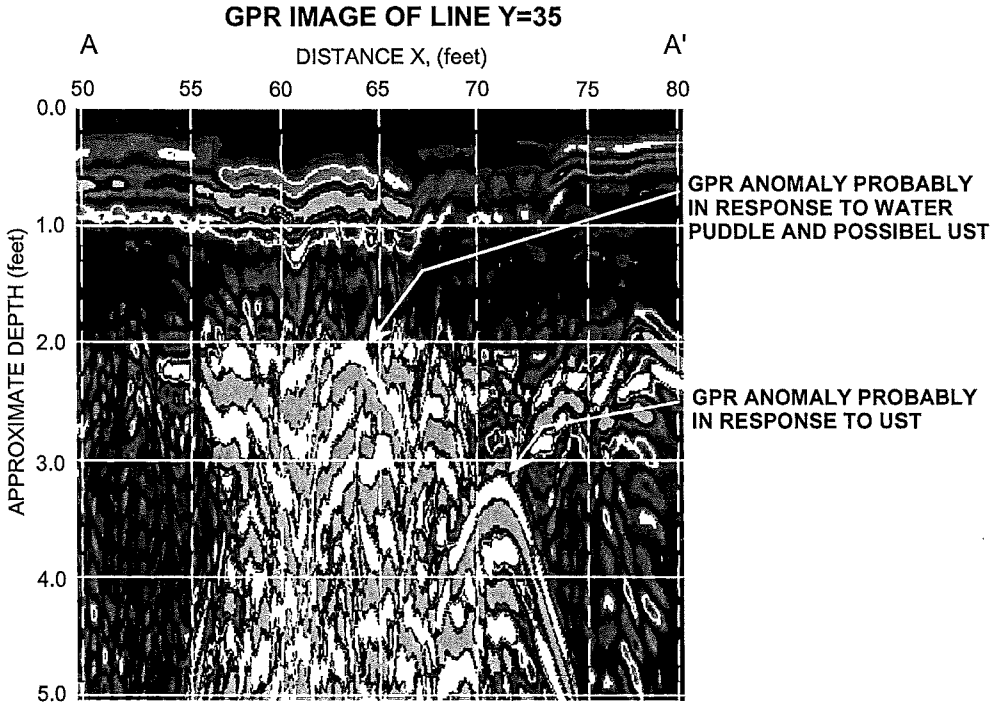
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | JULIA M. RATLIFF PROPERTY (PARCEL 7) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| JNO. | 2005-292 |
| DWG | |
| LAY | |
| DATE | 11/25/05 |
| DRWN | MJD |
| CHKD | |
| FIGURE | |

GRAPHIC SCALE IN METERS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



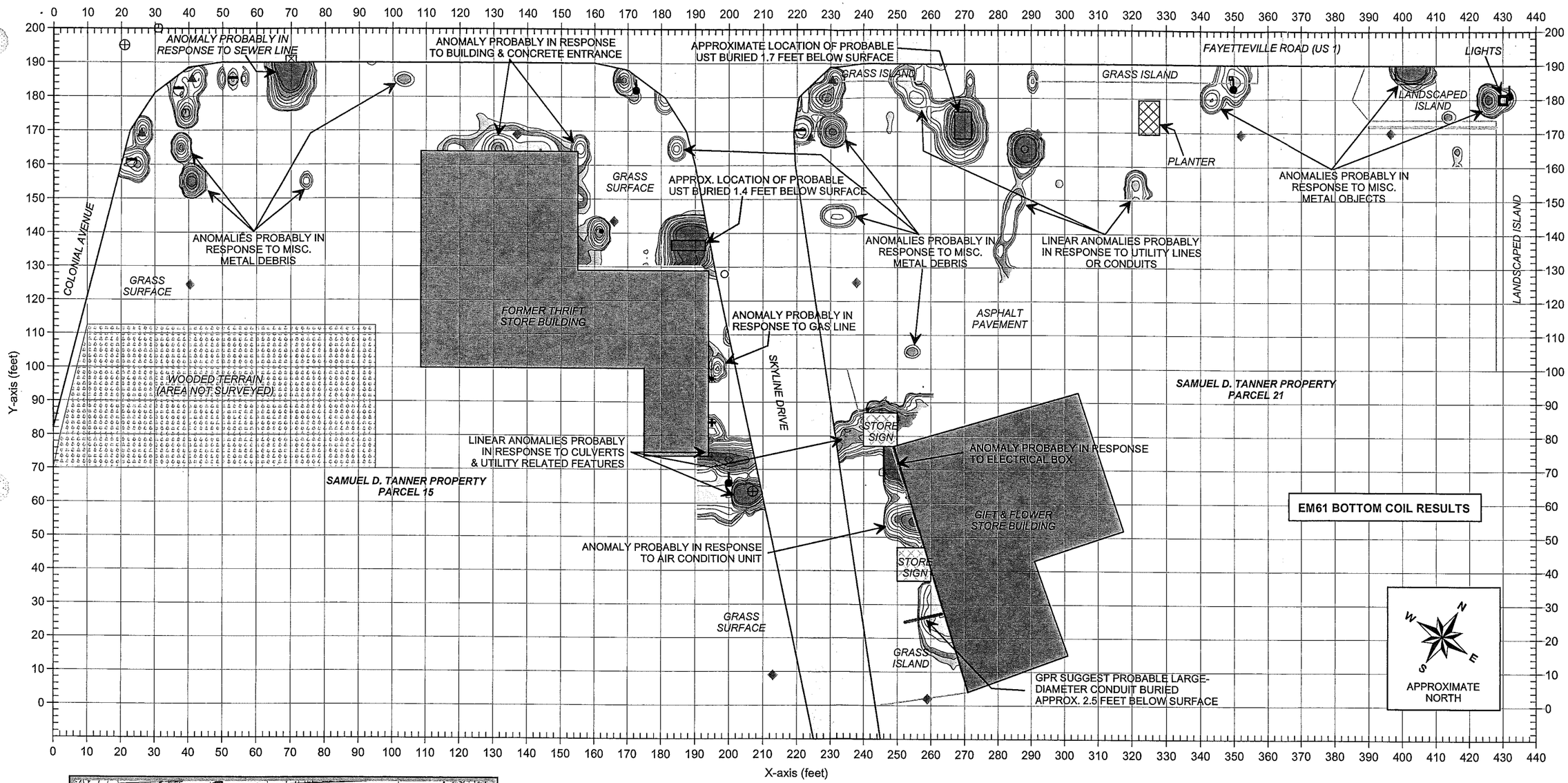

The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

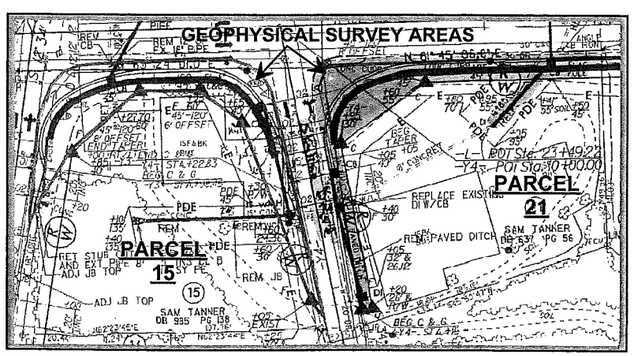


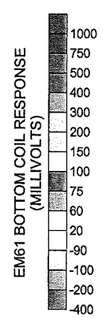

The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 5 |

GRAPHIC SCALE IN METERS




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 6

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

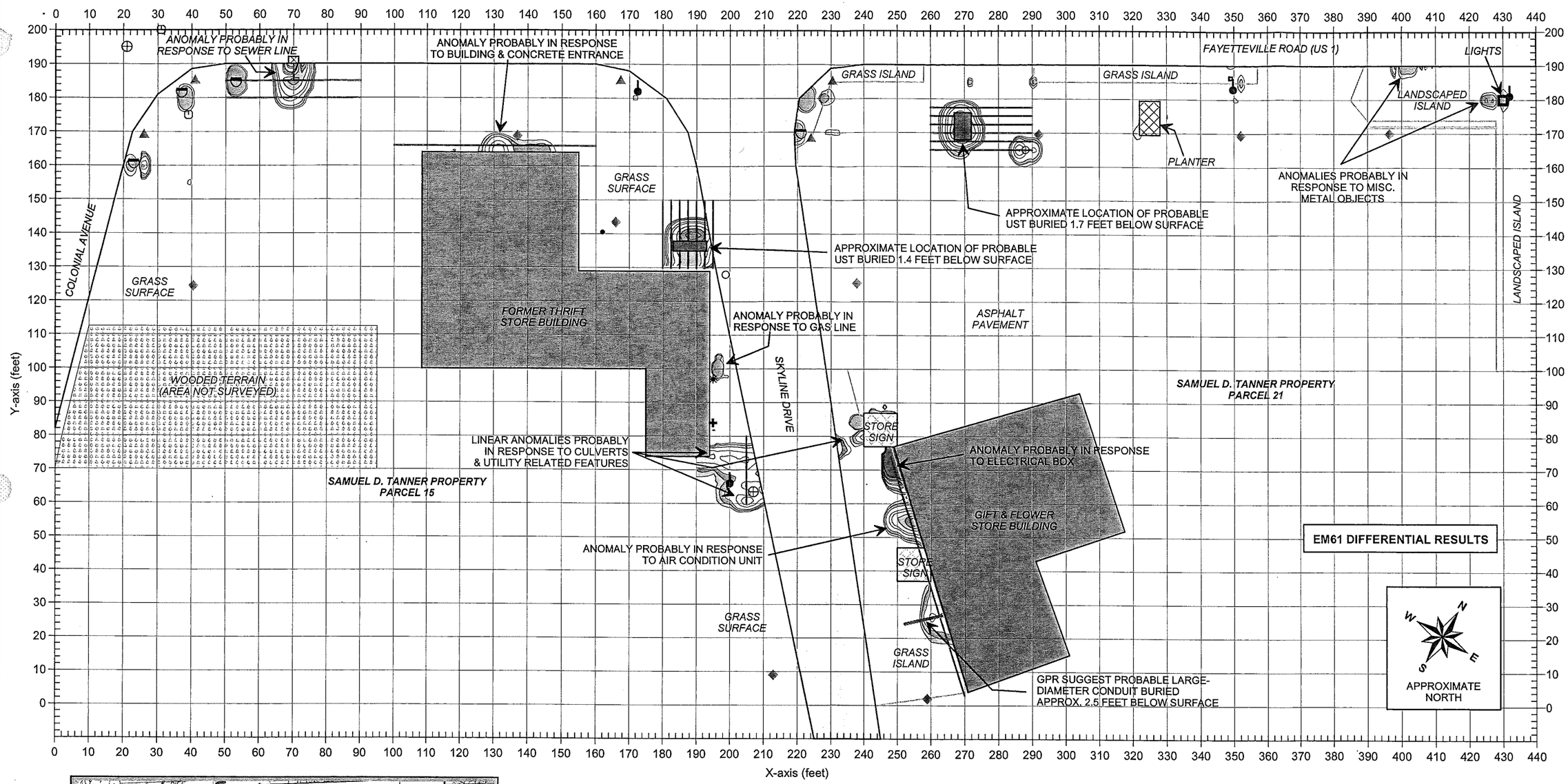
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

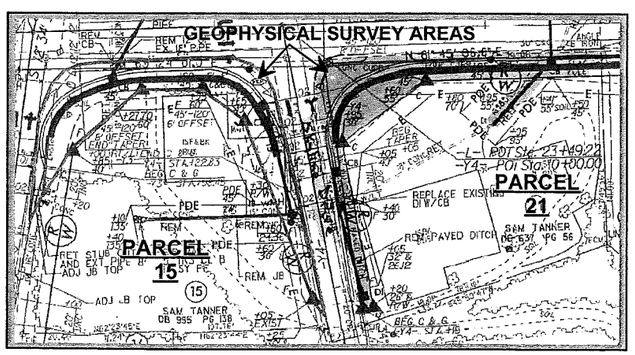
SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

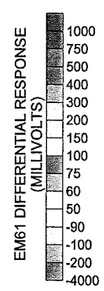
CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 7

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

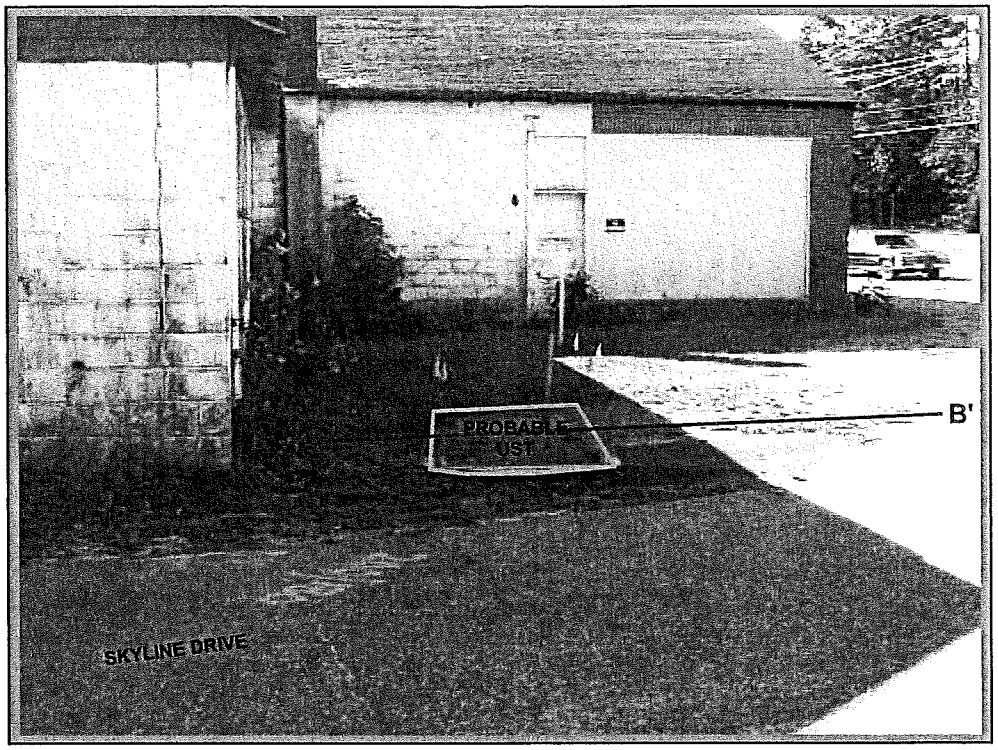
SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

CITY: ROCKINGHAM

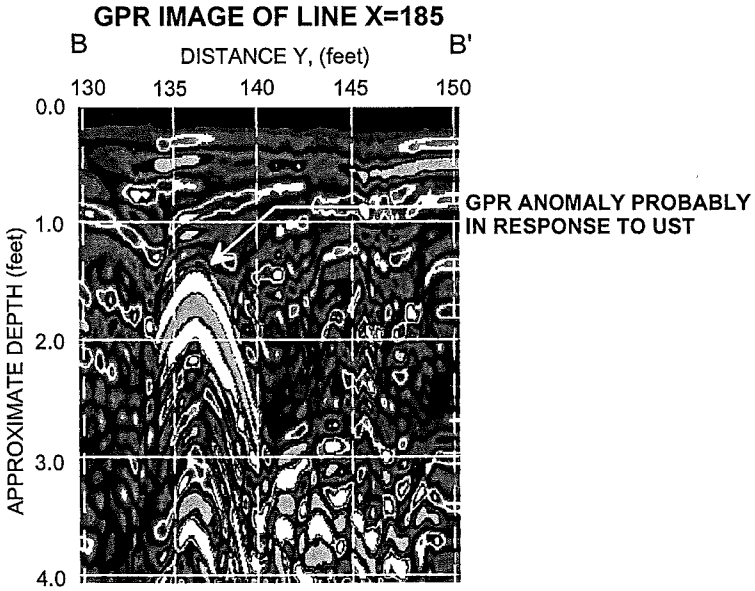
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



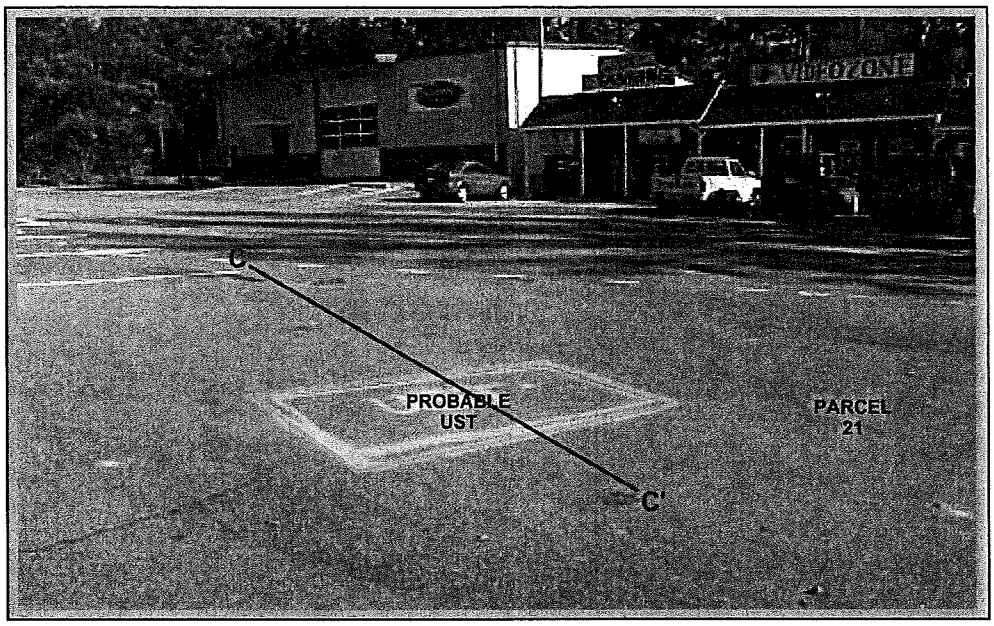

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 15.



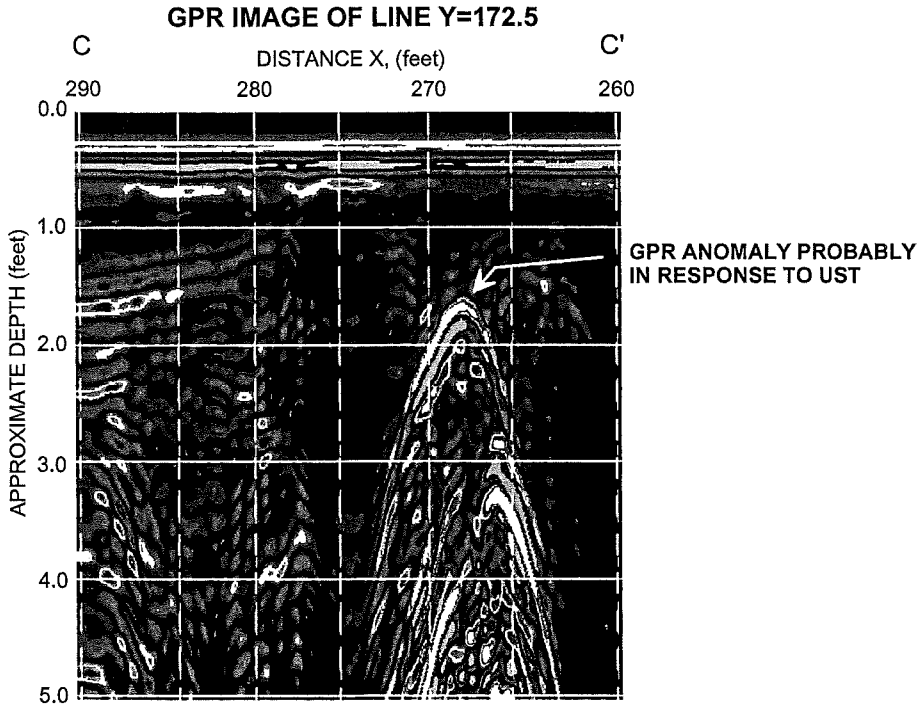

The GPR image obtained along a portion of survey line X=185 shows the anomaly that is probably in response to a UST near Y=137 and buried approximately 1.4 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 15) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO.: 2005-292 | FIGURE: | FIGURE 8 |

GRAPHIC SCALE IN METERS



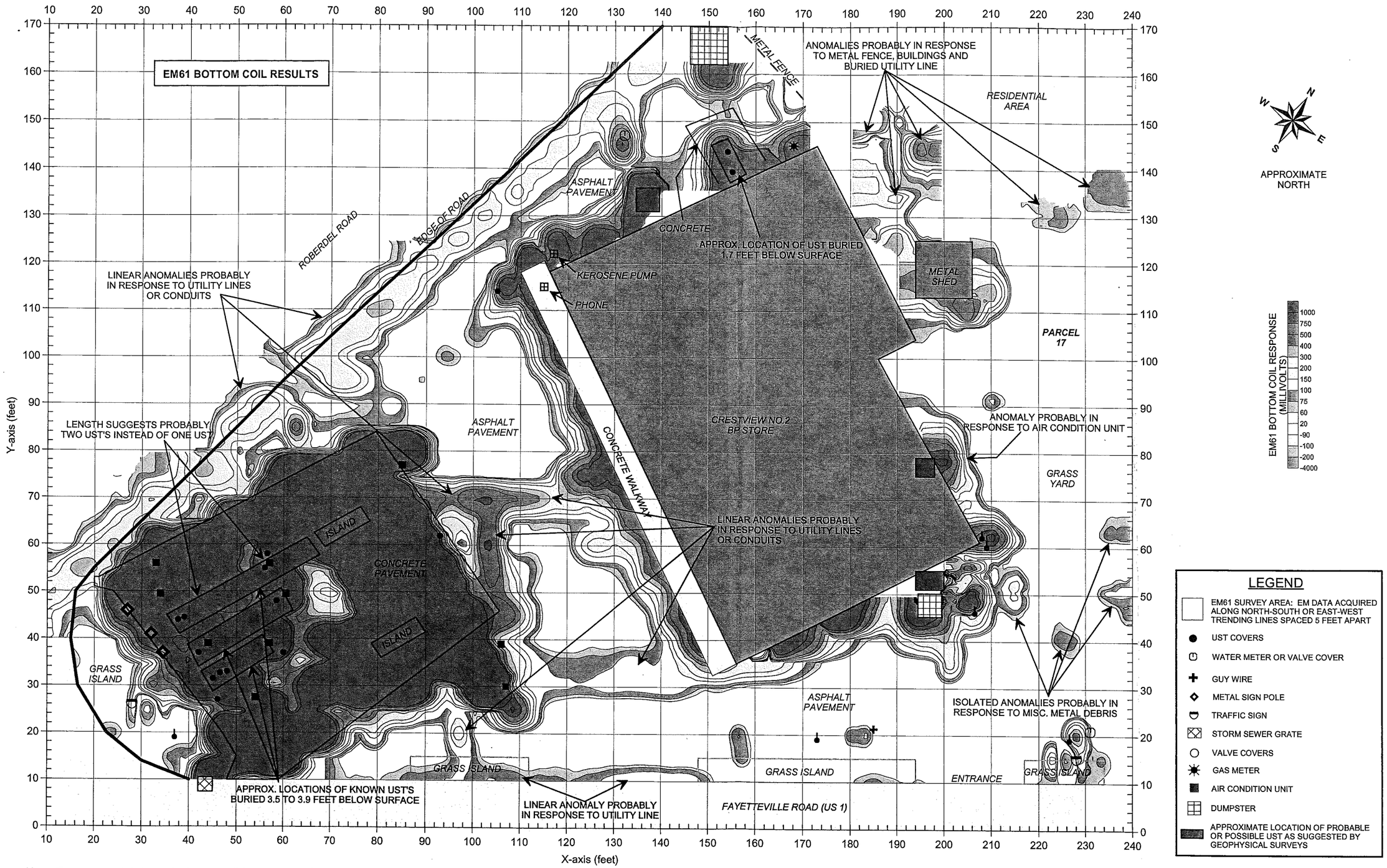

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 21.




The GPR image obtained along a portion of survey line Y=172.5 shows the anomaly that is probably in response to a UST near X=268 and buried approximately 1.7 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE | 11/28/05 | DRWN | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE | SAMUEL D. TANNER PROPERTY (PARCEL 21) | | LAY | | CHKD | |
| | CITY | ROCKINGHAM | STATE NORTH CAROLINA | DWG | | | |
| | TITLE | GEOPHYSICAL RESULTS | | J.NO. | 2005-292 | FIGURE | FIGURE 9 |

GRAPHIC SCALE IN METERS




Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

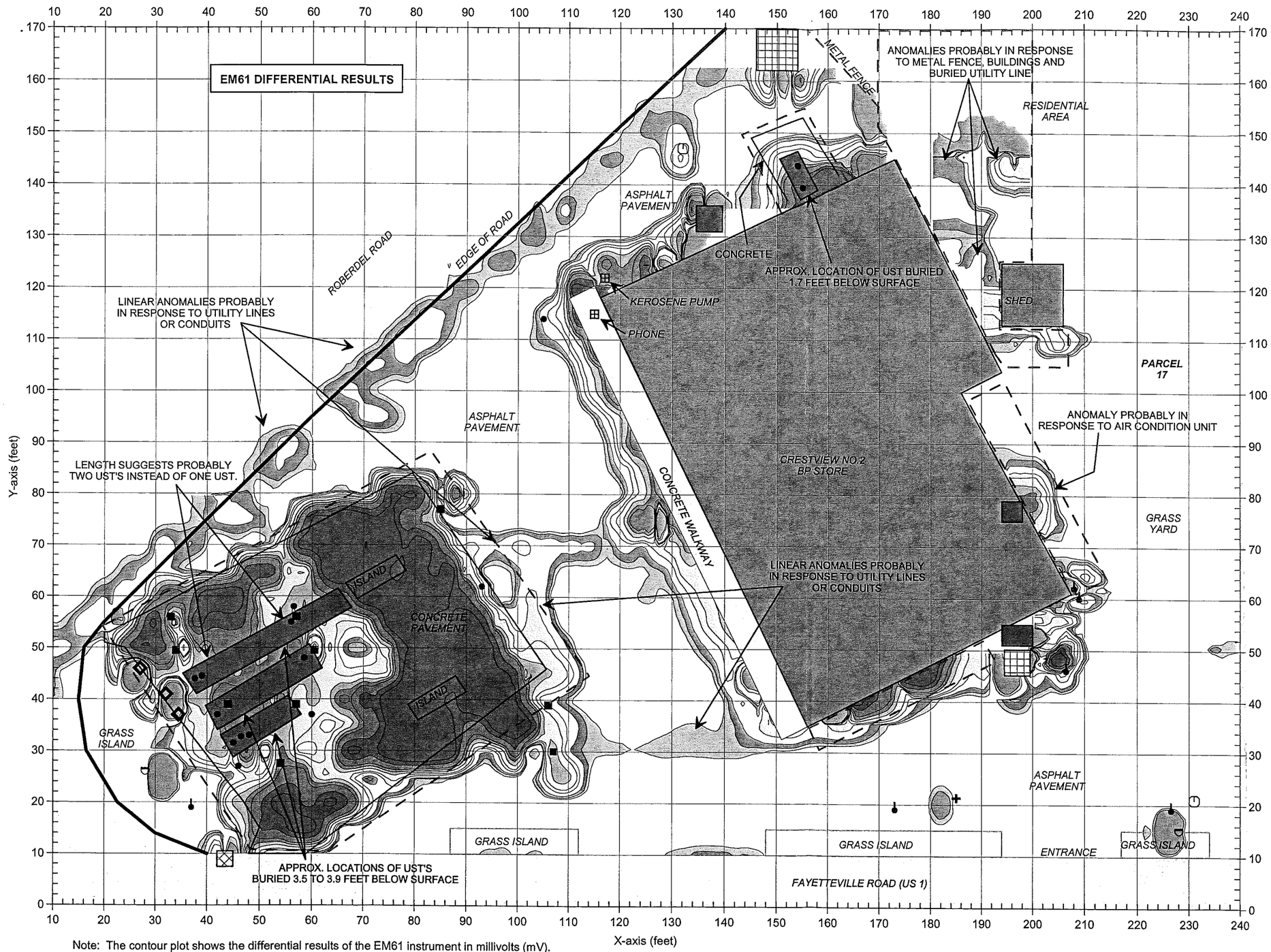
FIGURE 10

EM61 BOTTOM COIL RESULTS

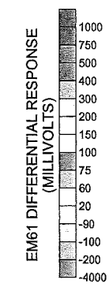
GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/25/05 |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | DRWN | MJD |
| CITY | ROCKINGHAM | STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS | J.NO. | 2005-292 |
| | | DWG | |
| | | LAY | |
| | | CHKD | |
| | | FIGURE | |

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- UST COVERS
- WATER METER OR VALVE COVER
- GUY WIRE
- METAL SIGN POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVERS
- GAS METER
- AIR CONDITION UNIT
- DUMPSTER
- GPR SURVEY AREA
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 11

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/25/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

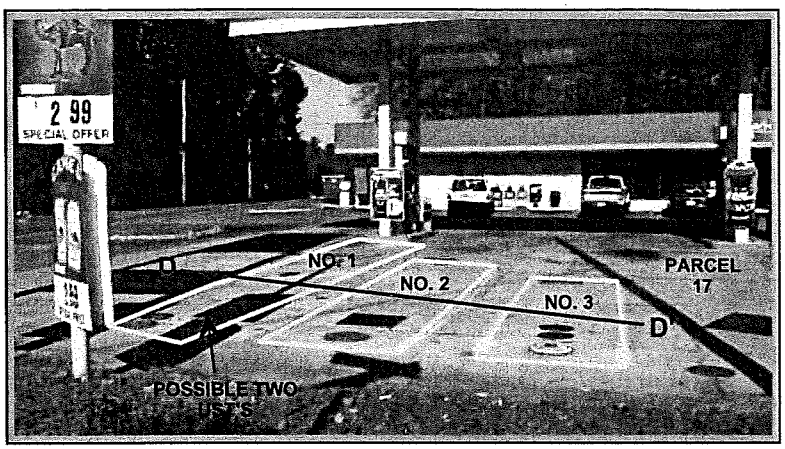
SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: HARVEY E. MELTON PROPERTY (PARCEL 17)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

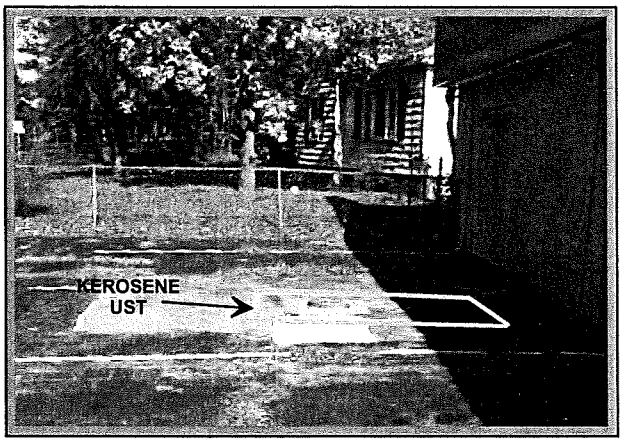
TITLE: GEOPHYSICAL RESULTS

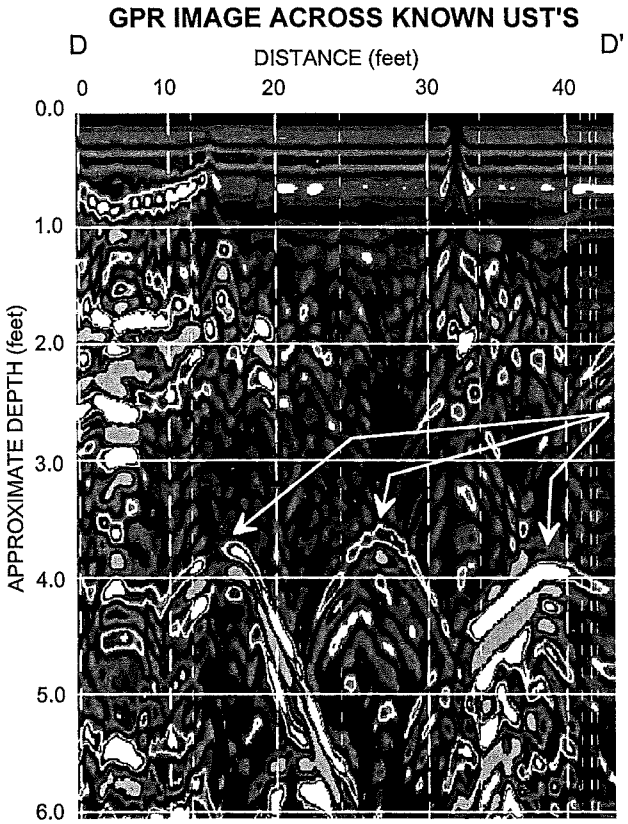
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approxiamte location of the three or four known and active UST's, as suggested by the geophysical results, at Parcel 17. The UST's appear to be approximately 3.5 to 3.9 feet below surface.

The photo shows the approximate location of the kerosene UST, as suggested by the geophysical results, at Parcel 17. The UST is located along the northwest wall of the store and is buried approximately 2.4 feet below surface.




**GPR ANOMALIES PROBABLY IN RESPONSE TO THREE UST'S BURIED 3.5 TO 3.9 FEET BELOW SURFACE**

The GPR image is obtained along a traverse line oriented perpendicular to the axis of the UST's. The three GPR anomalies in response to the probable UST's suggest that the UST's are buried approximately 3.5 to 3.9 feet below surface.

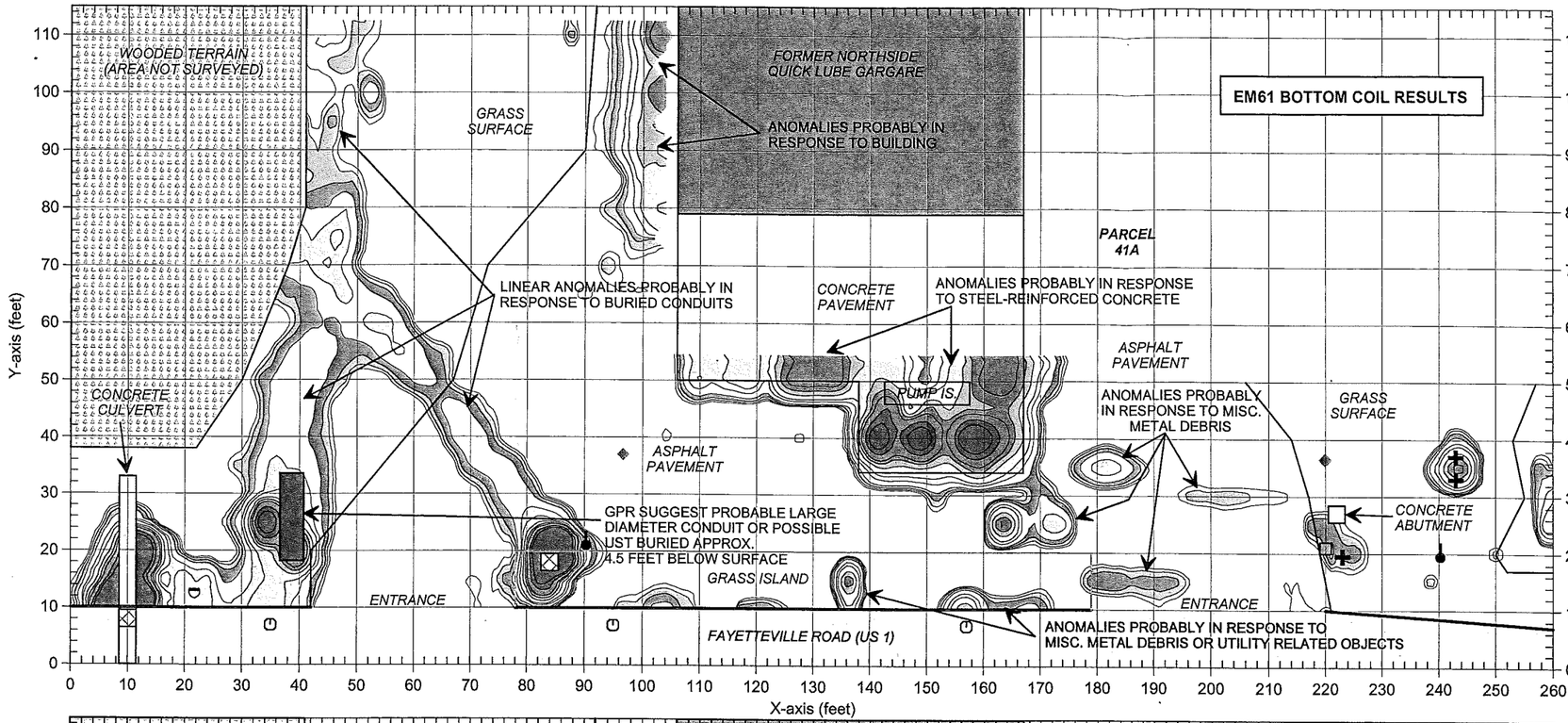
**PYRAMID**
ENVIRONMENTAL & ENGINEERING, P.C.

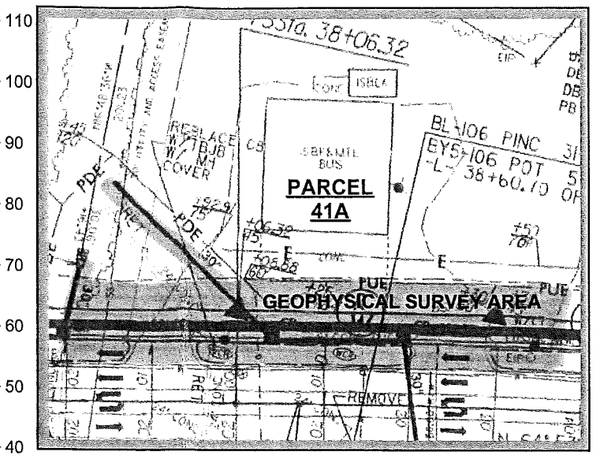
| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE 11/28/05 | DRWN |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | LAY | CHKD |
| CITY | ROCKINGHAM | STATE NORTH CAROLINA | DWG |
| TITLE | GEOPHYSICAL RESULTS | J.NO. 2005-292 | FIGURE |

GRAPHIC SCALE IN METERS

PHOTOS & GPR IMAGE OF UST LOCATIONS

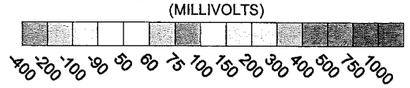
FIGURE 12

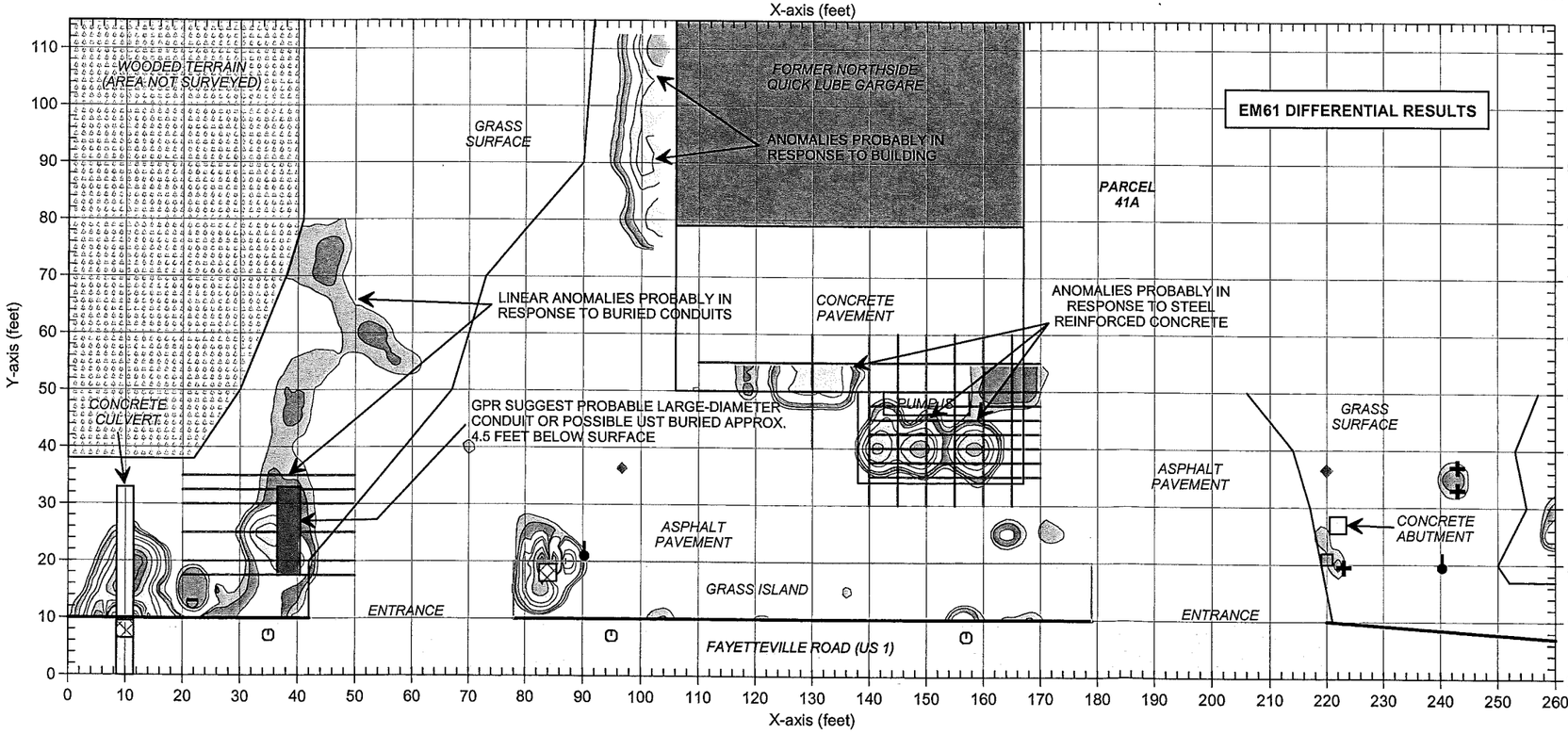


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MAIL BOX
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE LARGE DIAMETER CONDUIT OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 13

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| JOB NO. | 2005-292 |
| FIGURE | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

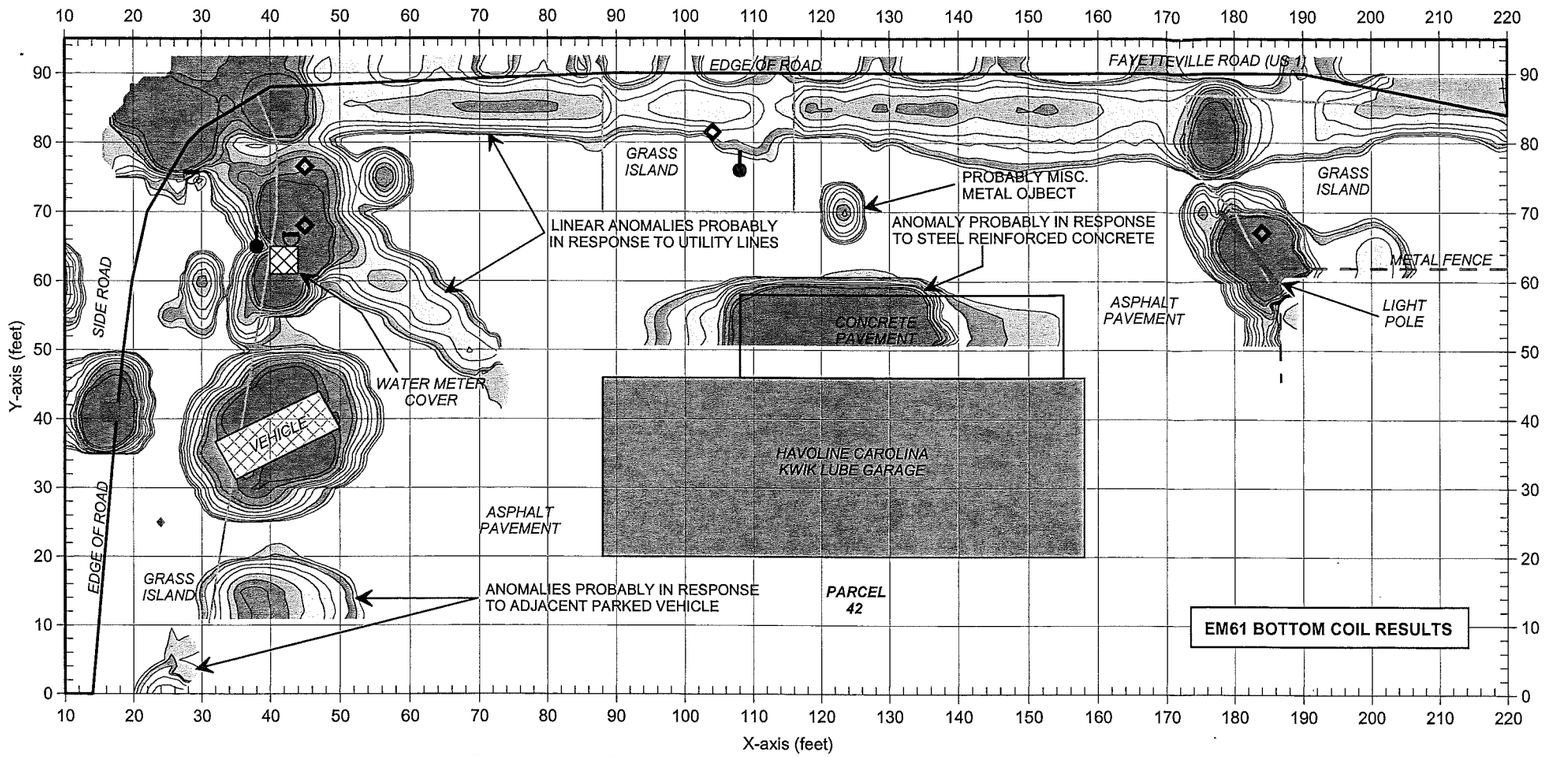
SITE: W.J. BARNHART PROPERTY (PARCEL 41A)

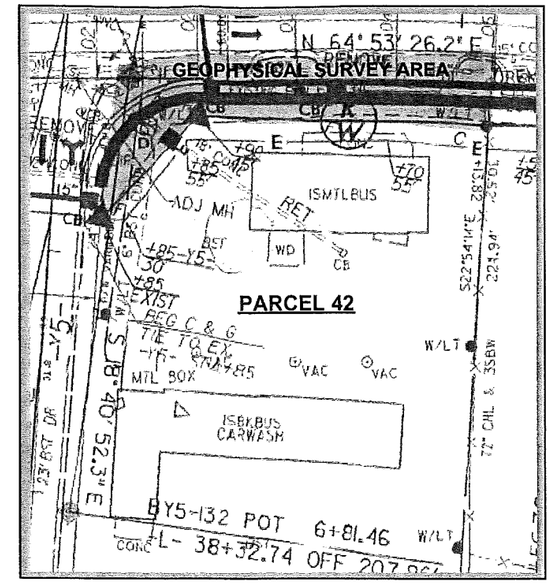
CITY: ROCKINGHAM

STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

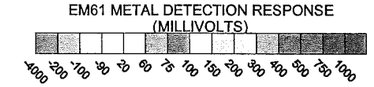
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

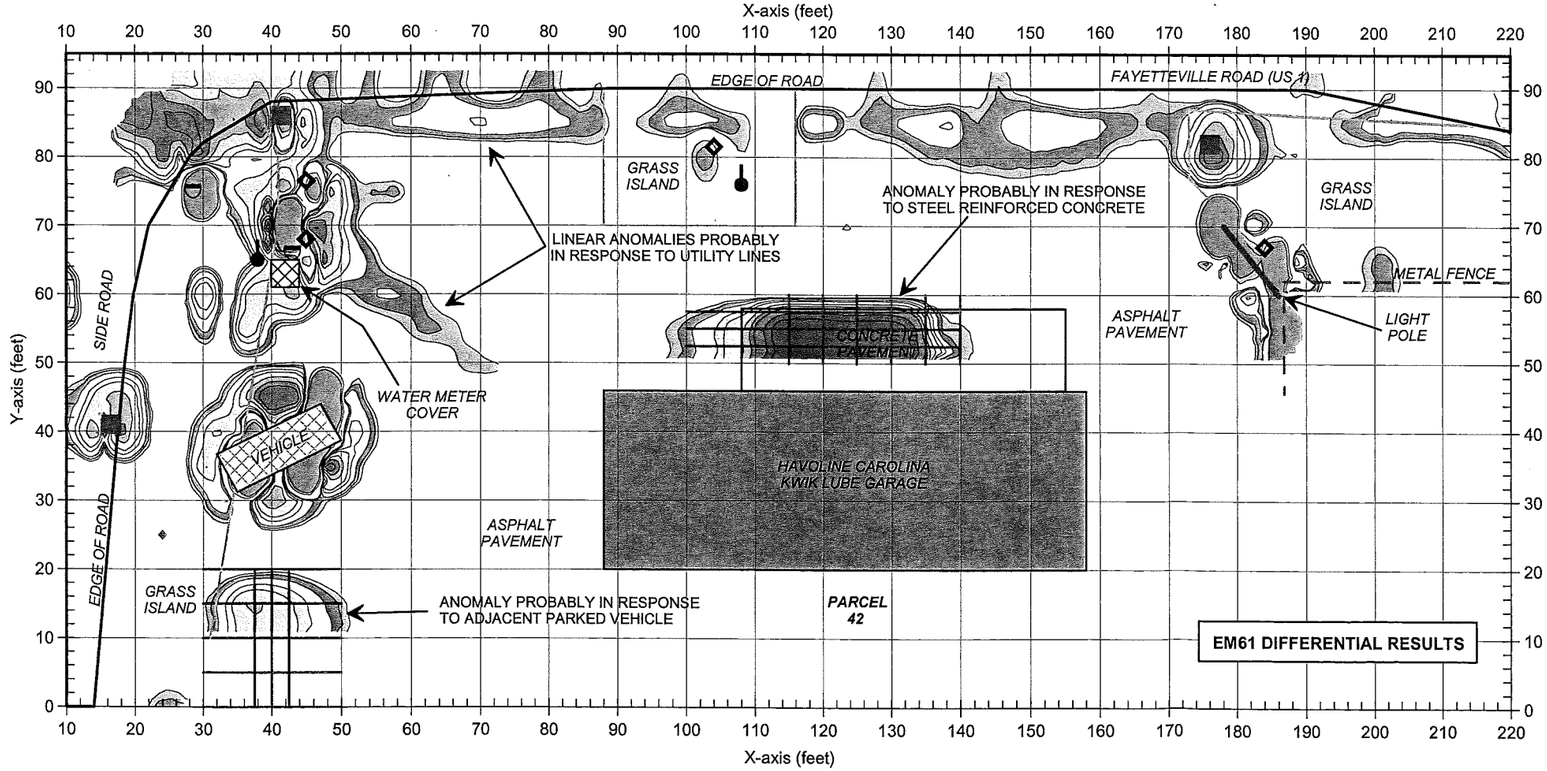


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- METAL SIGN POLE
- STORM SEWER GRATE
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 15, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 14

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| DATE | DRWN | FIGURE |
|---|---|---|
| 11/26/05 | MJD | |
| LAY | CHKD | |
| DWG | | 2005-292 |
| JOB NO. | | |

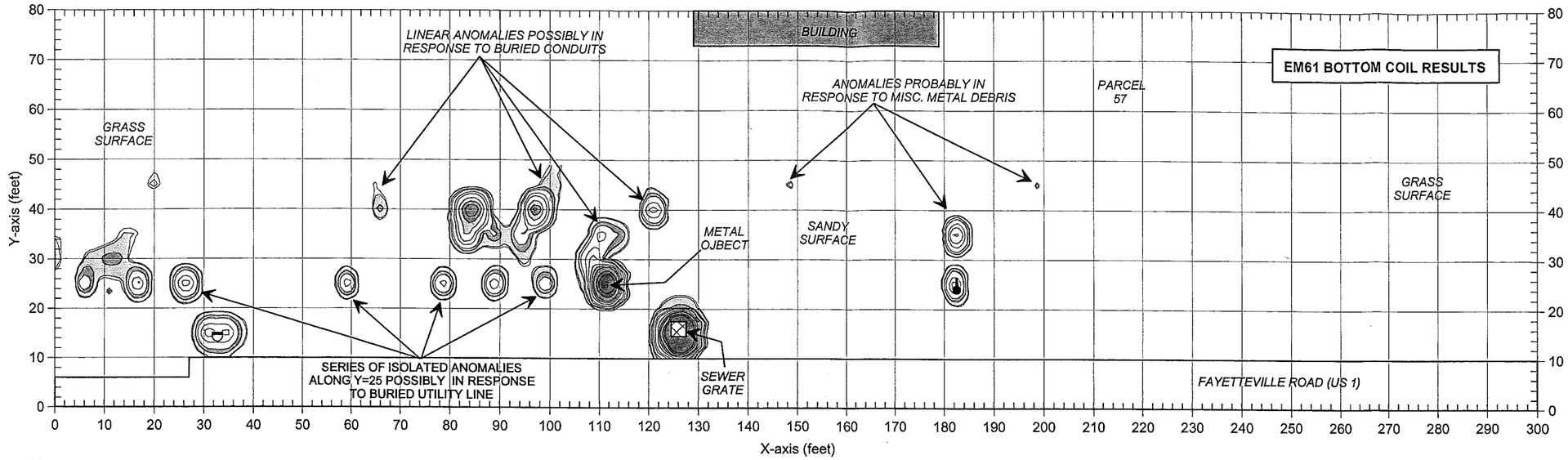
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

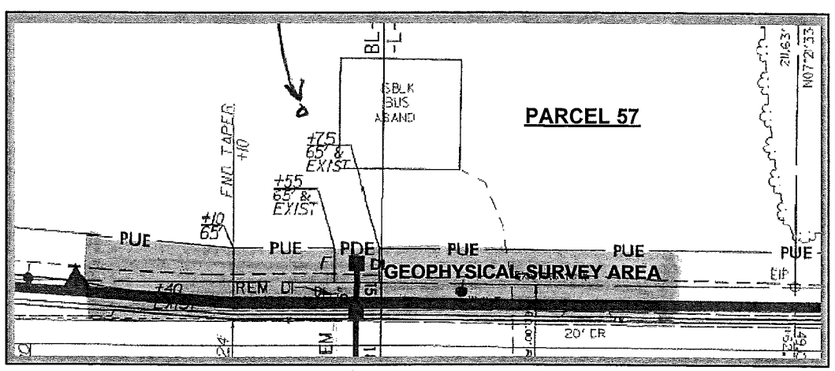
SITE: WESLEY DENHAM PROPERTY (PARCEL 42)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -90 -45 -50 -75 -100 -150 -200 -300 -400 -500 -750 -1000

N W E S

APPROXIMATE NORTH

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) surveys were not conducted at this site.

EM61
METAL DETECTION
RESULTS

FIGURE 15

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DATE | 11/18/05 |
| DRWN | MJD |
| LAY | |
| CH'KD | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

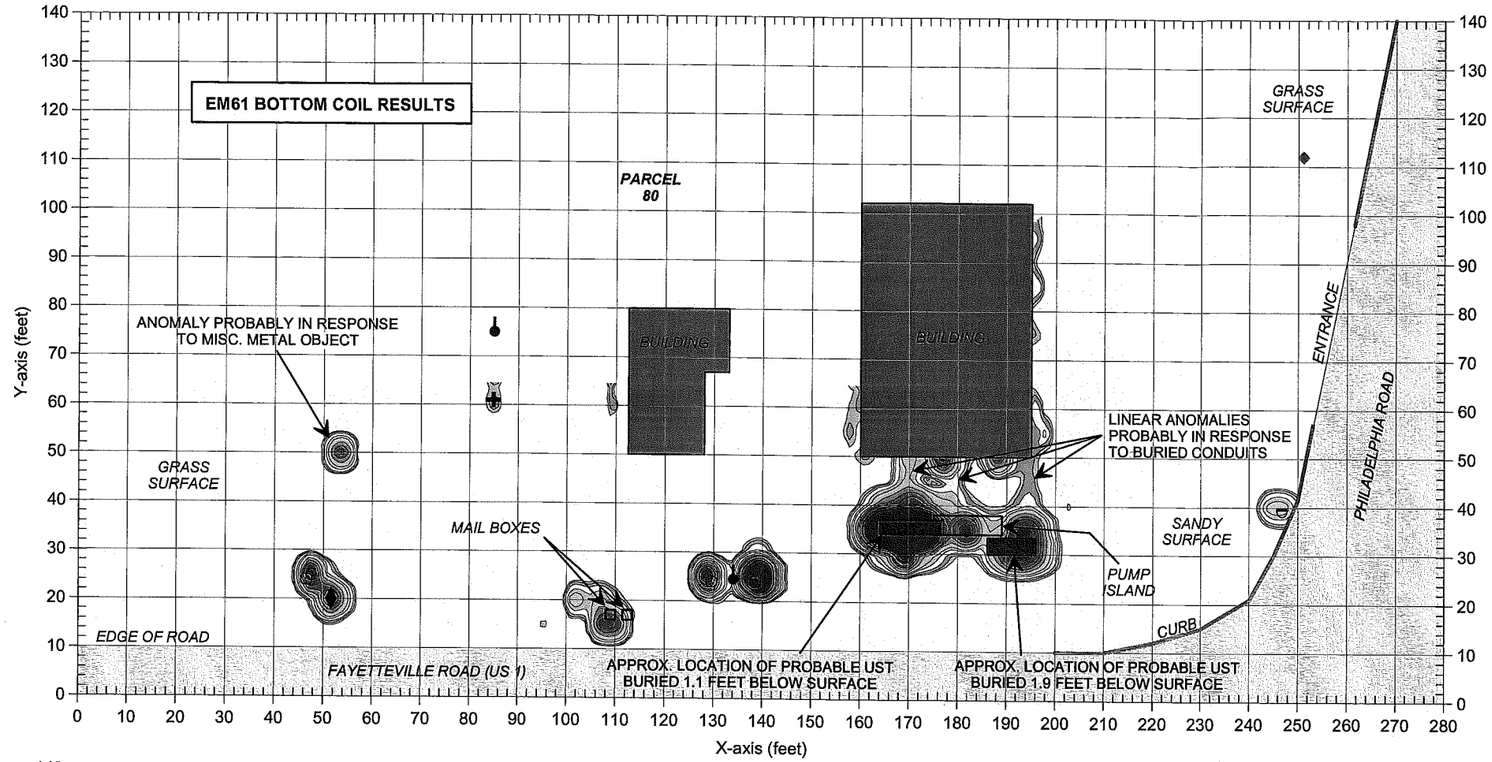
SITE: WILLIAM USSERY PROPERTY (PARCEL 57)

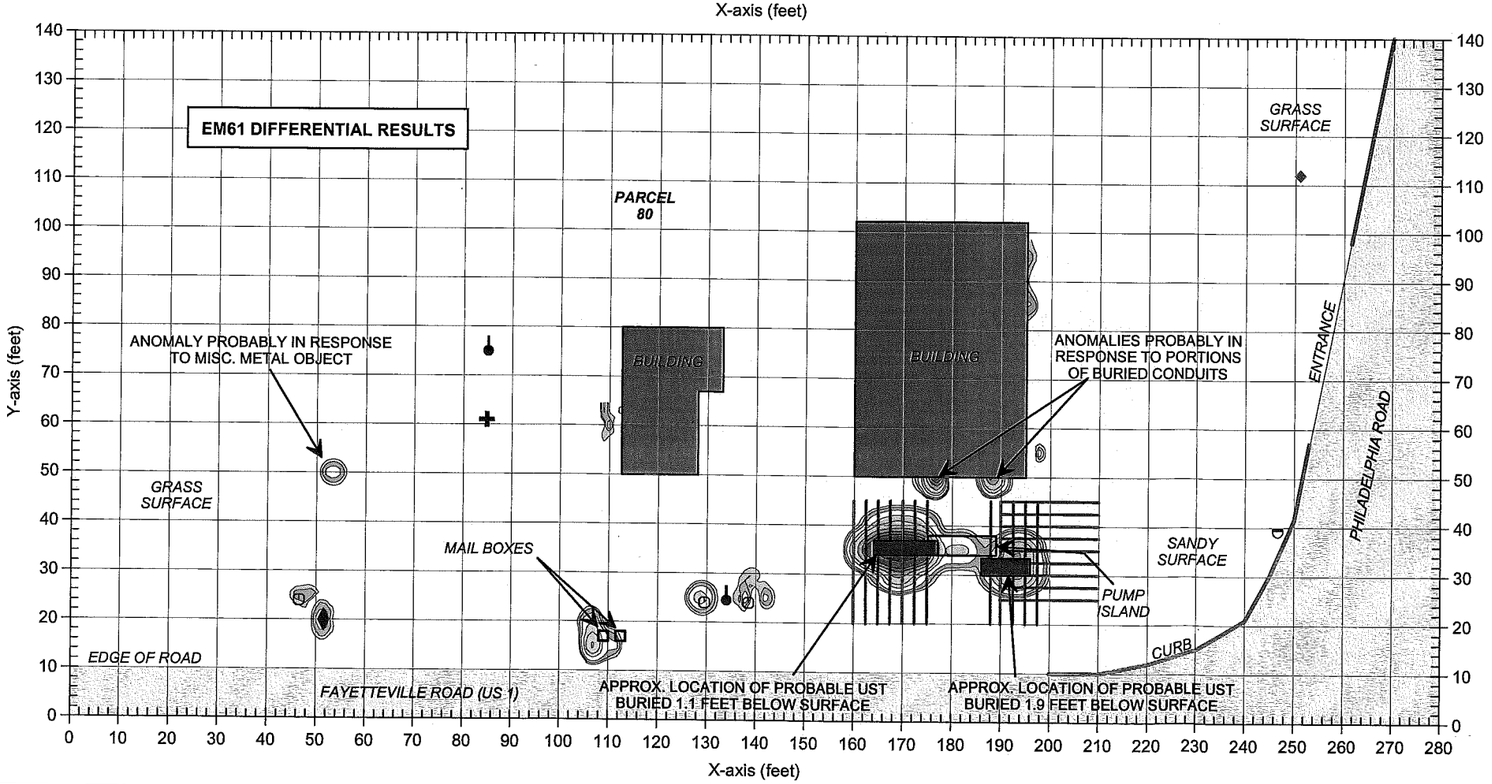
CITY: ROCKINGHAM

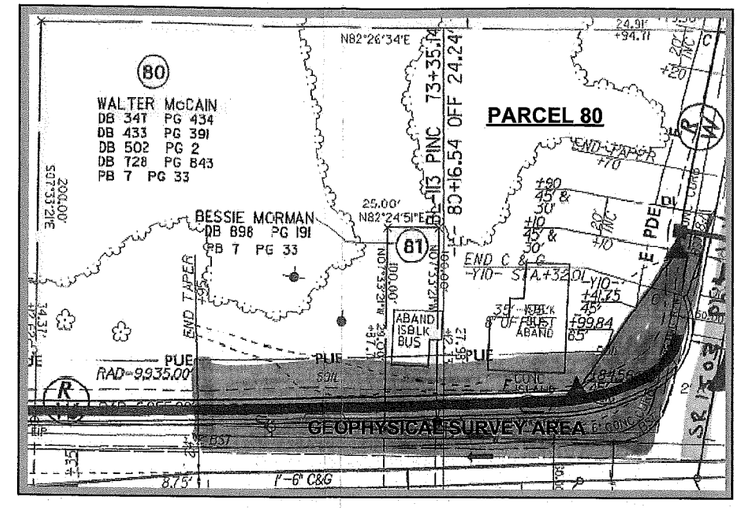
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- FIRE HYDRANT
- TRAFFIC SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 16

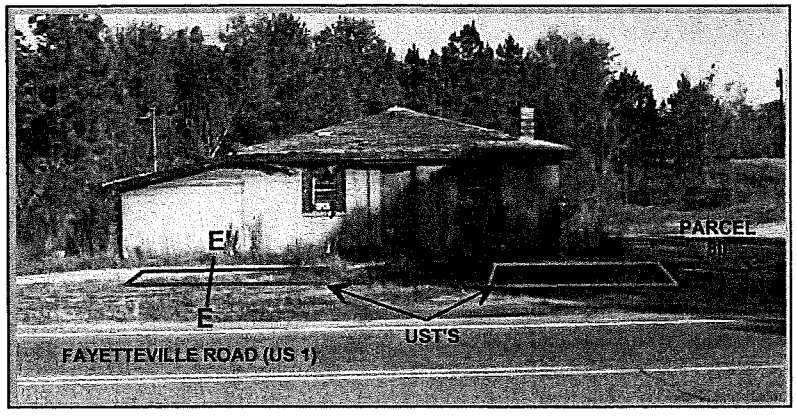
EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

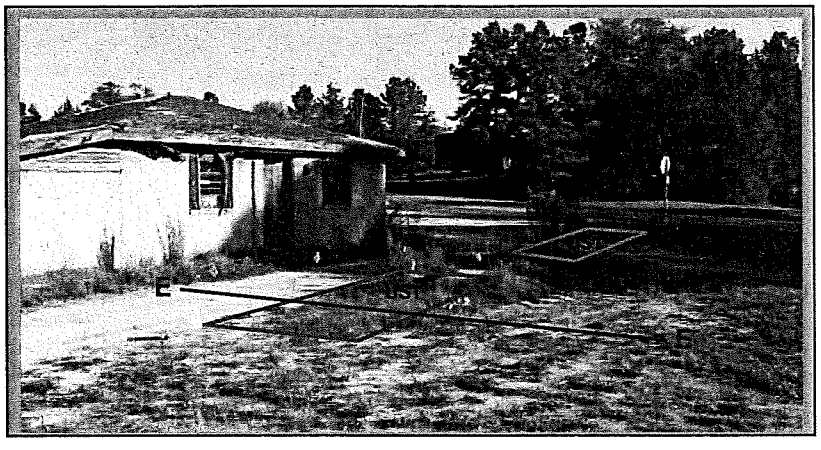
| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | 2005-292 |
| J-NO. | |

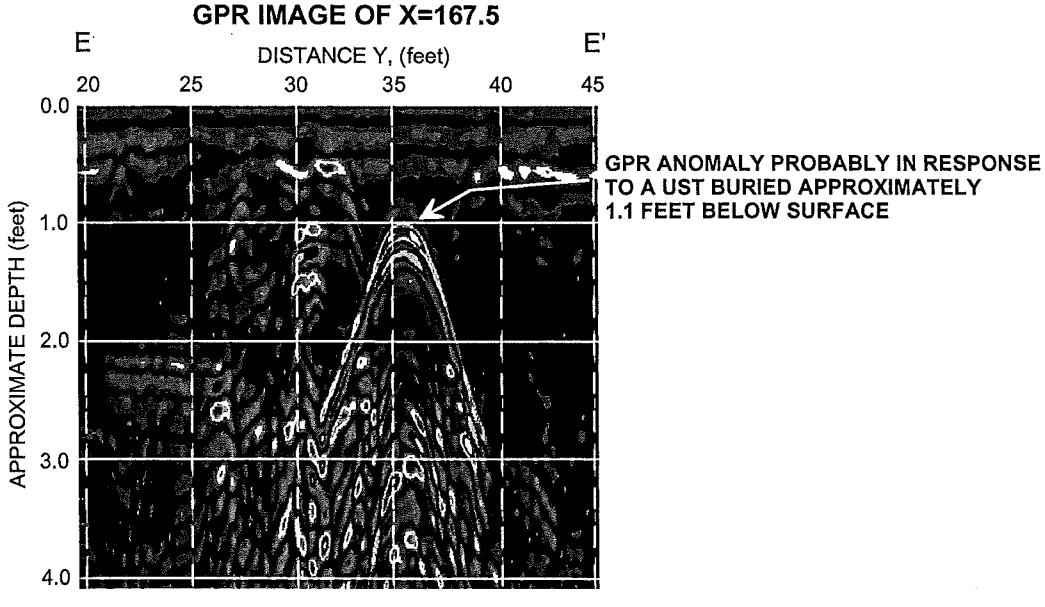
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WALTER McCAIN PROPERTY (PARCEL 80)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



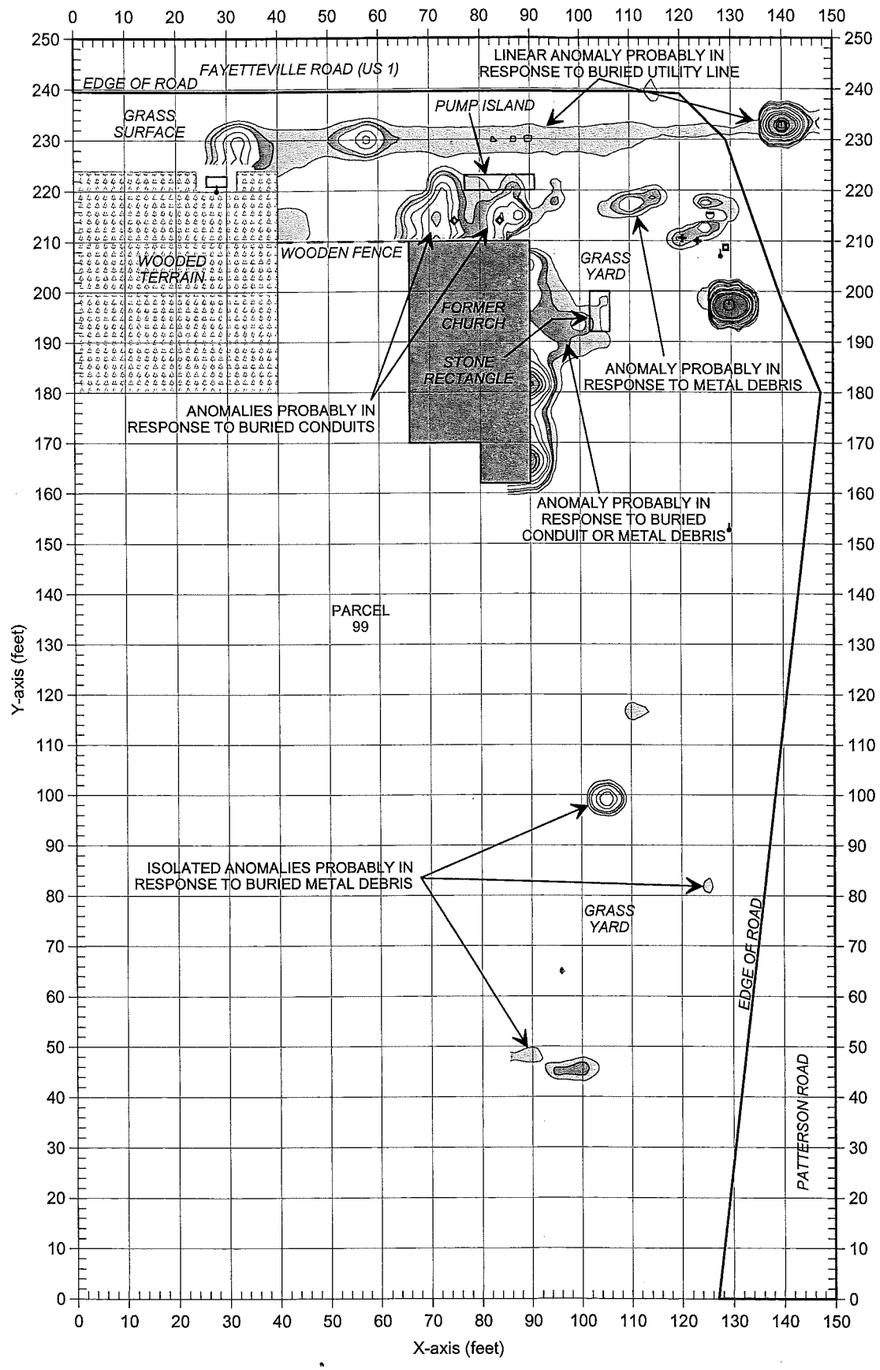

The two photos show the approximate locations of the two probable UST's at Parcel 80, as suggested by the geophysical results. The UST's appear to be buried approximately 1 to 2 feet below surface. A former pump island lies between the two probable UST's.



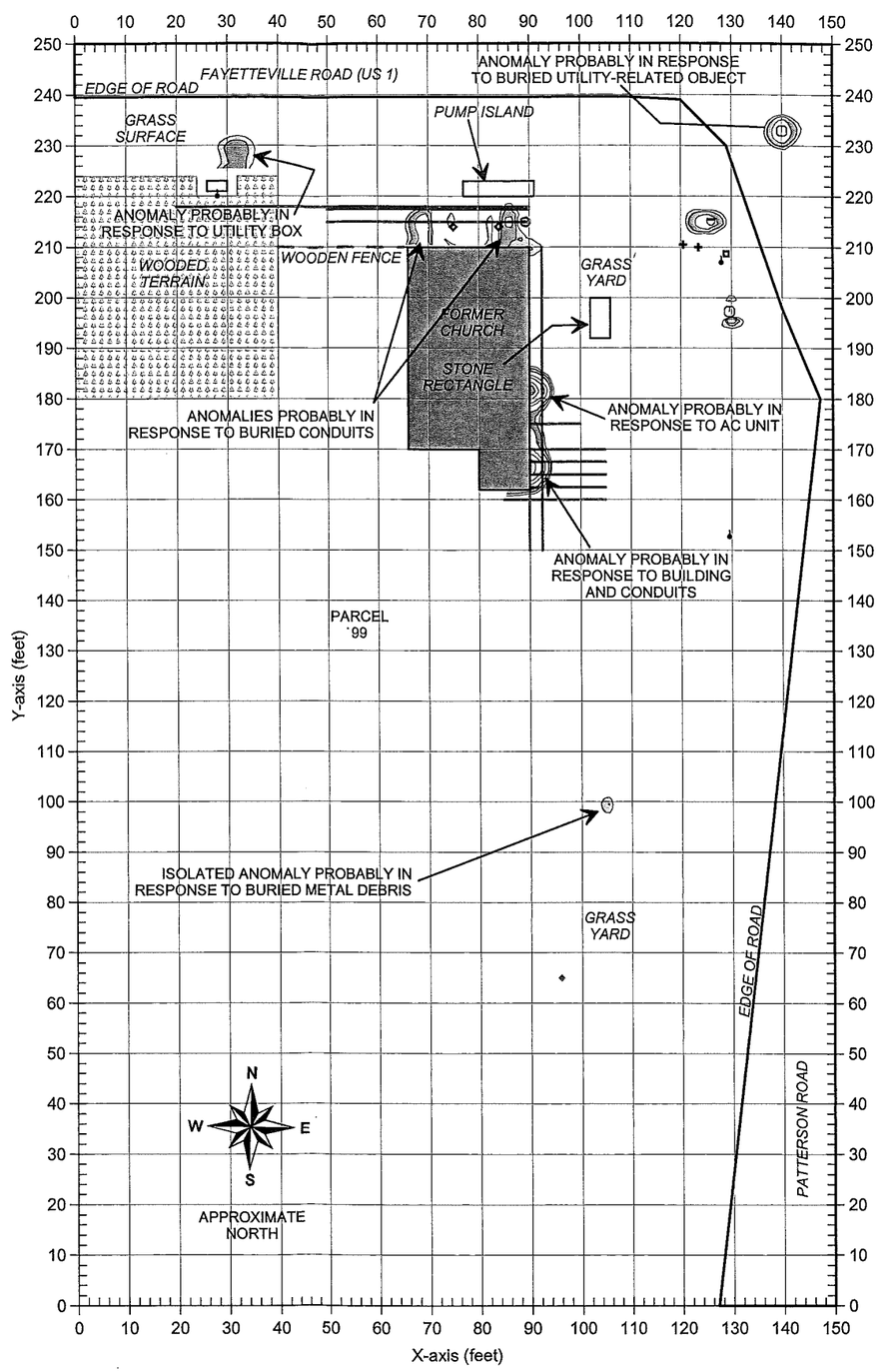



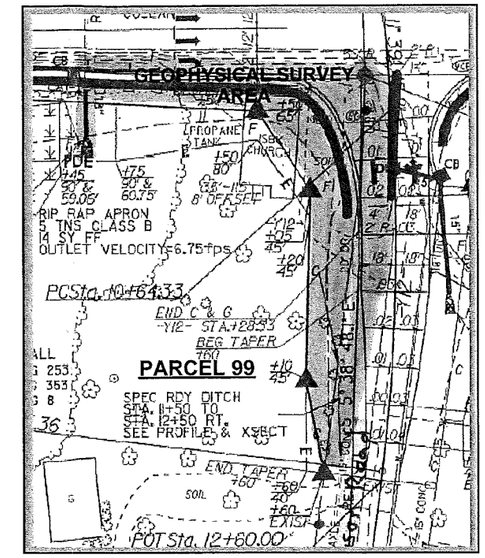

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE: 11/28/05 | DRWN: | GRAPHIC SCALE IN METERS | PHOTOS & GPR IMAGE OF UST LOCATIONS |
| | SITE: WALTER McCAIN PROPERTY (PARCEL 80) | LAY: | CHKD: | | |
| | CITY: ROCKINGHAM STATE: NORTH CAROLINA | DWG: | | | |
| | TITLE: GEOPHYSICAL RESULTS | J.NO.: 2005-292 | FIGURE: | | FIGURE 17 |

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -20 50 75 100 150 200 300 400 500 750 1000

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CANOPY POLE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

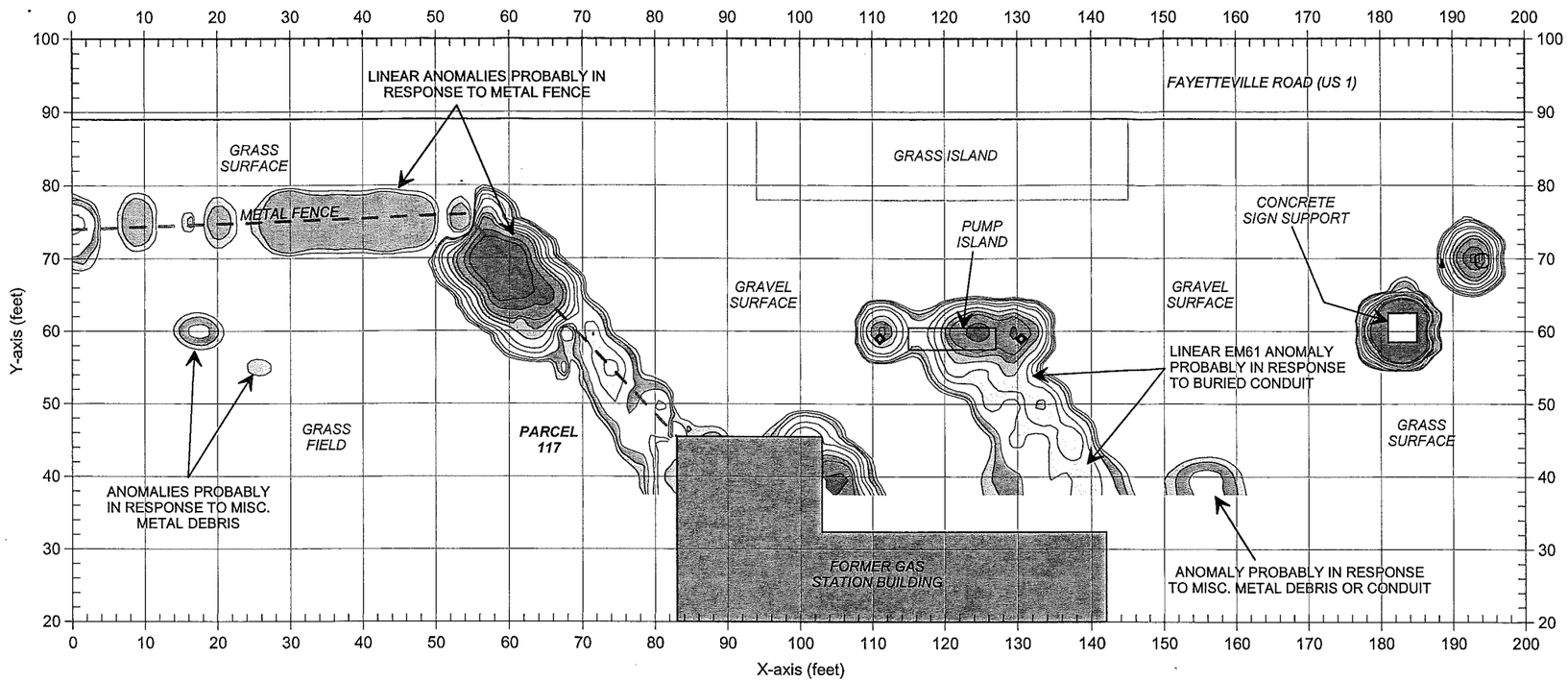
FIGURE 18

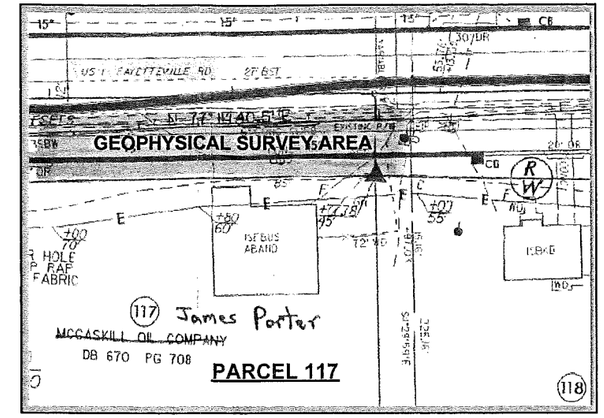
EM61
METAL DETECTION
RESULTS

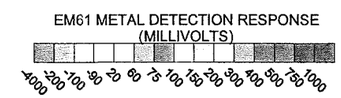
| | |
|---|---|
| GRAPHIC SCALE IN METERS | |
| DRWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| JOB NO. | 2005-292 |
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | LEON WALL PROPERTY (PARCEL 99) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

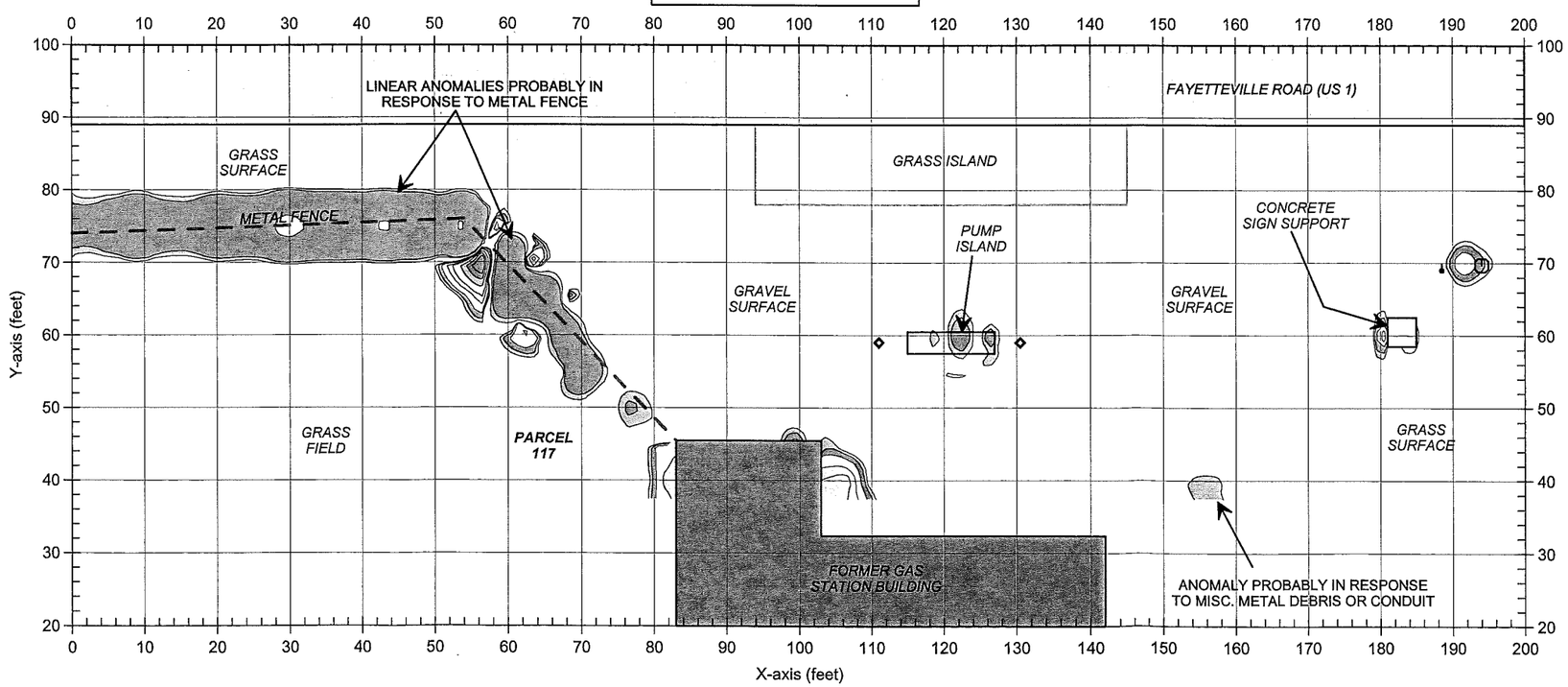
## EM61 BOTTOM COIL RESULTS






## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SUPPORT POLE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar surveys were not conducted at this site.

FIGURE 19

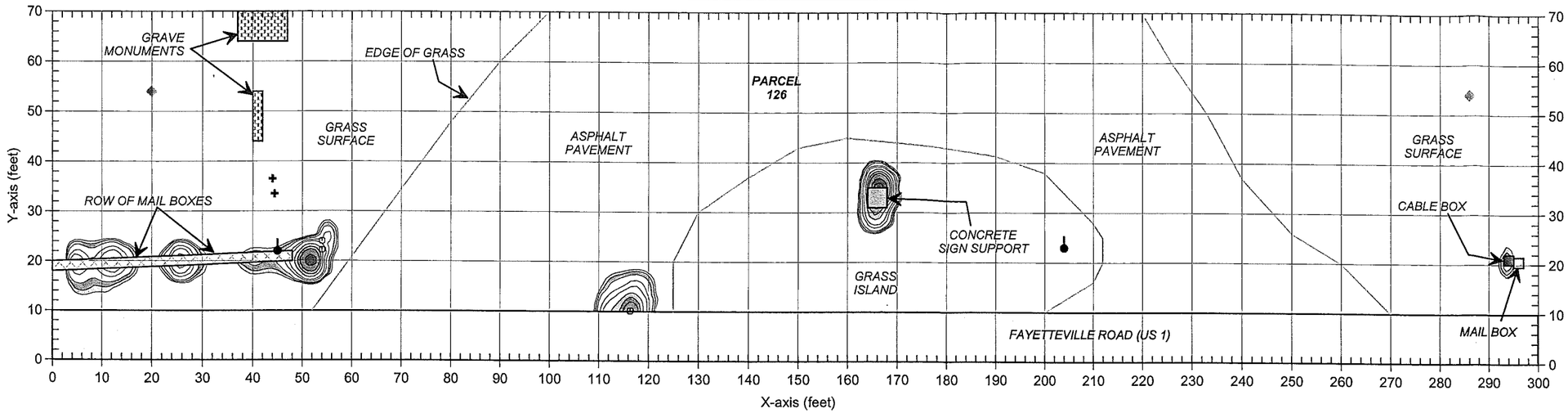
EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

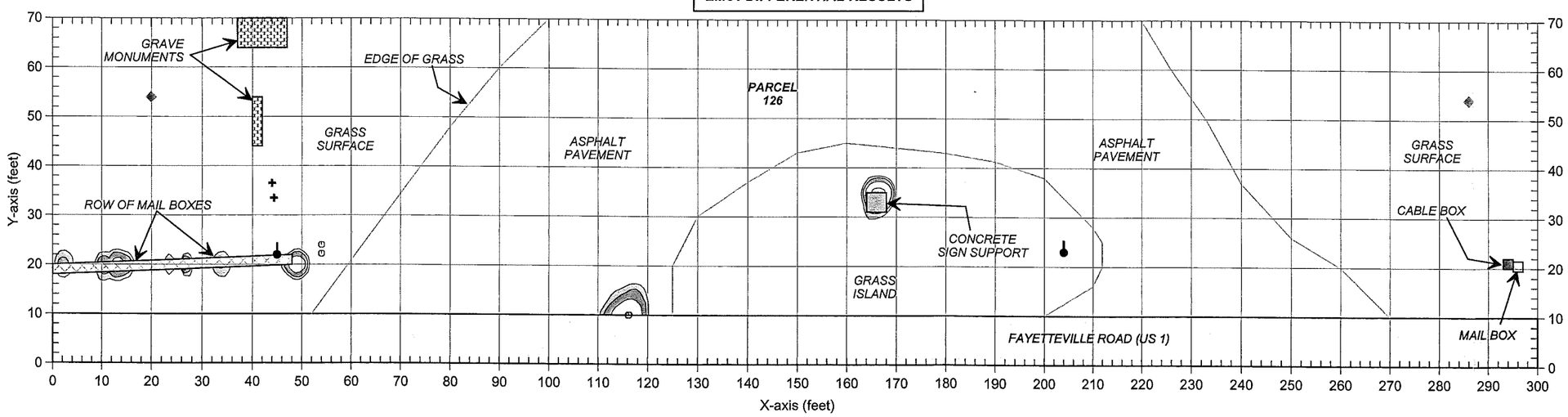
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | JAMES PORTER PROPERTY (PARCEL 117) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/26/05 |
| DRWN | MJD |
| LAY | |
| CHKD | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

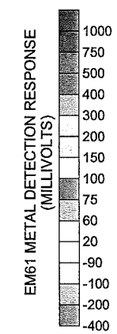
## EM61 BOTTOM COIL RESULTS

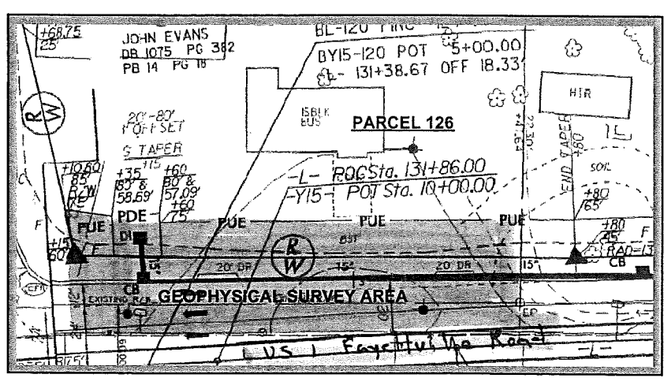



## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- UTILITY POLE
- WATER METER OR VALVE COVER
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- GUY WIRE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data surveys were not conducted at this site

FIGURE 20

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

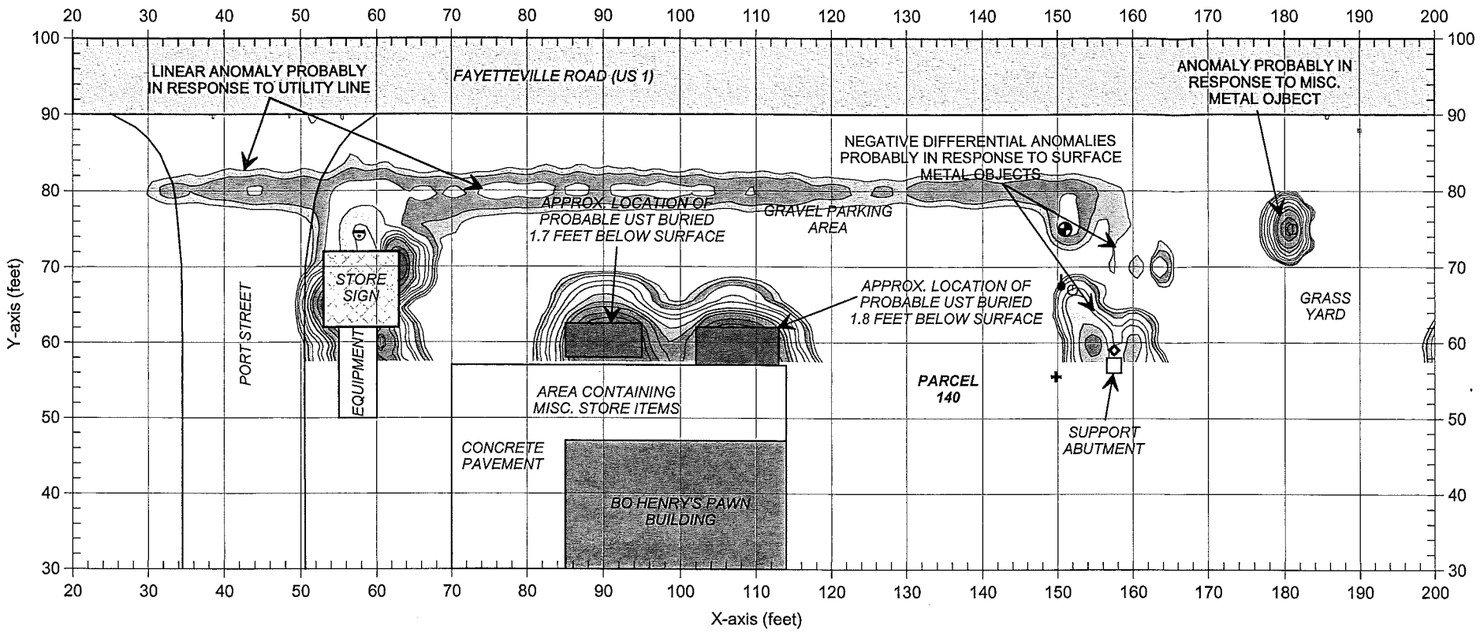
| DRAWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |

| DATE | LAY | DWG | J-NO. |
|---|---|---|---|
| 11/26/05 | | | 2005-292 |

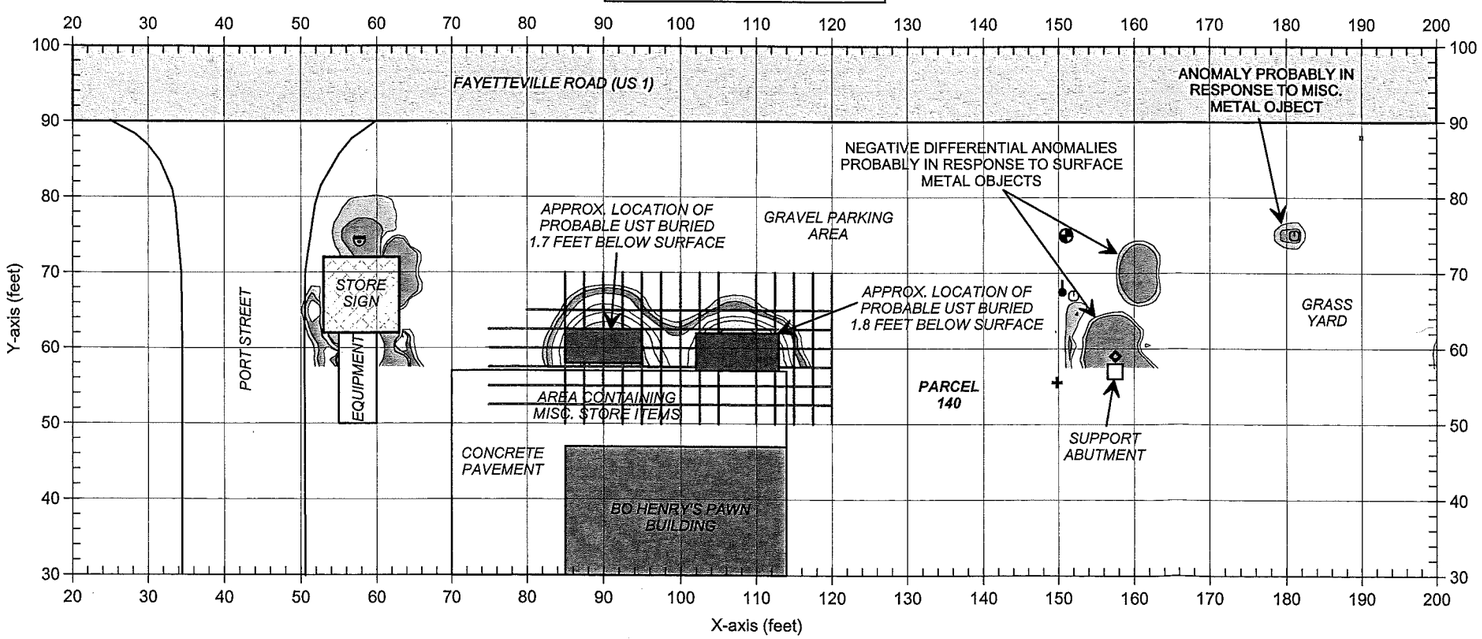
| CLIENT | SITE | CITY | STATE | TITLE |
|---|---|---|---|---|
| SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | JOHN EVANS PROPERTY (PARCEL 126) | ROCKINGHAM | NORTH CAROLINA | GEOPHYSICAL RESULTS |

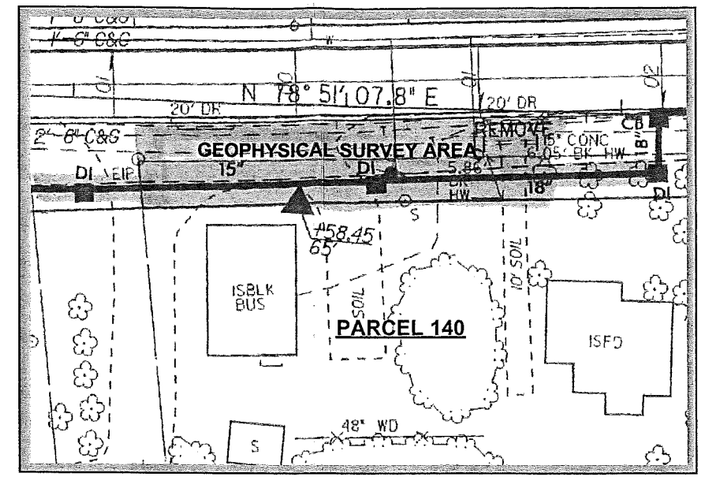
PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -50 20 60 75 100 150 200 300 400 500 750 1000

N W E S

APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- FIBER OPTIC LINE SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 21

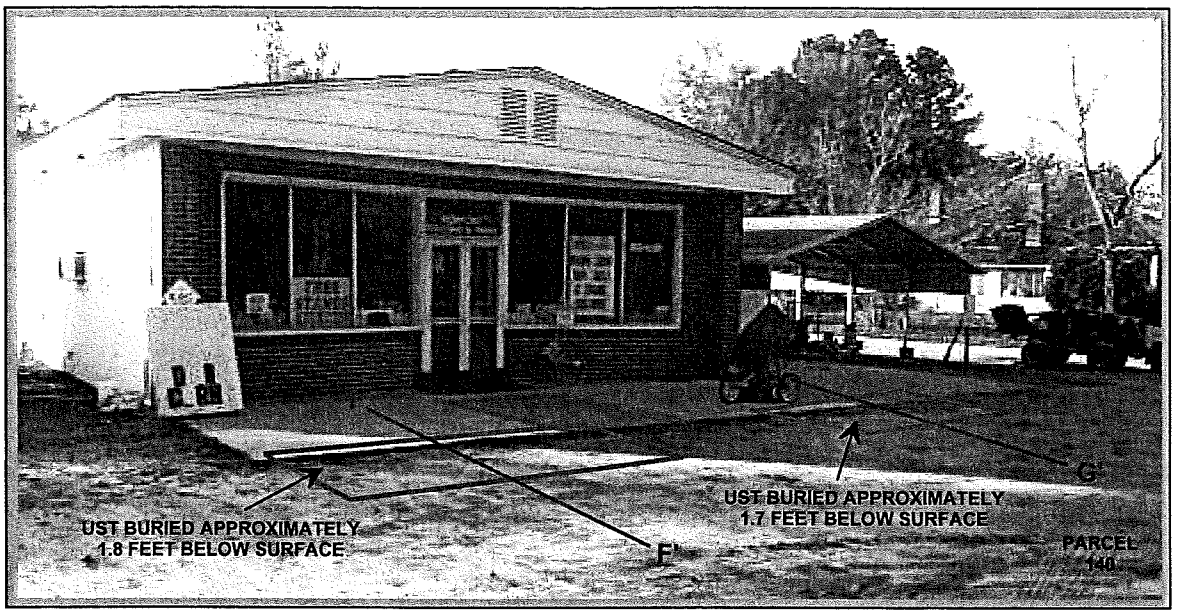
EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

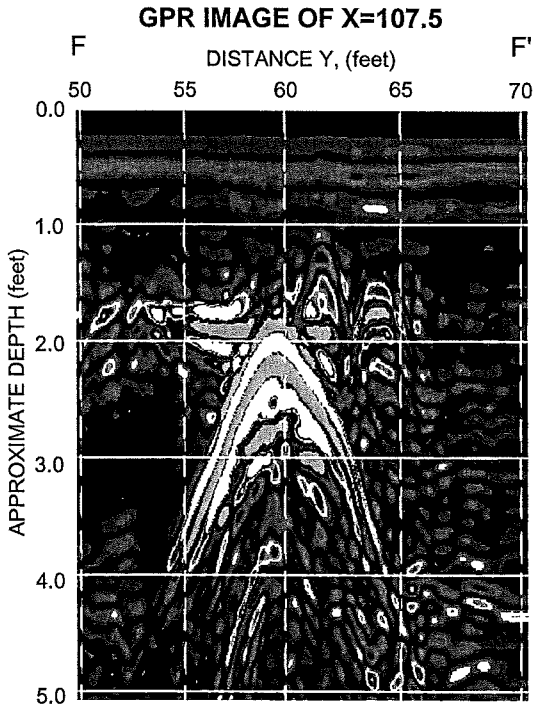
| | | | |
|---|---|---|---|
| DRAWN | MJD | FIGURE | |
| CHKD | | J.NO. | 2005-292 |
| DATE | 11/25/05 | LAY | |
| DWG | | | |

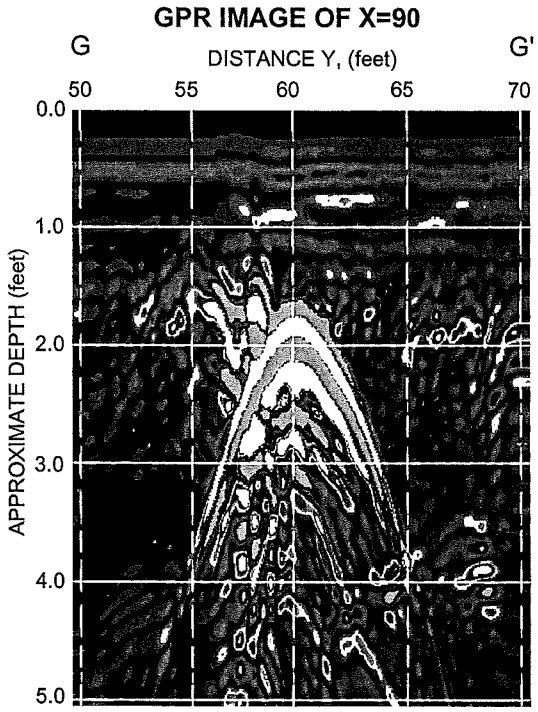
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: HENRY USSERY PROPERTY (PARCEL 140)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approximate locations of the two UST's, as suggested by the geophysical results at Parcel 140. The UST's appear to be approximately 1.8 and 1.7 feet below surface.




The GPR images obtained along survey lines X=107.5 and X=90 show the anomalies that are probably in response to the two UST's buried at Parcel 140. The GPR data suggest the UST's are buried approximately 1.8 feet and 1.7 feet below surface, respectively.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGES OF UST LOCATIONS |
| | SITE: HENRY USSERY PROPERTY (PARCEL 140) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JAND: 2005-292 | SOURC: | FIGURE 22 |

GRAPHIC SCALE IN METERS

# APPENDIX C

# BORING LOGS

# Log of Soil Boring 80-1

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-1
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DA/SLK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–1 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 1–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–3 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 3–4 | | ***SC*** Wet, tan, clayey fine sand | | MC | 100 | 0 | | |
| 4–8 | | Boring terminated at 8 feet. | | | | | | |

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**Raleigh, NC 27607**
**(919) 873-1060**

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# Log of Soil Boring 80-2

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-2
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [illegible] /SCH *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | | | |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 1 | | |
| 6–8 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 1 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-3

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-3
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–1 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–3 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 4–5 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 5–6 | | ***SC*** Dry, tan and red, clayey fine sand | | | | | | |
| 6–7 | | ***SC*** Dry, tan and red, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-4

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-4
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* AH/SCN *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–1 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 1–2 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 2–3 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 3–4 | | ***SP*** Dry, tan/red, fine to medium sand | | MC | 100 | 0 | | |
| 4–8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-5

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-5
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DH / SW *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) | FID Field Screen (ppm, 250 500 750) | Lab Sample Depth / Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 7 | | |
| 6–8 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 2 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-6

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-6
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DA / SWC *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) | FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | | |
| 2–4 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | | |
| 4–6 | | ***SC*** Moist, tan and red, clayey fine sand | | MC | 100 | 0 | | | |
| 6–8 | | ***SC*** Moist, tan, clayey fine sand | | MC | 100 | 0 | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | | |

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# Log of Soil Boring 80-7

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-7
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Sean Jarvah *Checked By:* JH/SW *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 6–8 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-8

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-8
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Sean Jarvah *Checked By:* AH/SWC *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–4 (1) | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 6–8 (2) | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 (3, 4) | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-9

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-9
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Sean Jarvah *Checked By:* [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (• ppm 250 500 750) / FID Field Screen (■ ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 4–6 | | ***SP*** Dry, tan/orange, fine sand | | MC | 100 | 0 | | |
| 6–8 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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# Log of Soil Boring 80-10

*Project:* Rockingham Sites (Parcel 080) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 80-10
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/30/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Sean Jarvah *Checked By:* *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | | | |
| 0 / 0 | | Ground Surface | | | | | | |
| 0–2 | | ***SC*** Dry, tan, clayey fine sand | | MC | 100 | 0 | | |
| 2–4 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 4–5 | | ***SP*** Moist, tan/brown, fine sand | | MC | 100 | 1 | | |
| 5–6 | | ***SC*** Moist, tan/orange, clayey fine sand | | | | | | |
| 6–8 | | ***SC*** Moist, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |

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**Raleigh, NC 27607**
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# APPENDIX D

# LABORATORY ANALYTICAL REPORT

Pace Analytical®
www.pacelabs.com

**Pace Analytical Services, Inc.**
9800 Kincey Avenue, Suite 100
Huntersville, NC 28078
Phone: 704.875.9092
Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

December 15, 2005

Ms. Sheri Knox
Solutions-IES
1101 Nowell Road
Raleigh, NC 27607

RE: Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

Dear Ms. Knox:

Enclosed are the analytical results for sample(s) received by the laboratory on December 1, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

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2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

Solid results are reported on a dry weight basis

Lab Sample No: 926398793 | Project Sample Number: 92108544-001 | Date Collected: 11/30/05 10:45
Client Sample ID: 80-5(4-6) | Matrix: Soil | Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 8.2 | % | | 12/01/05 16:32 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.4 | 12/08/05 20:10 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 105 | % | | 12/08/05 20:10 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 5.0 | 12/06/05 11:02 | DHW | | | |
| 4-Bromofluorobenzene (S) | 72 | % | | 12/06/05 11:02 | DHW | 460-00-4 | | |



Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC 99030
FL NELAP E87648

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Charlotte Certification IDs
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NC Drinking Water 37706
SC 99006
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2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

Lab Sample No: 926398801 | Project Sample Number: 92108544-002 | Date Collected: 11/30/05 10:50
Client Sample ID: 80-10(4-6) | Matrix: Soil | Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 10.9 | % | | 12/01/05 16:32 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.6 | 12/08/05 21:27 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 94 | % | | 12/08/05 21:27 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.5 | 12/06/05 11:32 | DHW | | | |
| 4-Bromofluorobenzene (S) | 72 | % | | 12/06/05 11:32 | DHW | 460-00-4 | | |



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Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

## PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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# QUALITY CONTROL DATA

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

QC Batch: 144394 — Analysis Method: EPA 8015
QC Batch Method: EPA 3545 — Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926398793 926398801

METHOD BLANK: 926413055
Associated Lab Samples: 926398793 926398801

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 88 | | |

LABORATORY CONTROL SAMPLE: 926413063

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 143.9 | 86 | |
| n-Pentacosane (S) | | | | 116 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926413071 926413089

| Parameter | Units | 926398934 Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | RPD | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 2.124 | 172.30 | 144.5 | 131.5 | 83 | 75 | 9 | |
| n-Pentacosane (S) | | | | | | 120 | 110 | | |



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SC 99030
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Fax: 828.252.4618

# QUALITY CONTROL DATA

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

QC Batch: 144145 Analysis Method: EPA 8015
QC Batch Method: EPA 8015 Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926398793 926398801

METHOD BLANK: 926402280
Associated Lab Samples: 926398793 926398801

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 72 | | |

LABORATORY CONTROL SAMPLE: 926402298

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 27.64 | 111 | |
| 4-Bromofluorobenzene (S) | | | | 74 | |

MATRIX SPIKE: 926402306

| Parameter | Units | 926400300 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 1.154 | 30.64 | 38.17 | 121 | |
| 4-Bromofluorobenzene (S) | | | | | 76 | |

SAMPLE DUPLICATE: 926402314

| Parameter | Units | 926400318 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 6.300 | 8.900 | 34 | 1 |
| 4-Bromofluorobenzene (S) | % | 96 | 111 | | |



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Fax: 704.875.9091

**Pace Analytical Services, Inc.**
2225 Riverside Drive
Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

# QUALITY CONTROL DATA

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

QC Batch: 144072 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926398793 926398801

SAMPLE DUPLICATE: 926399494

| Parameter | Units | 926399072 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 15.60 | 15.50 | 0 | |



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Asheville, NC 28804
Phone: 828.254.7176
Fax: 828.252.4618

Lab Project Number: 92108544
Client Project ID: NCDOT 34950.1.1 Parcel #80

## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |
| [1] | Sample re-analysis confirmed the sample is not homogeneous. |



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# CHAIN-OF-CUSTODY / Analytical Request Document

Pace Analytical®

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

897912

| Section A Required Client Information: | Section B Required Project Information: | Section C Invoice Information: |
|---|---|---|
| Company: Solutions-IES | Report To: Sheri Knox | Attention: |
| Address: 1101 Nowell Rd, Raleigh, NC 27607 | Copy To: | Company Name: NCDOT |
| | | Address: |
| Email To: sknox@solutions-ies.com | Purchase Order No.: WBS 34950.1.1 | Pace Quote Reference: |
| Phone: 919 873 1060 Fax: 919 873 1074 | Project Name: NCDOT Parcel 80 | Pace Project Manager: BKM |
| Requested Due Date/TAT: Standard | Project Number: C730.05AZ.NDOT | Pace Profile #: 3864 6 |

**REGULATORY AGENCY**

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☒ UST ☐ RCRA ☐ Other _____

**SITE LOCATION**

☐ GA ☐ IL ☐ IN ☐ MI ☐ MN ☒ NC
☐ OH ☐ SC ☐ WI ☐ OTHER _____

**Section D** Required Client Information

**SAMPLE ID**

One Character per box. (A-Z, 0-9 / .-) - Samples IDs MUST BE UNIQUE

Valid Matrix Codes

| MATRIX | CODE |
|---|---|
| DRINKING WATER | DW |
| WATER | WT |
| WASTE WATER | WW |
| PRODUCT | P |
| SOIL/SOLID | SL |
| OIL | OL |
| WIPE | WP |
| AIR | AR |
| OTHER | OT |
| TISSUE | TS |

Filtered (Y/N)

Requested Analysis: GRO 5030/8015, DRO 3545/8015

Pace Project Number: 92108544

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE G=GRAB C=COMP | COLLECTED 2005 COMPOSITE START DATE | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | GRO | DRO | Residual Chlorine (Y/N) | Lab I.D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ~~140~~ | ~~SL~~ | ~~G~~ | ~~11/30~~ | | | | | ~~4~~ | ~~2~~ | | | | | | ~~2~~ | | ~~1~~ | ~~1~~ | | 9 |
| 2 | 80-5(4-6) | SL | G | 11/30 | 1045 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 926390793 |
| 3 | 80-10(4-6) | SL | G | 11/30 | 1050 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 8801 |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

**Additional Comments:**

| RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME |
|---|---|---|---|---|---|
| D Hinch / Solutions-IES | 12/1 | 1030 | [signature] | 12-1-05 | 1100 |
| [signature] | 12-1-05 | 1315 | Kelly M Fadden | 12/1/05 | 1315 |
| | | | | | |
| | | | | | |

**SAMPLE CONDITION**

| Temp in °C | Received on Ice | Custody Sealed Cooler | Samples Intact |
|---|---|---|---|
| | Y/N | Y/N | Y/N |
| 0.6 | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N |

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: SEAN JARVAL

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY): 11/30/05

SEE REVERSE SIDE FOR INSTRUCTIONS

ALLC020rev3 31Mar05

RECEIVED
JAN 10 2006
NCDOT - Geotechnical Engineering Unit

# PRELIMINARY SITE ASSESSMENT
# PARCEL 099 - LEON WALL PROPERTY
# 736 FAYETTEVILLE ROAD
# ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
# WBS ELEMENT: 34950.1.1 (NCDOT PROJECT: U-3456)

**Prepared for:**
**NC Department of Transportation**
**Geotechnical Engineering Unit**
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

**Prepared by:**
**Solutions-IES**
1101 Nowell Road
Raleigh, North Carolina 27607

**Solutions-IES Project No. 2730.05A2.NDOT**

NORTH CAROLINA PROFESSIONAL SEAL 022585 ENGINEER SHERI LANE KNOX 1/6/06

Brian M. Rebar
Field Services Manager

Sheri L. Knox, P.E.
Project Manager

**January 6, 2006**

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3.0 FIELD ACTIVITIES ..... 1

4.0 LABORATORY RESULTS ..... 2

5.0 DISCUSSION AND CONCLUSIONS ..... 3

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TABLE 2 – SUMMARY OF SOIL ANALYTICAL RESULTS

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FIGURE 3 –BORING LOCATIONS & ESTIMATED EXTENT OF SOIL CONTAMINATION

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APPENDIX B – GEOPHYSICAL DATA

APPENDIX C – BORING LOGS

APPENDIX D – LABORATORY ANALYTICAL REPORT

## 1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening Fayetteville Road (US-1) in Rockingham, Richmond County, North Carolina. The project will require the NCDOT to acquire additional property for new roadway construction. On November 3, 2005, Solutions-IES submitted a proposal to conduct Preliminary Site Assessments (PSAs) for 14 parcels of land that contain or reportedly contained underground storage tanks (USTs) or are areas of concern identified by NCDOT. This report summarizes the results of field and laboratory activities conducted during the PSA of a portion of the Leon Wall property (Parcel 099) located at 736 Fayetteville Road just west of SR 1682 (Patterson Road). The location of the parcel is shown on Figures 1 and 2. The scope of work was performed as outlined in Solutions-IES proposal NC05449P, and initiated based on a Notice to Proceed issued by NCDOT dated November 7, 2005

## 2.0 BACKGROUND AND SITE DESCRIPTION

Parcel 099 is bordered by Fayetteville Road to the north and Patterson Road to the east. The proposed right-of-way will require acquisition of part of the property. A church currently occupies the building that resides on the parcel. According to NCDOT, an old petroleum dispenser pump island is located in front of the building approximately 32 feet from the centerline of Fayetteville Road. Photographs of the site are included in Appendix A.

## 3.0 FIELD ACTIVITIES

Prior to beginning subsurface sampling, Solutions-IES contacted the North Carolina One Call Center to locate underground utilities at the site. Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electromagnetic survey of the subsurface in the proposed right-of-way and drainage easement area. The survey was performed on November 17, 2005. The electromagnetic survey (EM61) did not identify any USTs in the proposed right-of-way. Ground penetrating radar (GPR) was also used to investigate the presence of metal or fiberglass USTs within the right-of-way. The EM61 image is included as Figure 18 in Appendix B. A GPR image was not included in the geophysical report. The extent of detected anomalies was spray painted on the ground by Pyramid. After reviewing the geophysical report, Solutions-IES mobilized to the site on November 28, 2005 to collect soil samples from the proposed right-of-way. Eight soil borings were advanced at the site to a depth of eight feet below ground surface (ft bgs) using a Geoprobe®. Two borings were advanced through the apparent former pump island (99-3 and 99-4), one boring was advanced on the east side of the building where an

anomaly was indicated in the geophysical report (99-6), and the remainder of the borings (99-1, 99-2, 99-5, 99-7, and 99-8) were spaced approximately 50 feet apart (Figure 3).

A MacroCore® sampler fitted with a single-use disposable, polyvinyl chloride (PVC) liner was used to collect samples at 4-foot intervals. Each soil sample was split into two aliquots. Each aliquot was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the other bag was placed at ambient temperature for field screening with a flame ionization detector (FID). After approximately 20 minutes to allow accumulation of volatile organic compounds (VOCs) in the headspace of the latter bag, the headspace was scanned with the FID. The FID readings were rounded to the nearest whole number and entered on the boring logs along with the soil description and any indications of petroleum staining or odor (Appendix C).

The subsurface at the site consisted of approximately 1-foot of brown fine sand underlain by tan fine-grained sand (Unified Soil Classification SP), underlain by tan/orange clayey fine sand (Unified Soil Classification SC). Water was encountered in borings 99-1 and 99-2, at a depth of 7.3 and 6.7 ft bgs, respectively. The water encountered in borings 99-1 and 99-2 is suspected to be perched water and not truly representative of the groundwater. Groundwater or perched water was not encountered in the remaining borings.

There was no indication of VOCs in the headspace of samples scanned with the FID (Table 1). For confirmation, soil samples collected from soil borings 99-3 at a depth of 0-2 ft bgs, and 99-5 from 2-4 ft bgs, were placed in laboratory-supplied jars and stored on ice pending shipment to Pace Analytical Services, Inc. (Pace) in Huntersville, NC under chain-of-custody control. The samples were submitted for analysis of gasoline range organics (GRO) and diesel range organics (DRO) total petroleum hydrocarbons (TPH) by EPA Modified Method 8015 with preparation methods 5030 and 3545, respectively.

## 4.0 LABORATORY RESULTS

According to the laboratory analytical results, TPH DRO (28 mg/kg) was detected in the soil sample collected from soil boring 99-3 at a depth of 0-2 ft bgs. This is above the NCDENR "Action Level" of 10 mg/kg. This boring was advanced beneath the pump island and likely represents surficial soil contamination due to leaks in the dispenser or piping. Concentrations of TPH DRO/GRO were not detected in the sample collected from boring 99-5 above the laboratory method detection limits. The analytical results are summarized in Table 2, and the laboratory reports for the soil samples are included in Appendix D.

## 5.0 DISCUSSION AND CONCLUSIONS

Solutions-IES advanced eight soil borings at Parcel 099 to a depth of 8 ft bgs within the proposed right-of-way and easement area. Field observations and FID readings did not indicate the presence of VOCs in soil samples collected in the study area. However, TPH DRO was detected in the soil sample collected from 99-3 at a concentration exceeding the NCDENR Action Level. Boring 99-3 was collected from beneath a suspected former pump island. Boring 99-4 was also advanced beneath the suspected pump island, but a soil sample was not submitted to the laboratory for analysis because VOCs were not detected in the headspace of the bagged sample soil collected from this boring. As shown in figure 3, the petroleum impacted soil within the study area possibly encompasses an area of approximately 10 ft by 20 ft in the vicinity of boring 99-3 and 99-4 (suspected former pump island), possibly to a depth of 3 ft, which is a depth typical of dispenser piping. The estimated volume of impacted soil is 630 $ft^3$ (cubic feet). Removal of the suspected former pump island and associated petroleum impacted soil may be necessary when installation of the new drainage system begins.

# TABLES

**TABLE 1**
**SUMMARY OF FIELD SCREENING RESULTS FOR SOIL**
**Parcel 099 – Leon Wall Property**
**736 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**November 28, 2005**

| Sample Depth Below Ground Surface | Soil Borings | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 99-1 | 99-2 | 99-3 | 99-4 | 99-5 | 99-6 | 99-7 | 99-8 |
| | FID Reading (ppm) | | | | | | | |
| 0 - 2 feet | ND | ND | ND | ND | ND | ND | ND | ND |
| 2 - 4 feet | ND | ND | ND | ND | ND | ND | ND | ND |
| 4 - 6 feet | ND | ND | ND | ND | ND | ND | ND | ND |
| 6 - 8 feet | ND | ND | ND | ND | ND | ND | ND | ND |

Notes:

1. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
2. Samples denoted by shaded cells were submitted for laboratory analysis.
3. ND - Not detected

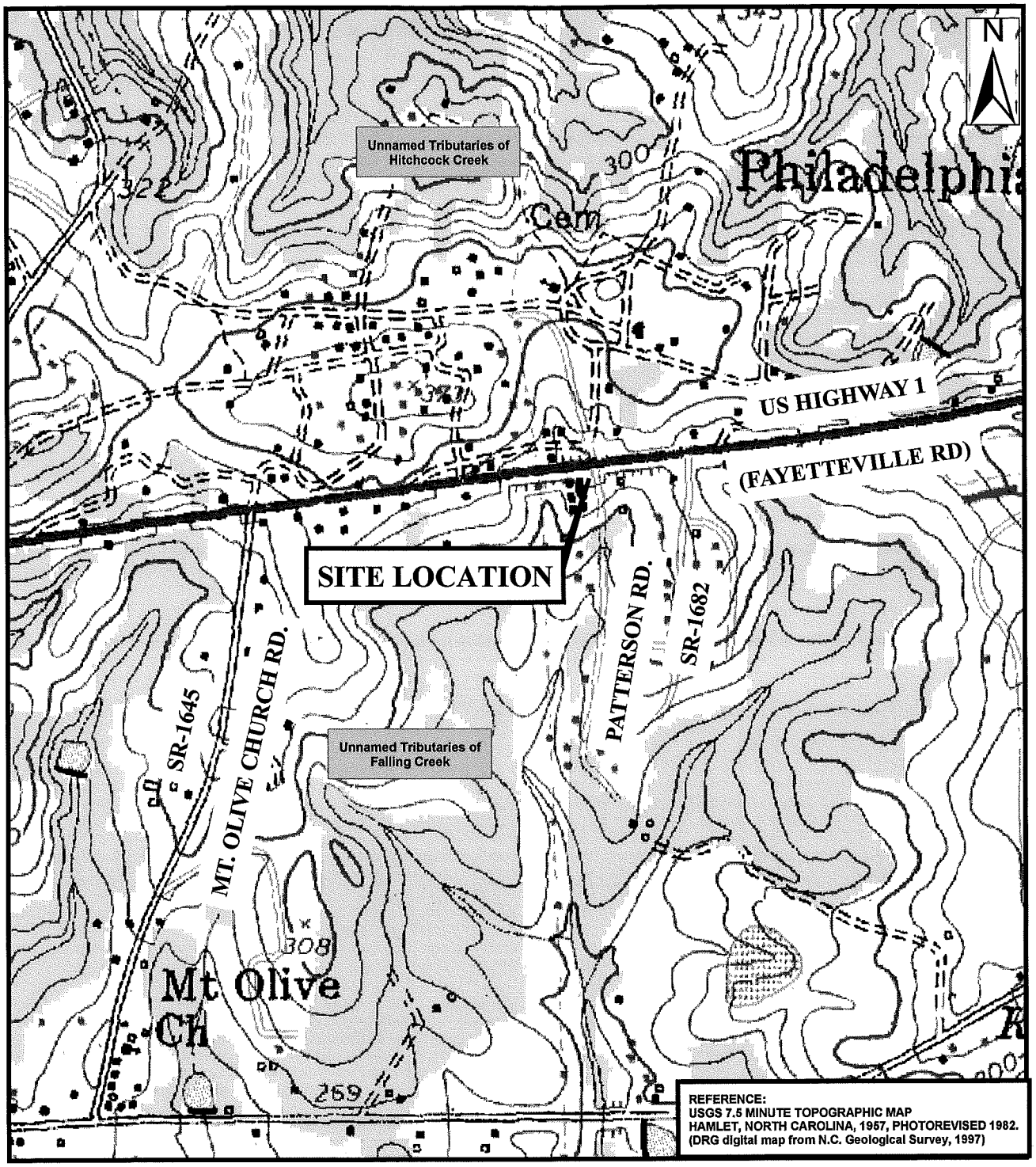
**TABLE 2**
**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 099 – Leon Wall Property**
**736 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**November 28, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 99-3 | 0-2 | <5.0 | **28** |
| 99-5 | 2-4 | <4.0 | <5.3 |

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons
3. Shaded values exceed NC DENR action levels (10 mg/kg).

# FIGURES



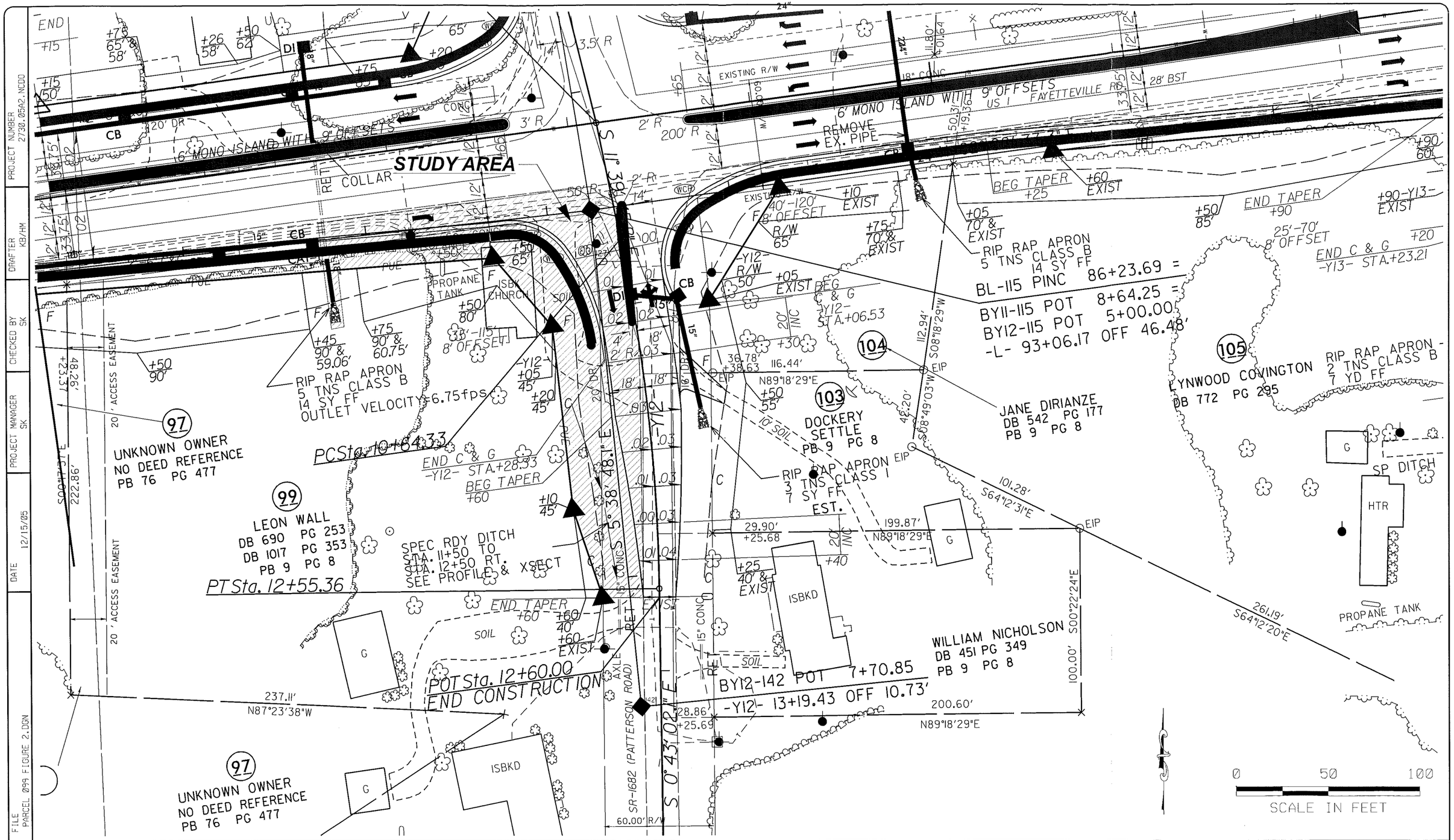

1:10,000

SITE LOCATION MAP
PARCEL # 099 - LEON WALL PROPERTY
736 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1(NCDOT PROJECT: U-3456)

Solutions
Industrial & Environmental Services

1101 Nowell Road, Raleigh, NC 27609
Phone (919) 873-1060, Fax (919) 873-1074

| | | | |
|---|---|---|---|
| Created by: KBB<br>Checked by: BR<br>File: FIG1.mxd<br>Software: ESRI ArcMap 9.0 | | Project: 2730.05A2.NCDO<br>Date: 12/15/05 | |
| | | FIGURE | 1 |





Solutions-IES
Industrial & Environmental Services
1101 NOWELL ROAD
RALEIGH, NORTH CAROLINA 27607
TEL.: (919) 873-1060 FAX.: (919) 873-1074

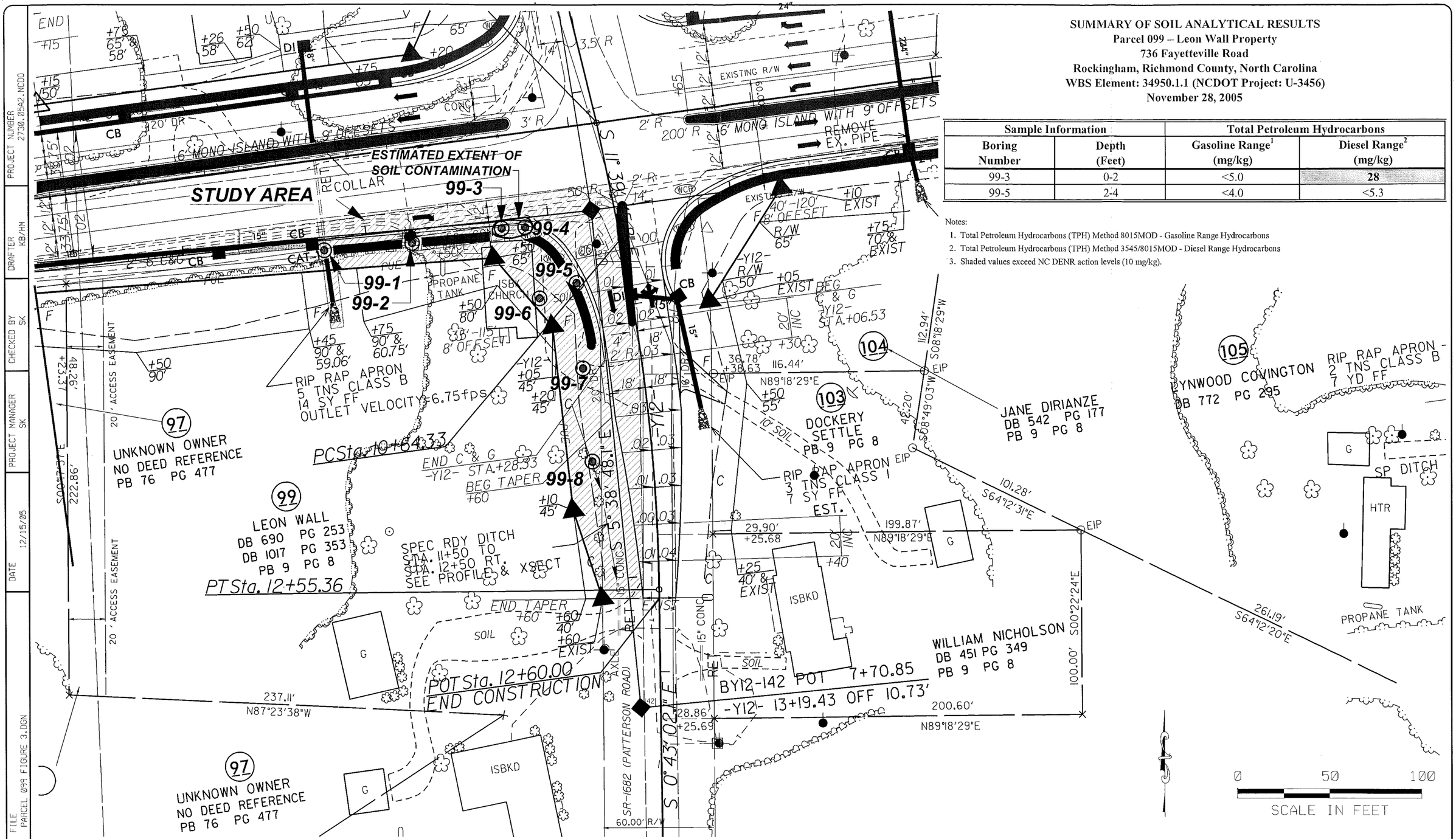

SITE MAP
PARCEL # 099 - LEON WALL PROPERTY
736 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 2

**SUMMARY OF SOIL ANALYTICAL RESULTS**
**Parcel 099 – Leon Wall Property**
**736 Fayetteville Road**
**Rockingham, Richmond County, North Carolina**
**WBS Element: 34950.1.1 (NCDOT Project: U-3456)**
**November 28, 2005**

| Sample Information | | Total Petroleum Hydrocarbons | |
|---|---|---|---|
| Boring Number | Depth (Feet) | Gasoline Range[1] (mg/kg) | Diesel Range[2] (mg/kg) |
| 99-3 | 0-2 | <5.0 | 28 |
| 99-5 | 2-4 | <4.0 | <5.3 |

Notes:
1. Total Petroleum Hydrocarbons (TPH) Method 8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons
3. Shaded values exceed NC DENR action levels (10 mg/kg).




PROJECT NUMBER 2730.05A2.NCDO
DRAFTER KB/HM
CHECKED BY SK
PROJECT MANAGER SK
DATE 12/15/05
FILE PARCEL 099 FIGURE 3.DGN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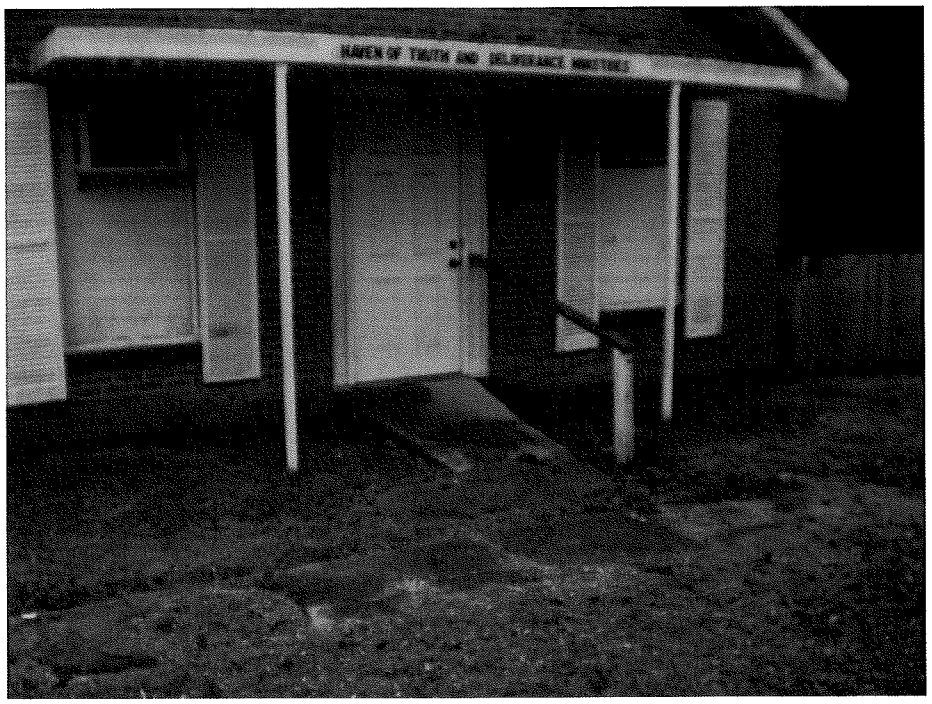
LEGEND
◎ **99-8** BORING LOCATION

BORING LOCATIONS & ESTIMATED EXTENT OF SOIL CONTAMINATION
PARCEL # 099 - LEON WALL PROPERTY
736 FAYETTEVILLE ROAD (US HIGHWAY 1)
ROCKINGHAM, RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT NO. 34950.1.1 (NCDOT PROJECT: U-3456)

FIGURE: 3

# APPENDIX A

# PHOTOGRAPHS



**Photograph 1** - Looking south at Parcel 099; borings 99-3 & 99-4 were advanced beneath the concrete pump island.

**Photograph 2** - Looking west at Parcel 099; boring locations are marked with orange flags.

**Photograph 3** - Looking at the east side of Parcel 099; boring locations are marked with orange flags.

# APPENDIX B

# GEOPHYSICAL DATA

Pyramid Project # 2005292

# GEOPHYSICAL INVESTIGATION REPORT

*GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S*

## Rockingham, US 1 (Fayetteville Road) Sites

**Rockingham, North Carolina**
**State Project Number U-3456**

**November 30, 2005**

**Report prepared for:** **Sheri Knox & Daniel Hirth**
**Solutions Industrial & Environmental Services Inc.**
**1101 Nowell Rd.**
**Raleigh, NC 27607**

**Prepared by:** _____
**Douglas Canavello, PG**

**Reviewed by:** _____
**Brett S. Higgins**


**PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.**
**700 NORTH EUGENE ST.**
**GREENSBORO, NC 27401**
**(336) 335-3174**

**Solutions Industrial & Environmental Services Inc.**
**GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC UST'S**
**Rockingham, US 1 (Fayetteville Road) Sites**
**State Project Number U-3456**

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- 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties
- 3.4 Parcel 17 – Harvey E. Melton Property
- 3.5 Parcel 41A – W. J. Barnhart Property
- 3.6 Parcel 42 – Wesly Denham Property
- 3.7 Parcel 57 – William Ussery Property
- 3.8 Parcel 80 – Walter McCain Property
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- 3.10 Parcel 117 – James Porter Property
- 3.11 Parcel 126 – John Evans Property
- 3.12 Parcel 140 – Henry Ussery Property

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5.0 LIMITATIONS


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| Figure 6 | Parcels 15 & 21, Samuel D. Tanner Properties – EM61 Bottom Coil Results |
| Figure 7 | Parcels 15 & 21, Samuel D. Tanner Properties – EM61 Differential Results |
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| Figure 14 | Parcel 42, Wesly Denham Property – EM61 Metal Detection Results |
| Figure 15 | Parcel 57, William Ussery Property – EM61 Metal Detection Results |

FIGURES (continued)


| | |
|---|---|
| Figure 16 | Parcel 80, Walter McCain Property – EM61 Metal Detection Results |
| Figure 17 | Parcel 80, McCain Property – Photos & GPR Image of UST Locations |
| Figure 18 | Parcel 99, Leon Wall Property – EM61 Metal Detection Results |
| Figure 19 | Parcel 117, James Porter Property – EM61 Metal Detection Results |
| Figure 20 | Parcel 126, John Evans Property – EM61 Metal Detection Results |
| Figure 21 | Parcel 140, Henry Ussery Property – EM61 Metal Detection Results |
| Figure 22 | Parcel 140, Ussery Property – Photo & GPR Images of UST Locations |

## 1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions Industrial & Environmental Services, Inc. during the period of November 11-23, 2005, within the proposed Right-of-Way (ROW) areas at 13 sites in Rockingham, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3456 and WBS Element 34950.1.1. The sites are located along the north or south sides of US 1 (Fayetteville Road) from 0.25 miles west of SR-1424 (Roberdell Road) to 0.25 miles west of SR 1640 (Wiregrass Road). The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Mr. Walt Beckwith, PG provided maps during the week of November 1, 2005 that outlined the geophysical survey areas of each site. Solutions IES representatives, Ms. Sheri Knox, PE and Mr. Daniel Hirth, PG provided guidance during the geophysical investigations. Geophysical surveys were conducted at the following 13 sites:

| Property Owner | Parcel | Present Use of Property |
|---|---|---|
| W. J. Barnhart Property | (Parcel 4) | Used Car Lot & Auto Repair Garage |
| Julia M. Ratliff Property | (Parcel 7) | Vacant Lot |
| Samuel D. Tanner Property | (Parcel 15) | Vacant Building & Lot |
| Harvey E. Melton Property | (Parcel 17) | BP Gas Station |
| Samuel D. Tanner Property | (Parcel 21) | Strip Mall |
| W. J. Barnhart Property | (Parcel 41A) | Vacant Building & Lot |
| Wesly Denham Property | (Parcel 42) | Havoline Carolina Quick Lube |
| William Ussery Property | (Parcel 57) | Vacant Building & Lot |
| Walter McCain Property | (Parcel 80) | Vacant Buildings & Lot |
| Leon Wall Property | (Parcel 99) | Vacant Building & Lot |
| James Porter Property | (Parcel 117) | Vacant Building & Lot |
| John Evans Property | (Parcel 126) | Custom Monument Company |
| Henry Ussery Property | (Parcel 140) | Bo Henry's Pawn Shop |

Photos of the above sites are presented in **Figure 1**.

## 2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot survey grid was established across the proposed ROW areas of the 13 sites using water-based marking paint. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the manufacture's specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST's and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 24 scans per second. A 110 MHz high pass filter and an 800 MHz low pass filter were used during data

acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately seven feet, based on an estimated two-way travel time of 7 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint software. The locations of GPR survey areas or individual GPR survey lines are shown as dashed, purple rectangles or solid purple lines, respectively on the EM61 differential contour plots. Photos of the EM61 and GPR instruments are shown in **Figure 2**. The approximate perimeters of probable or possible UST's , based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags when possible. The approximate locations of probable or possible UST's are shown on the EM61 contour plots as magenta-shaded rectangles.

During the weeks of November 14 and November 23, 2005, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox and Mr. Hirth.

## 3.0 DISCUSSION OF RESULTS

### 3.1 Parcel 4 - W. J. Barnhart Property

Parcel 4 is located on the southern side of Fayetteville Road and contains an active used car lot and auto repair garage. The western portion of the ROW area consists of asphalt with a concrete pad and the eastern portion of the ROW area consists of a sandy surface.

The bottom coil results and the differential results are presented in **Figure 3**. The linear anomaly intersecting grid coordinates X=50 Y=26, is probably in response to a buried utility line or conduit. The high amplitude anomaly centered near the former pump island area is probably in response to the steel-reinforced concrete pad. GPR surveys conducted across the steel-reinforced concrete pad did not detect any large metal objects. The geophysical results suggest that the ROW area at Parcel 4 does not contain metallic UST's.

### 3.2 Parcel 7 - Julia M. Ratliff Property

The Ratliff property is located northwest of the Fayetteville Road and Roberdell Road intersection. The parcel consists of an open, asphalt and grass-covered lot. The EM61 bottom coil results and the differential results are presented in **Figure 4**. The linear bottom coil, EM61 anomalies, such as the ones intersecting grid coordinates X=100 Y=60, X=110 Y=74, and X=130 Y=104, are probably in response to utility lines or conduits. GPR surveys conducted across a portion of the EM anomaly centered near grid coordinates X=65 Y=35, suggest the presence of at least one UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide.

A large water puddle was present across the western portion of the EM anomaly when the GPR surveys were conducted that prevented GPR data to be collected across the entire anomaly. However, based on the location of the probable UST, the size of the EM61 anomaly suggests that a second UST may be centered near grid coordinates X=64 Y=32. Concrete was encountered approximately three inches below surface across this area, which prevented probing with a steel rod to determine whether a second UST exists. A photo showing the approximate location of the probable and possible UST's along with a GPR image obtained along survey line Y=35 are presented in **Figure 5**.

The geophysical results suggest that the remaining portion of the proposed ROW area at Parcel 7 does not contain metallic UST's.

### 3.3 Parcels 15 & 21 – Samuel D. Tanner Properties

Parcels 15 and 21 are located immediately southwest and southeast, respectively of the Fayetteville Road and Skyline Drive intersection. Parcel 15 consists primarily of grass and gravel surfaces, whereas the front portion of Parcel 21 consists of an asphalt-covered parking area. The EM61 bottom coil results and the differential results are presented in **Figures 6 and 7**, respectively.

GPR surveys across the EM61 anomaly centered near grid coordinates X=188 Y=135, (on Parcel 15) suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below

surface. The surveys also suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

At Parcel 21, GPR surveys acquired across the EM anomaly centered near grid coordinates X=269 Y=173, suggest the presence of a UST buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide. Photos showing the approximate locations of the probable UST's at Parcels 15 and 21, along with corresponding GPR images are presented in Figures **8 and 9**, respectively.

### 3.4 Harvey E. Melton Property (Parcel 17)

The Melton property is an active BP gas station and store located northeast of the Fayetteville Road and Roberdell Road intersection. The pump island area consists of a steel-reinforced concrete surface that overlies the known and active UST's, whereas the parking area adjacent to the store consists of asphalt pavement. A grass yard surrounds the back portion of the site.

The EM61 bottom coil results and the differential results are presented in Figures **10 and 11**, respectively. The linear bottom coil, EM anomalies are probably in response to utility lines or conduits. The majority of non-linear anomalies are probably in response to cultural features such as storm drains, signs, utility-related objects, buildings, metal fence, and steel-reinforced concrete.

GPR surveys were conducted across the concrete pavement and across the area containing the active UST's. The surveys delineated the footprint of the three and possibly four active UST's that are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. A GPR image obtained across the UST area is presented in **Figure 12** and suggests that the tanks lie approximately 3.5 to 3.9 feet below surface.

GPR data acquired across the EM61 anomaly centered near X=155 Y=144, delineated the footprint of the kerosene tank that is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide. A photo showing the location of the

tank is presented in Figure 12. The geophysical results suggest that the remainder of the surveyed area at Parcel 17 does not contain UST's.

### 3.5 W. J. Barnhart Property (Parcel 41A)

Parcel 41A is a former gas station site located on the north side of Fayetteville Road approximately 300 feet west of Lawson Street. The geophysical survey area consists of asphalt and grass-covered surfaces with a concrete pad located around a former pump island. The EM61 bottom coil results and the differential results are presented in **Figure 13**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=40 Y=50, X=45 Y=95, and X=70 Y=40, are probably in response to utility lines or conduits.

GPR surveys conducted across a portion of the linear anomaly centered at X=37 Y=22, suggest the probable presence of a wide-diameter (more than 2.5 feet wide) conduit or possibly a UST that is approximately 15 to 17 feet long and buried approximately 4.5 feet below surface. This probable wide-diameter conduit (centered near X=38 Y=25) is located parallel and contingent with the probable utility line identified by the EM61 survey, suggesting that the probable conduit is a utility-related object. However, the footprint of this probable utility-related conduit or possible UST was marked in the field with spray paint and pin flags.

GPR surveys conducted across the concrete pad adjacent to the pump island suggest that the EM61 anomalies recorded in this area are probable in response to steel-reinforcement in the concrete. With the exception of the probable utility-related feature found at X=38 Y=25, the geophysical findings obtained within the survey area at Parcel 41A suggest that the ROW area does not contain metallic UST's.

### 3.6 Wesly Denham Property (Parcel 42)

The Havoline Carolina Kwik Lube garage operates at Parcel 42, which is located on the south side of Fayetteville Road. Asphalt and grass surfaces cover much of the proposed ROW area with a small concrete pad located in front of the building. The EM61 bottom coil results and the differential

results are presented in **Figure 14**. The linear bottom coil, EM anomalies, such as the ones intersecting grid coordinates X=60 Y=58, and X=80 Y=85, are probably in response to utility lines or conduits. The high amplitude anomaly centered near grid coordinates X=40 Y=40, is in response to a vehicle that could not be moved for the geophysical investigations. The anomalies centered near X=40 Y=12, and X=120 Y=55, are in response to a nearby vehicle and steel-reinforced concrete, respectively.

The geophysical results obtained within the surveyed portion of Parcel 42 suggest that the proposed ROW area does not contain metallic UST's.

### 3.7 William Ussery Property (Parcel 57)

Parcel 57 is located on the north side of Fayetteville Road approximately 0.2 miles east of Old Aberdeen Road. The EM61 bottom coil results and the differential results are presented in **Figure 15**. A series of small, bottom coil anomalies were recorded along survey line Y=25 from grid coordinate X=5 to X=115, which may be in response to an east-west trending, buried utility line or conduit. Several other bottom coil anomalies were recorded across the survey area that are probably in response to miscellaneous metal debris.

All of the differential anomalies are probably in response to known cultural features or buried debris, suggesting that the proposed ROW area at Parcel 57 does not contain metallic UST's.

### 3.8 Walter McCain Property (Parcel 80)

Parcel 80 is located immediately northwest of the Fayetteville Road and Philadelphia Road intersection and consists of two vacant buildings surrounded by sandy or grass surfaces. A former pump island pad is located south of the eastern-most building. The EM61 bottom coil results and the differential results are presented in **Figure 16**.

GPR surveys conducted across the EM61 anomalies centered near grid coordinates X=170 Y=35, and X=194 Y=32, suggest the presence of two metallic UST's. The probable UST centered near X=170

Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32 appears to be10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by the former pump island pad. Photos of the UST locations along with an image of GPR survey line X=167.5 are presented in **Figure 17**.

Based upon the geophysical results, the remaining portion of the proposed ROW area does not appear to contain metallic UST's.

### 3.9 Leon Wall Property (Parcel 99)

Parcel 99 is located immediately southwest of the Fayetteville Road and Patterson Road intersection and consists mostly of a grass yard surrounding a vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 18** in which a bottom coil, linear anomaly is recorded along survey line Y=230. This linear anomaly is probably in response to a utility line. GPR surveys conducted across the differential EM61 anomaly centered near X=92 Y=165, is probably in response to a water line adjoining the vacant building. GPR surveys were also conducted between the building and the former pump island pad that is centered near coordinates X=84 Y=222. The surveys suggest that the EM anomalies recorded in this portion of the survey area are probably in response to miscellaneous metal debris.

Based upon the geophysical results, the proposed ROW area at Parcel 99 does not appear to contain metallic UST's.

### 3.10 James Porter Property (Parcel 117)

Parcel 117 is a former gas station site located on the south side of Fayetteville Road approximately 0.25 miles west of Locklear Drive. The site consists primarily of grass and asphalt surfaces with a former pump island pad located in front of the vacant building. The EM61 bottom coil results and the differential results are presented in **Figure 19**. The linear, bottom coil anomaly intersecting grid coordinates X=130 Y=54, is probably in response to a buried utility line or conduit. The linear

anomaly intersecting X=40 Y=74, is probably in response to a metal fence. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation across the survey area of Parcel 117 suggests that the proposed ROW area does not appear to contain metallic UST's.

### 3.11 John Evans Property (Parcel 126)

The active Custom Monument Company operates on Parcel 126, which is located immediately northeast of the Fayetteville Road and LockLear Drive intersection. The geophysical survey area consists of grass and asphalt surfaces and the EM61 bottom coil results and the differential results are presented in **Figure 20**. All of the EM61 anomalies recorded across the surveyed portion of the site are probably in response to known cultural features, suggesting that the proposed ROW area does not contain metallic UST's.

### 3.12 Henry Ussery Property (Parcel 140)

Parcel 140 is a former gas station site, which is presently occupied by Bo Henry's Pawn Shop. The property is located immediately southeast of the Fayetteville Road and Port Street intersection. Much of the proposed ROW area consists of sandy or grass-covered surfaces. A concrete pad surrounds the north and west sides of the building. The EM61 bottom coil results and the differential results are presented in **Figure 21**. The linear bottom coil anomaly intersecting grid coordinates X=80 Y=80, is probably in response to a buried utility line.

GPR surveys conducted across the differential anomalies centered near coordinates X=90 Y=60, and X=107 Y=59, suggest the presence of two UST's buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide. Probing with a steel rod across this area suggest the presence of a concrete slab buried approximately 0.3 feet below surface and overlying the UST's. A photo showing the locations of the probable UST along with GPR images are presented in **Figure 22**.

## 4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 13 sites along Fayetteville Road (US 1) in Rockingham, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic UST's within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 13 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results did not detect the presence of unknown metallic UST's within the surveyed portions of the proposed ROW areas at the following sites:

| | |
|---|---|
| W. J. Barnhart Property | (Parcel 4) |
| W. J. Barnhart Property | (Parcel 41A) |
| Wesly Denham Property | (Parcel 42) |
| William Ussery Property | (Parcel 57) |
| Leon Wall Property | (Parcel 99) |
| James Porter Property | (Parcel 117) |
| John Evans Property | (Parcel 126) |

- Julia M. Ratliff Property (Parcel 7): Geophysical results suggest the presence of a UST centered near X=71 Y=35, and buried approximately 3.2 feet below surface. Based on the GPR results, the probable UST appears to be approximately 10 feet long and 4 feet wide. A second UST may be present immediately west of this UST.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

- Samuel D. Tanner Property (Parcel 15): Geophysical results suggest the presence of a UST centered near X=188 Y=137, and buried approximately 1.4 feet below surface. GPR surveys suggest that the probable tank is approximately 10 feet long and 3.5 feet wide.

- Harvey E. Melton Property (Parcel 17): Three and probably four active UST's are centered near grid coordinates X=54 Y=53, X=50 Y=43, and X=50 Y=34, respectively. The UST centered near grid coordinates X=54 Y=53, appears to be approximately 35 feet long and probably consists of two UST's instead of one. The known kerosene UST is centered near X=155 Y=144, and is buried approximately 1.7 feet below surface. The kerosene tank appears to be approximately 9 to 10 feet long and 3.5 to 4 feet wide.

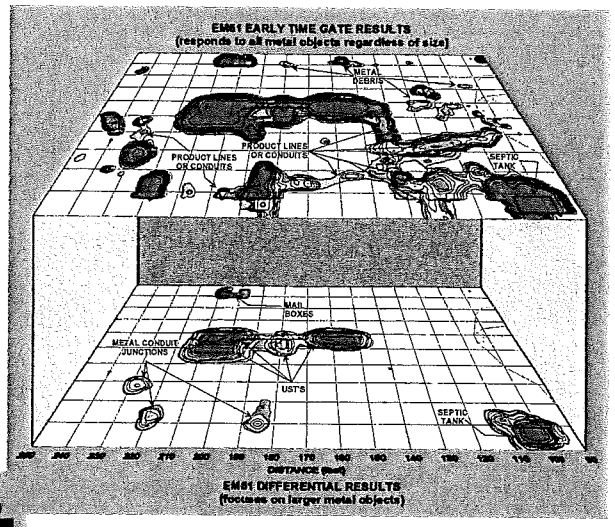
- Samuel D. Tanner Property (Parcel 21): Geophysical results suggest the presence of a UST centered near grid coordinates X=269 Y=173, and buried approximately 1.7 feet below surface. The UST appears to be approximately 10 feet long and 5 feet wide.

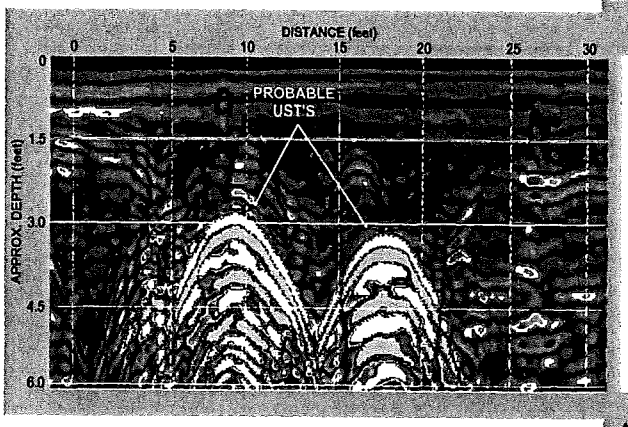
- Walter McCain Property (Parcel 80): Geophysical results suggest the presence of two UST's centered near grid coordinates X=170 Y=35, and X=194 Y=32. The probable UST centered near X=170 Y=35, appears to be approximately 13 feet long, 3.5 feet wide, and buried approximately 1.1 feet below surface. The probable UST centered near grid coordinates X=192 Y=32, appears to be 10 feet long, 3.5 feet wide, and buried approximately 1.9 feet below surface. The two probable UST's are separated by a former pump island pad.

- Henry Ussery Property (Parcel 140): Geophysical results suggest the presence of two UST's centered near coordinates X=90 Y=60, and X=107 Y=59, and buried approximately 1.7 feet and 1.8 feet below surface, respectively. Both probable UST's appear to be approximately 10 to 11 feet long and 4 to 4.5 feet wide.

## 5.0 LIMITATIONS

EM61 and GPR surveys have been performed and this report prepared for Solutions Industrial & Environmental Services, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic UST's but only suggest where some of the metallic UST's may be present. The EM61 and GPR anomalies, interpreted as possible UST's or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EM61 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANK
DISTANCE (feet)
EM61 DIFFERENTIAL RESULTS
(focuses on larger metal objects)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5
10
15
20
25
30
PROBABLE UST'S
APPROX. DEPTH (feet)
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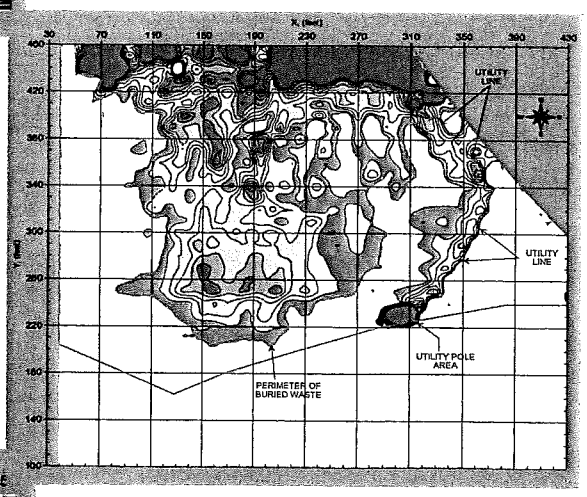
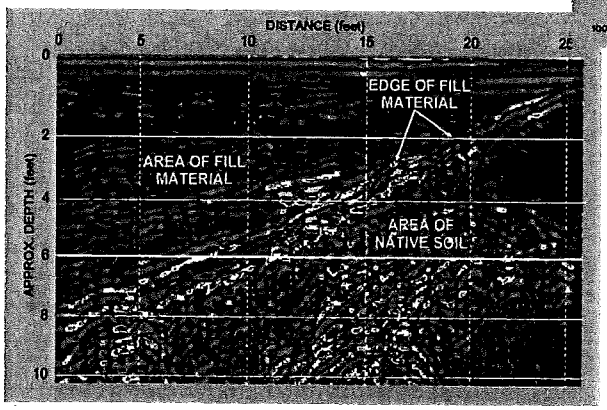
1.5
3.0
4.5
6.0

# FIGURES


X, (feet)
UTILITY LINE
UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE


DISTANCE (feet)
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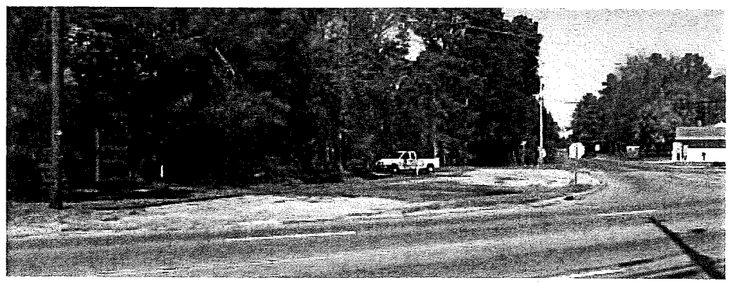
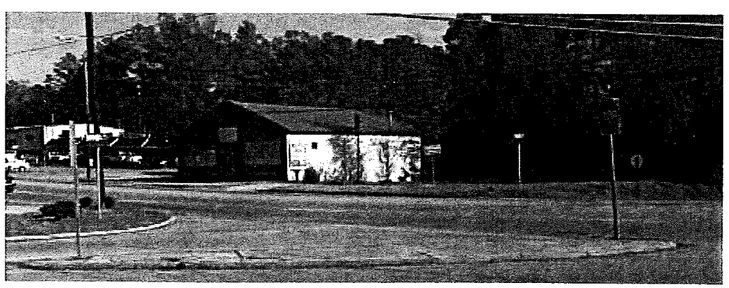
5
10
15
20
25
EDGE OF FILL MATERIAL
AREA OF FILL MATERIAL
AREA OF NATIVE SOIL
APPROX. DEPTH (feet)
0
2
4
6
8
10

Parcel 4 - W. J. Barnhart Property

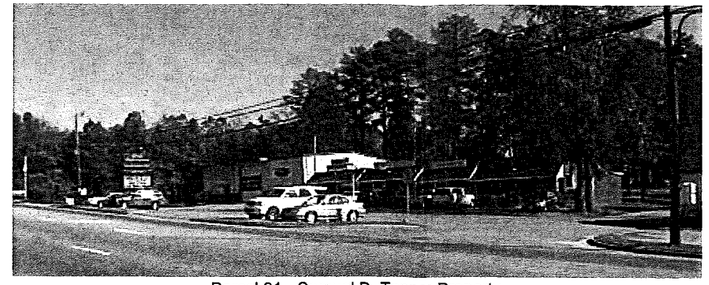


Parcel 7 - Julia M. Ratliff Property

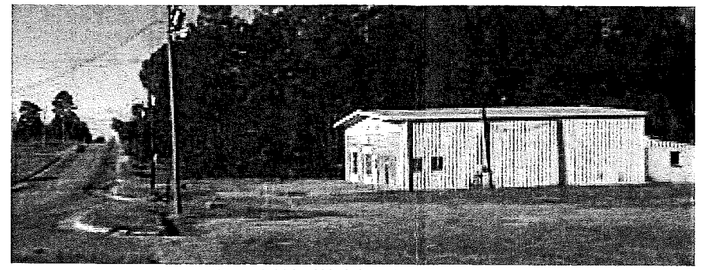


Parcel 15 - Samuel D. Tanner Property

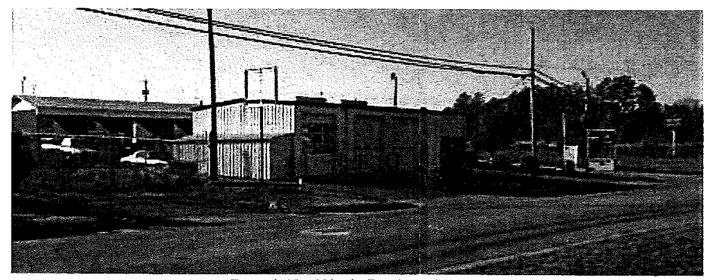
Parcel 17 - Harvey E. Melton Property



Parcel 21 - Samuel D. Tanner Property

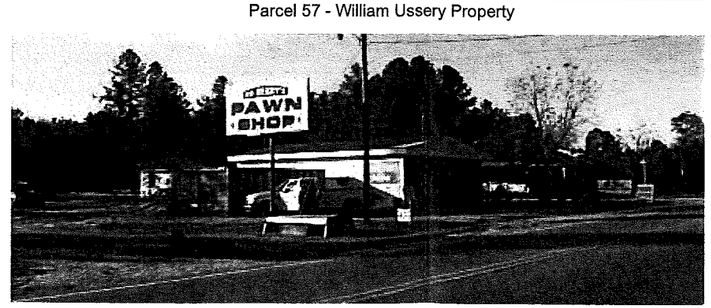


Parcel 41A - W. J. Barnhart Property

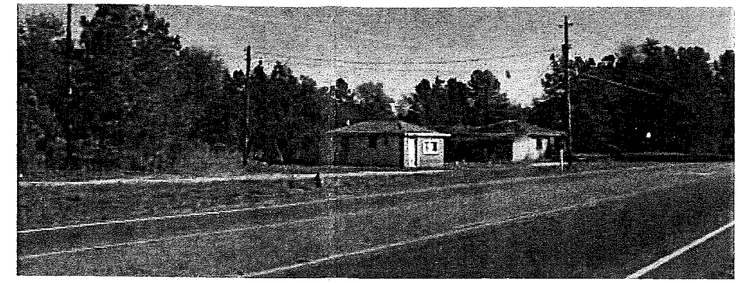


Parcel 42 - Wesly Denham Property

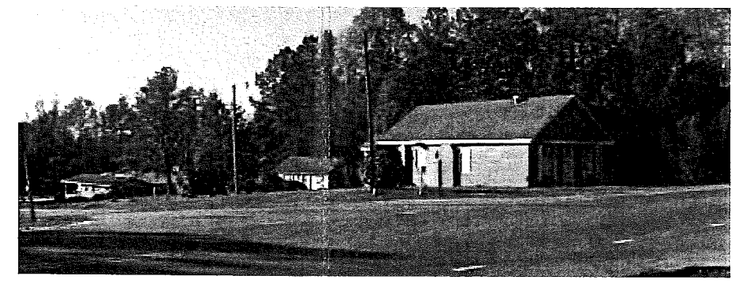
Parcel 57 - William Ussery Property



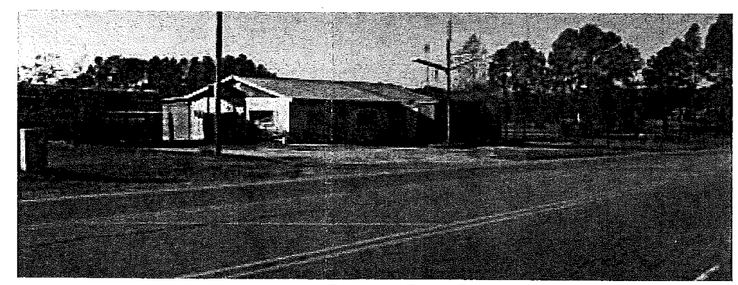

Parcel 140 - Henry Ussery Property



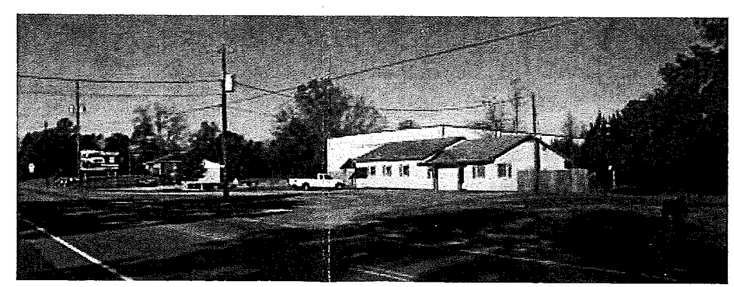
Parcel 80 - Walter McCain Property



Parcel 99 - Leon Wall Property



Parcel 117 - James Porter Property



Parcel 126 - John Evans Property

SITE PHOTOS

FIGURE 1

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DATE | 11/28/05 | DRWN | MJD |
| LAY | | CHKD | |
| DWG | | FIGURE | |
| JNO. | 2005-292 | | |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

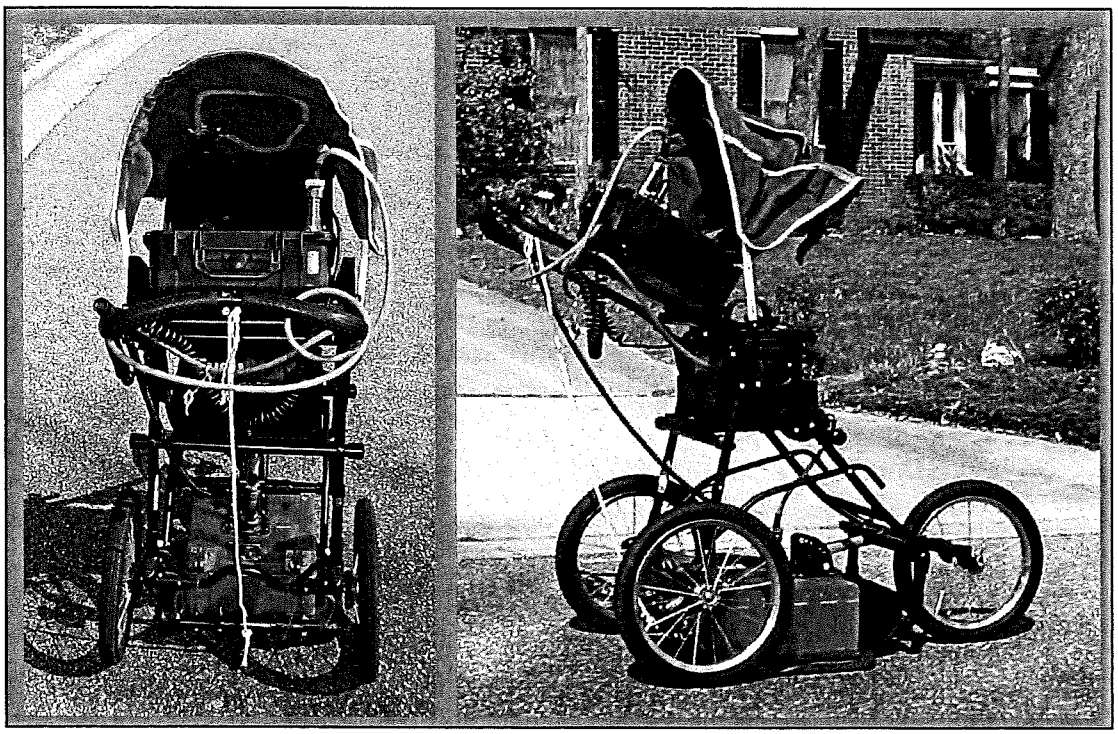
SITE: ROCKINGHAM SITES

CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

The Geonics EM61 metal detector was used to conduct the metal detection surveys at the Rockingham sites in November 2005.



The SIR-2000 GPR system equipped with a 400 MHz antenna that was used at the Rockingham sites in November 2005.

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

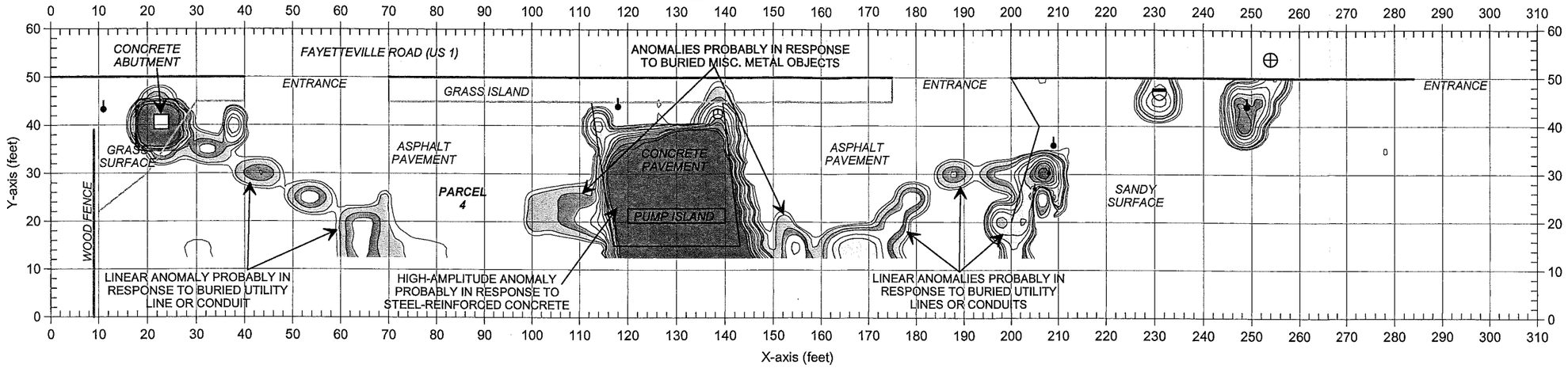
| | | | | | |
|---|---|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE | 11/28/05 | DRWN |
| SITE | ROCKINGHAM SITES | | LAY | | CHKD |
| CITY | ROCKINGHAM | STATE NORTH CAROLINA | DWG | | |
| TITLE | GEOPHYSICAL RESULTS | | JNO. | 2005-292 | SCALE |

GRAPHIC SCALE IN METERS

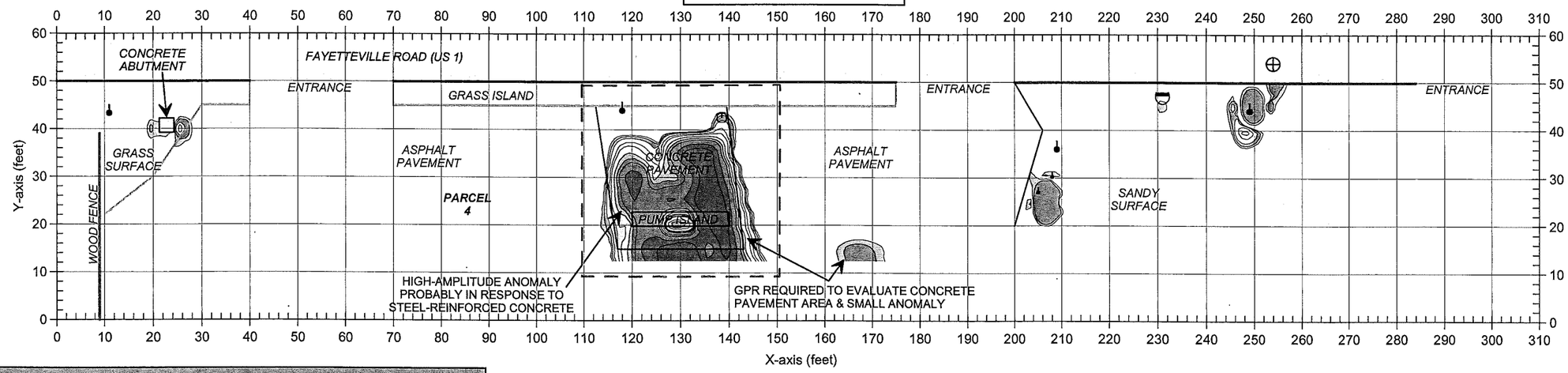
GEOPHYSICAL EQUIPMENT

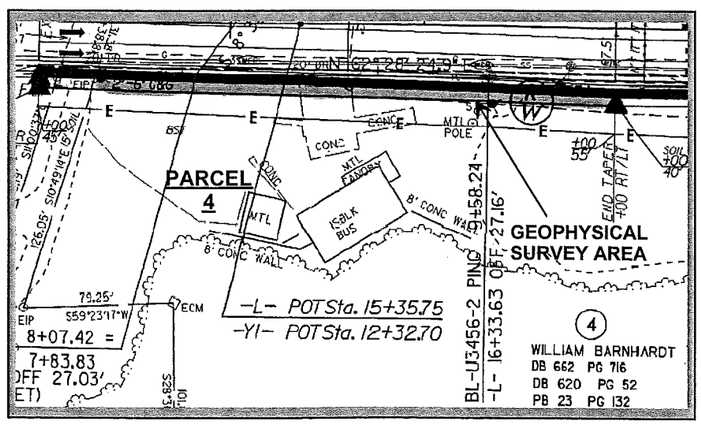
FIGURE 2

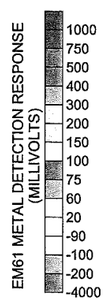
## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE OR LIGHT POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY AREA

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 3

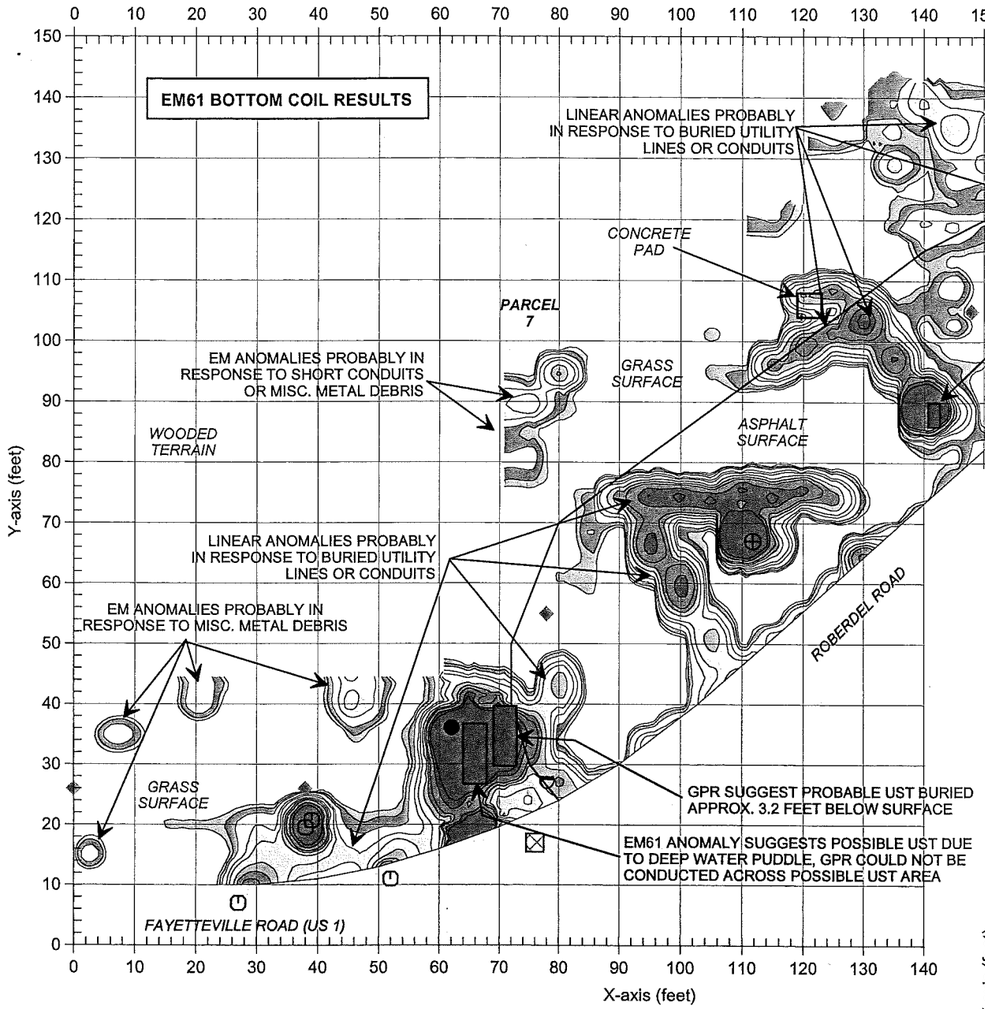
EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| DRWN | MJD | FIGURE | |
| CHKD | | | |
| DATE | 11/26/05 | J.NO. | 2005-292 |
| LAY | | DWG | |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: W. J. BARNHART PROPERTY (PARCEL 4)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

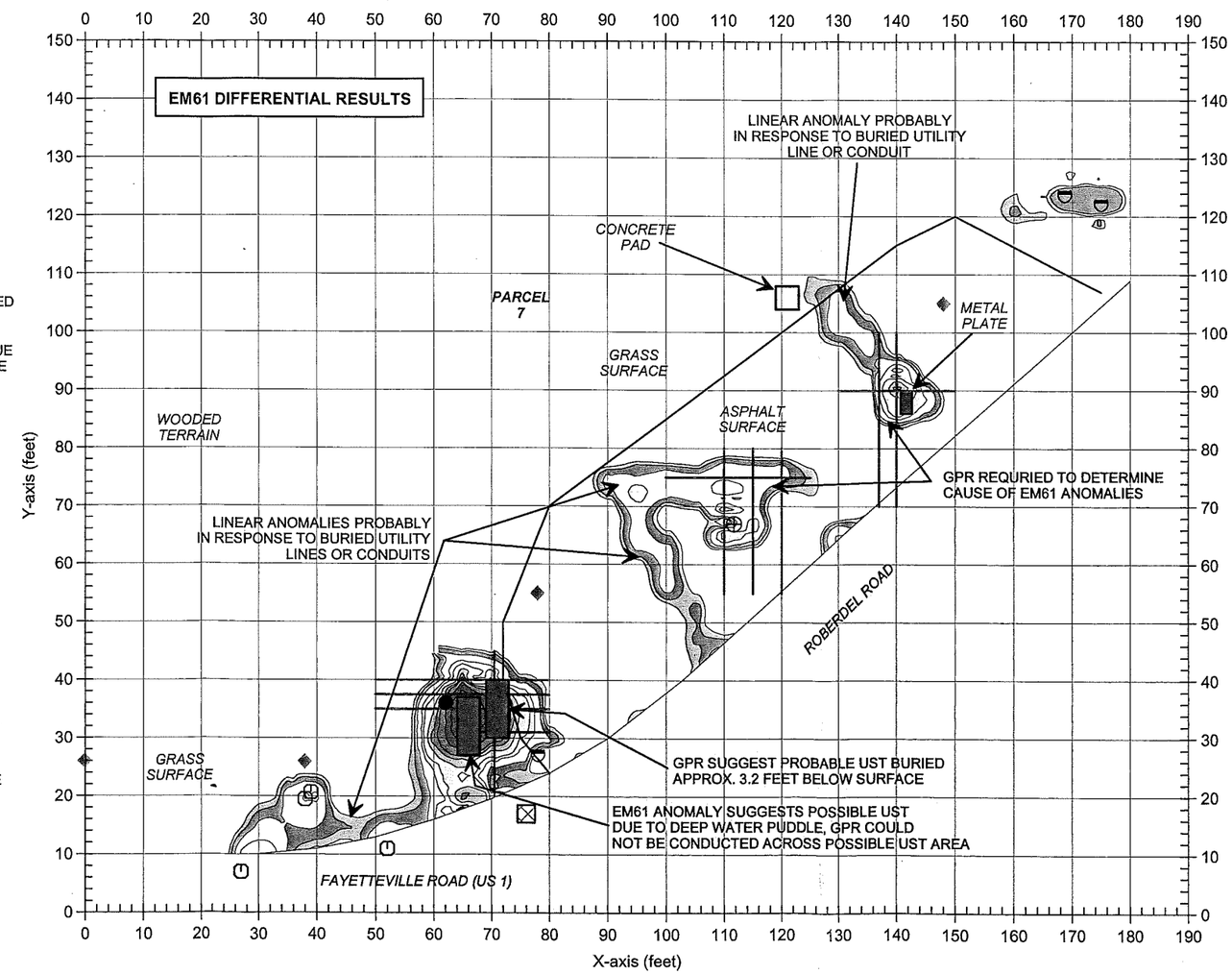
- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH & EAST-WEST TRENDING LINES SPACED 5 FEET APART
- MONITORING WELL
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MANHOLE COVER
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

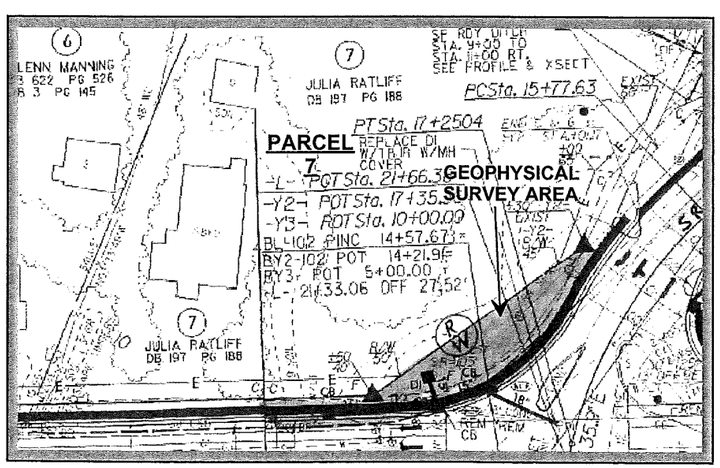
Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -30 -15 -7.5 -3.75 3.75 7.5 15 30 50 100 200 400



APPROXIMATE NORTH

FIGURE 4

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | | |
|---|---|---|
| DRWN | CHKD | FIGURE |
| MJD | | |
| DATE | LAY | DWG. NO. |
| 11/25/05 | | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

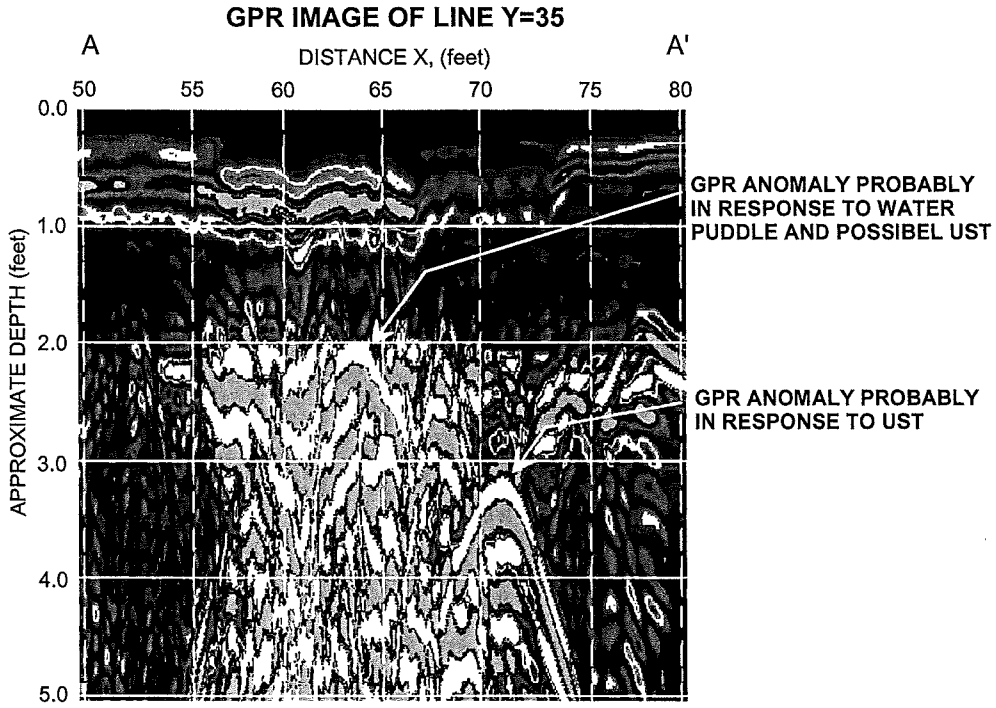
SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

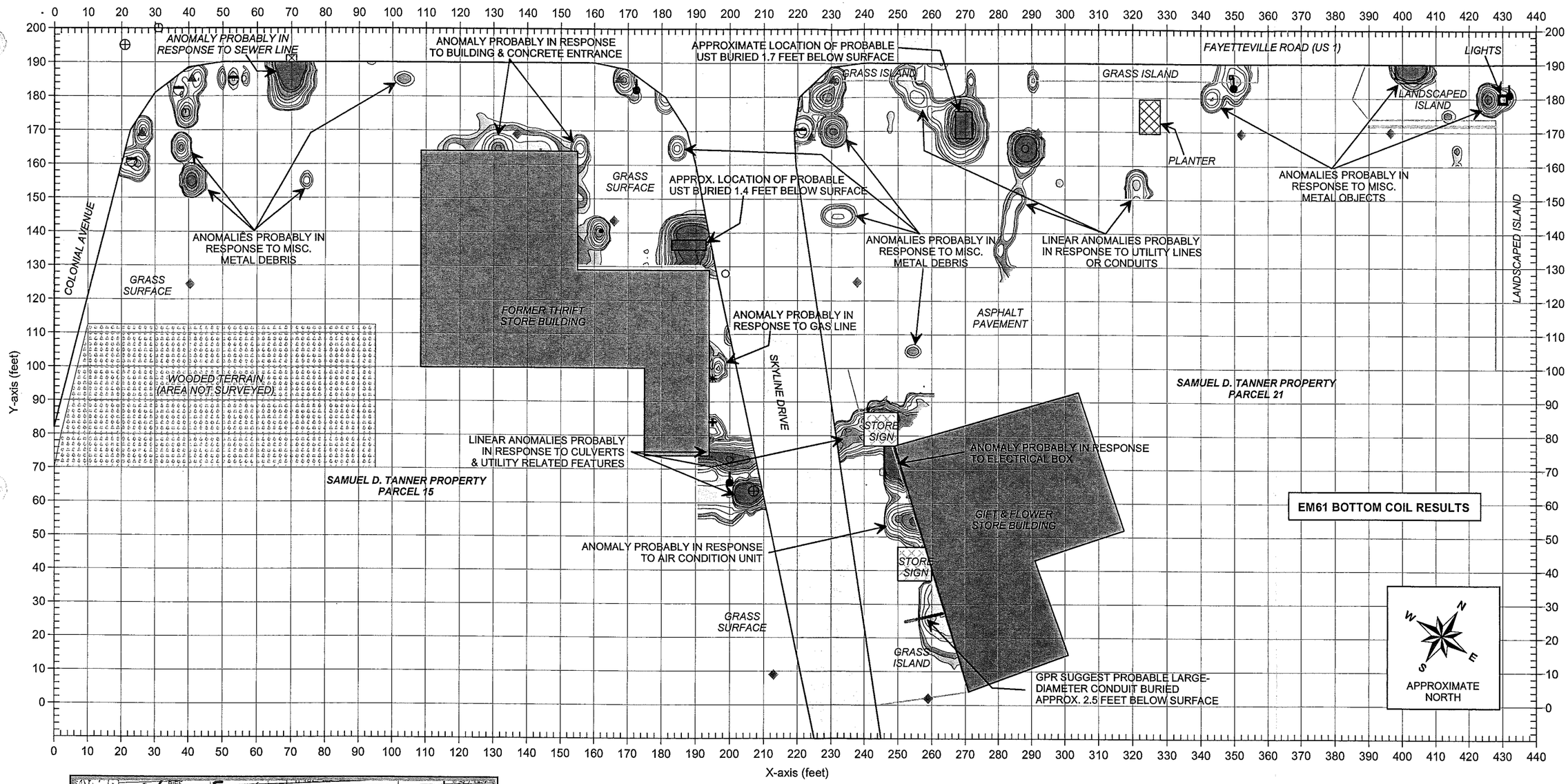
The photo shows the location of the probable UST and possible UST, as suggested by the geophysical results at Parcel 7.

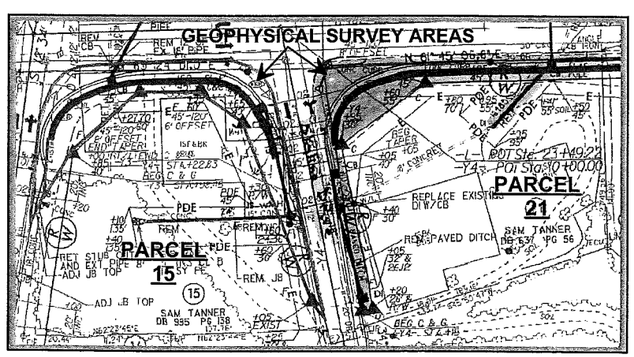


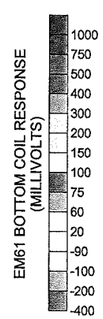

The GPR image obtained along a portion of survey line Y=35 shows the anomaly that is probably in response to a UST near X=71 and buried approximately 3.2 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: JULIA M. RATLIFF PROPERTY (PARCEL 7) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JAOB: 2005-292 | FIGURE: | FIGURE 5 |

GRAPHIC SCALE IN METERS




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 6

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRWN | MJD |
| CHKD | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| J.NO. | 2005-292 |
| FIGURE | |

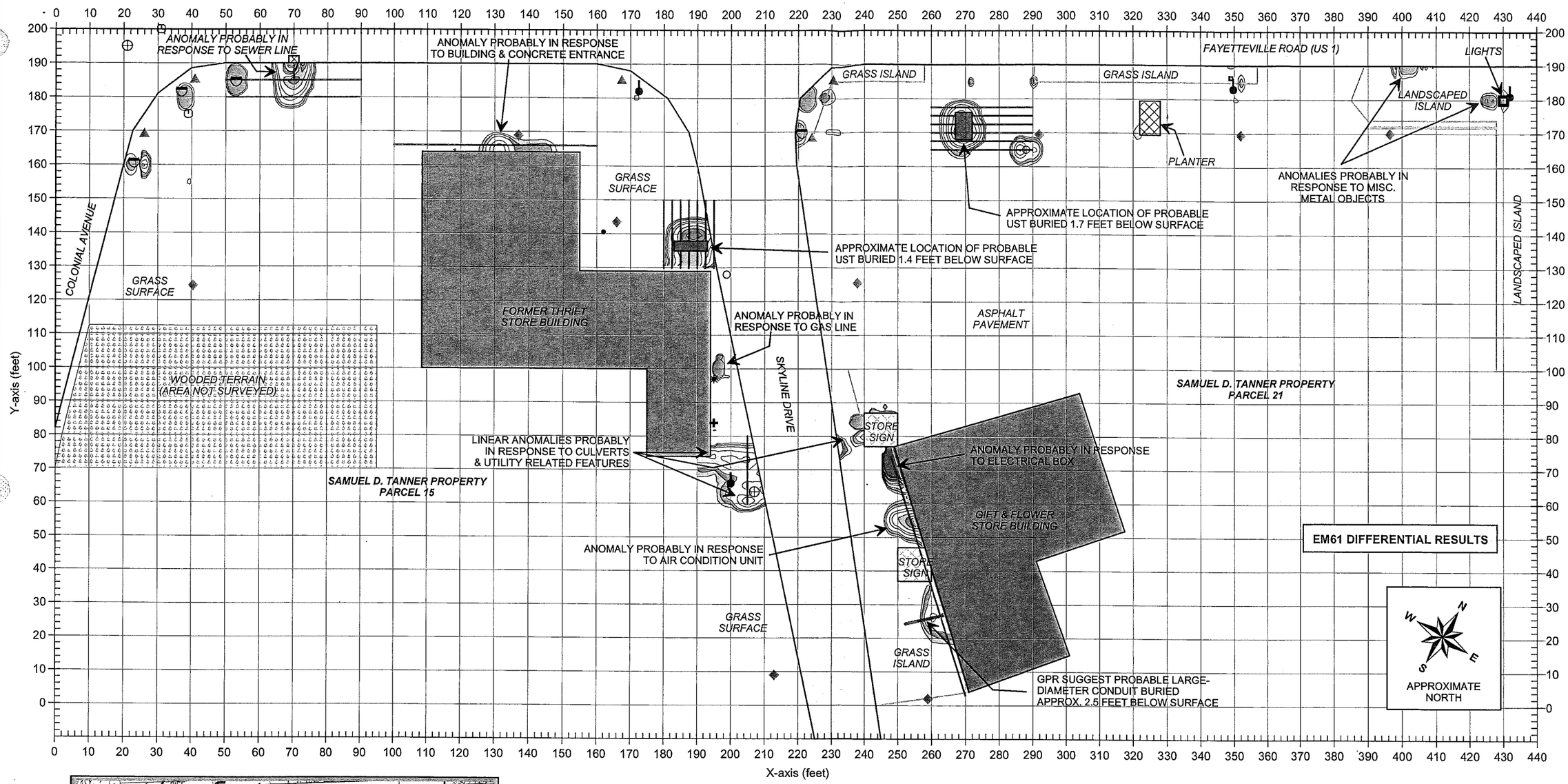
SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

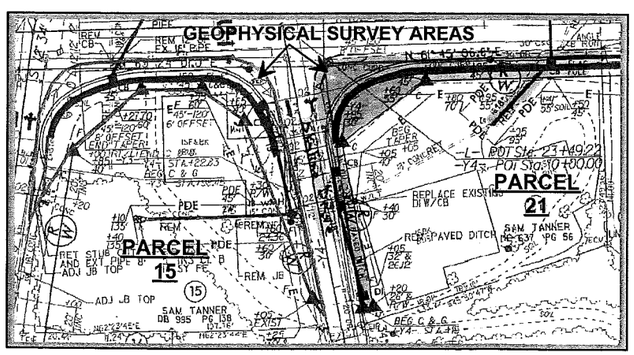
SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

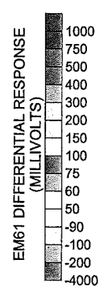
ROCKINGHAM — NORTH CAROLINA

GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST & NORTH-SOUTH TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CONCRETE R/W MARKER
- GAS METER
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- VALVE COVER
- MANHOLE COVER
- MONITORING WELL
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 7

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| DATE | DWG | CHKD | DRWN |
|---|---|---|---|
| 11/25/05 | LAY | | MJD |

J-NO. 2005-292 FIGURE

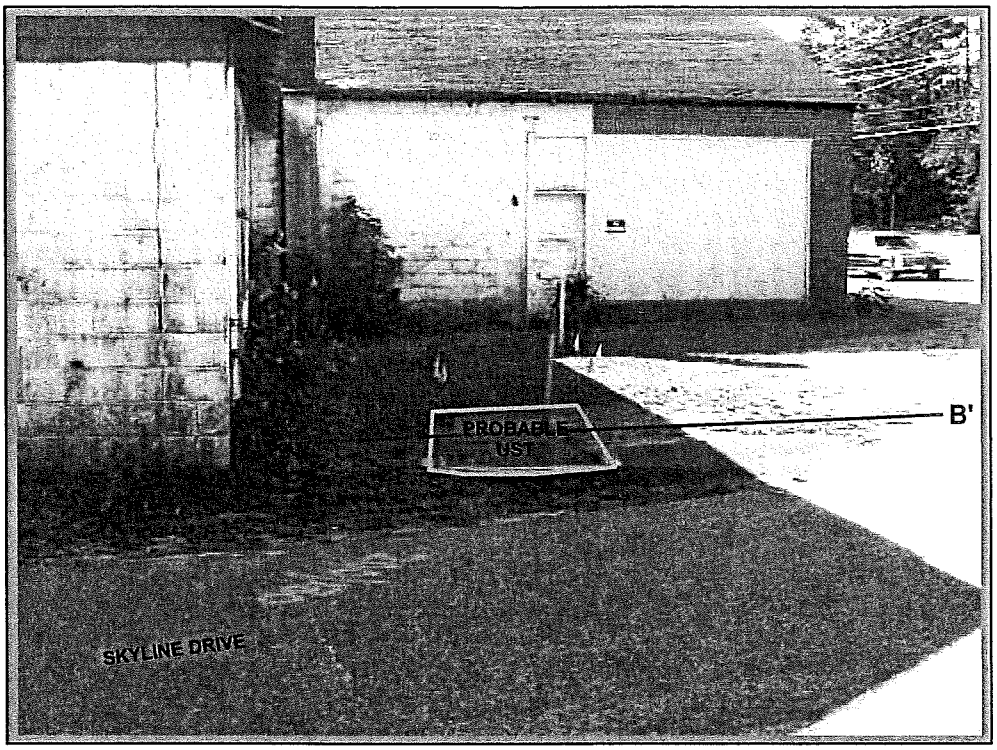
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

SITE: SAMUEL D. TANNER PROPERTY (PARCELS 15 & 21)

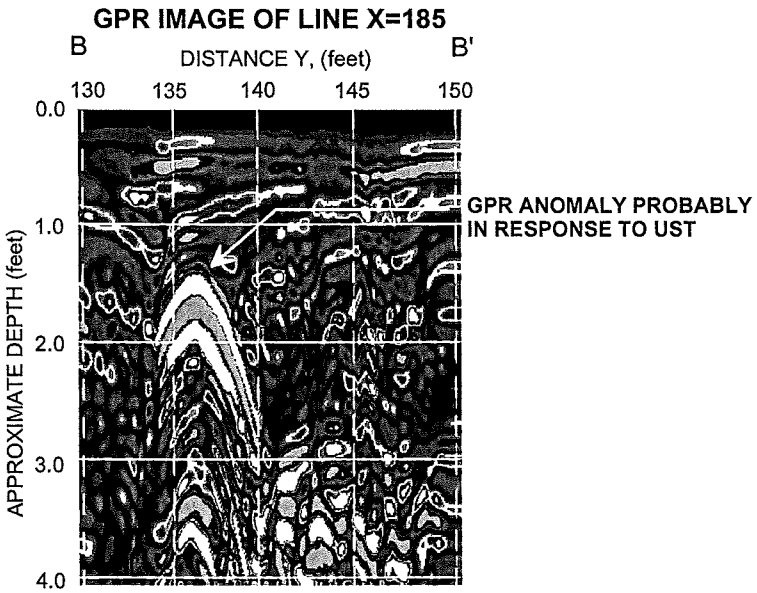
CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.



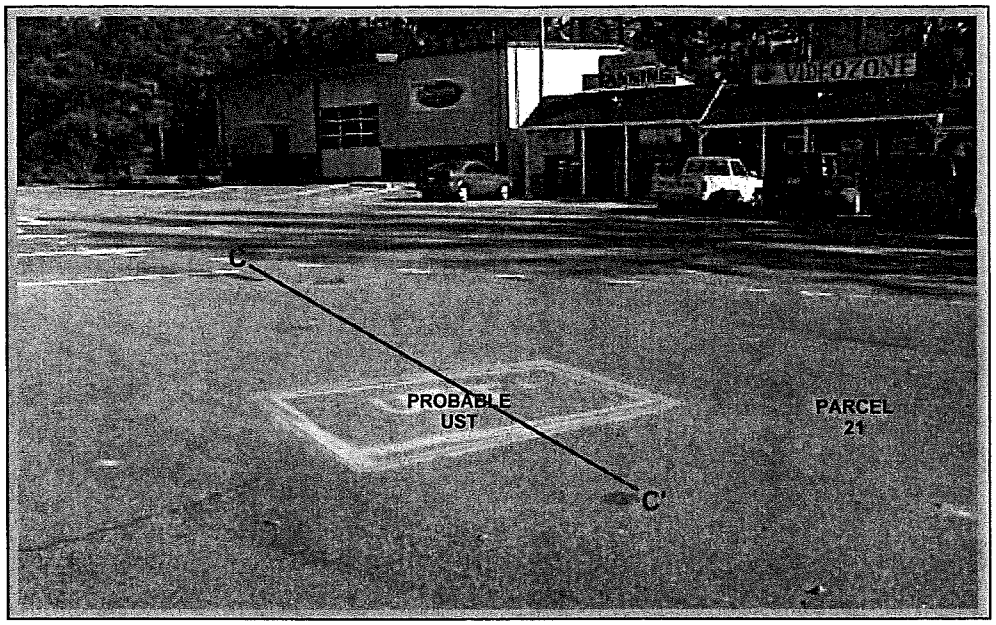

The photo shows the location of the probable UST, as suggested by the geophysical results at Parcel 15.



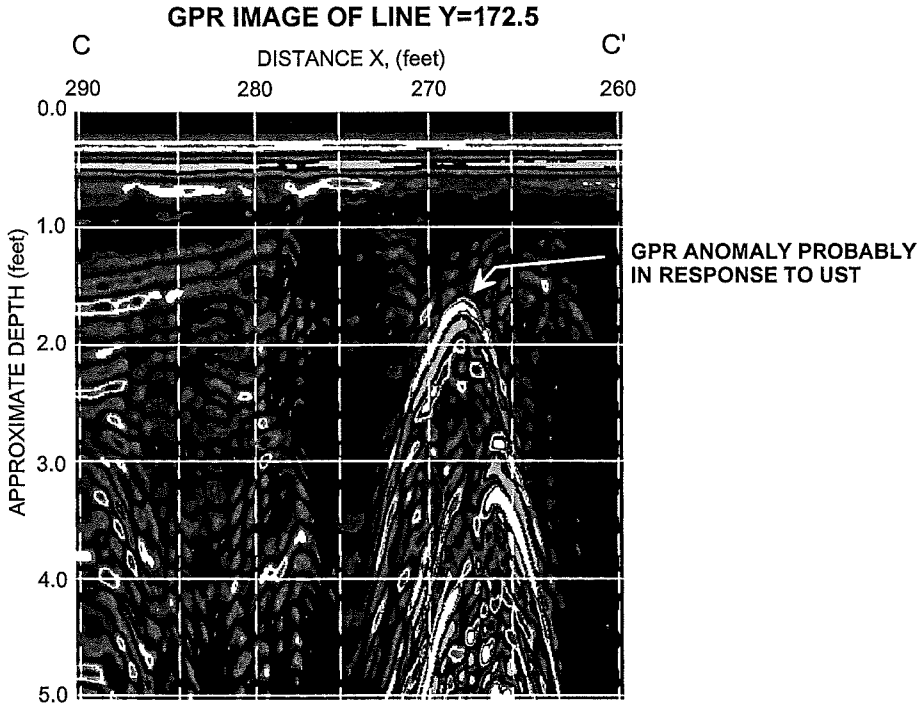

The GPR image obtained along a portion of survey line X=185 shows the anomaly that is probably in response to a UST near Y=137 and buried approximately 1.4 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 15) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | J.NO.: 2005-292 | FIGURE: | FIGURE 8 |

GRAPHIC SCALE IN METERS



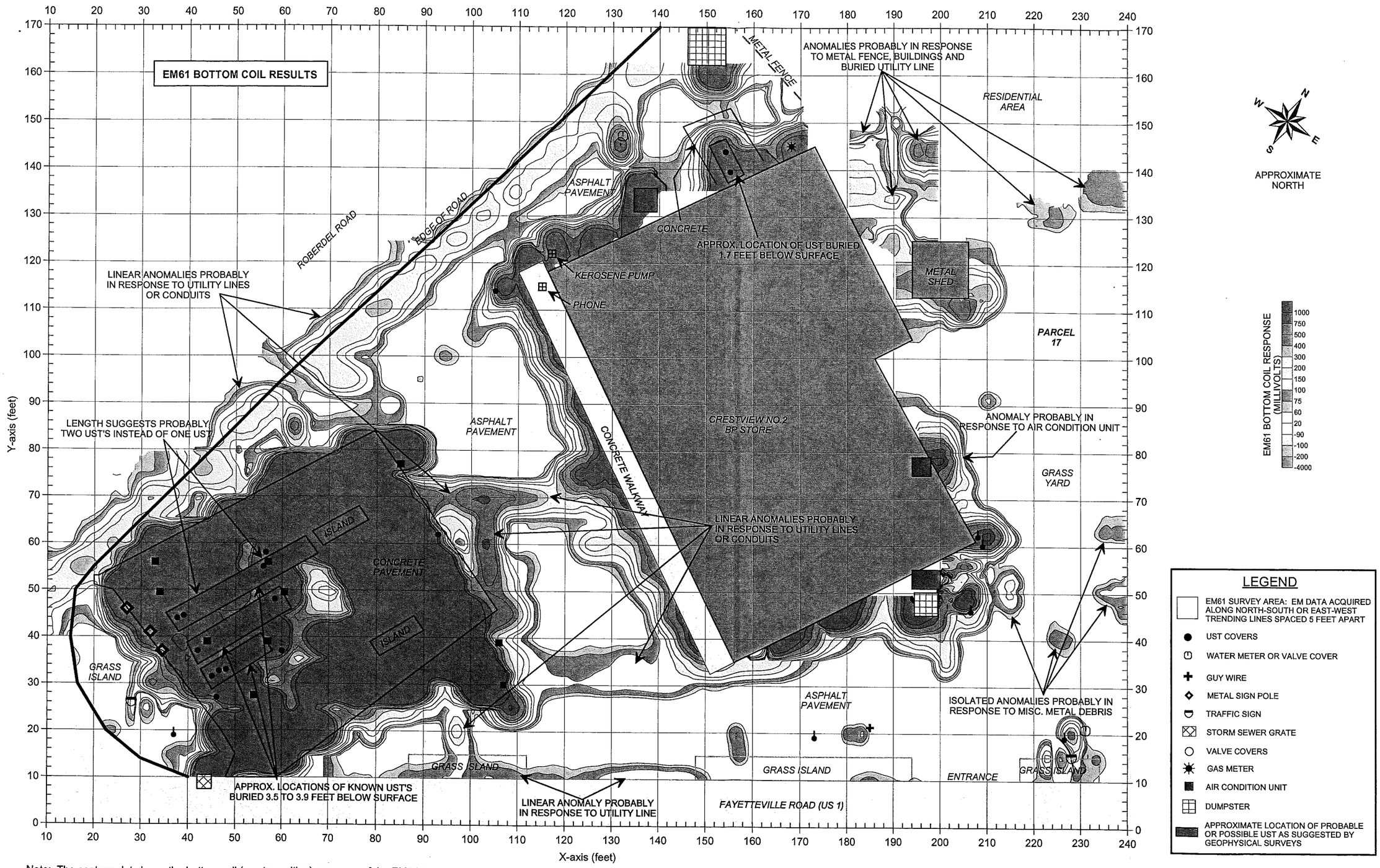

The photo shows the location of the probable UST,
as suggested by the geophysical results at Parcel 21.




The GPR image obtained along a portion of survey line Y=172.5 shows the anomaly that is probably in response to a UST near X=268 and buried approximately 1.7 feet below surface. The location of this GPR image is shown with a solid purple line in the above photo.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGE OF UST LOCATION |
| | SITE: SAMUEL D. TANNER PROPERTY (PARCEL 21) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 9 |

GRAPHIC SCALE IN METERS




Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

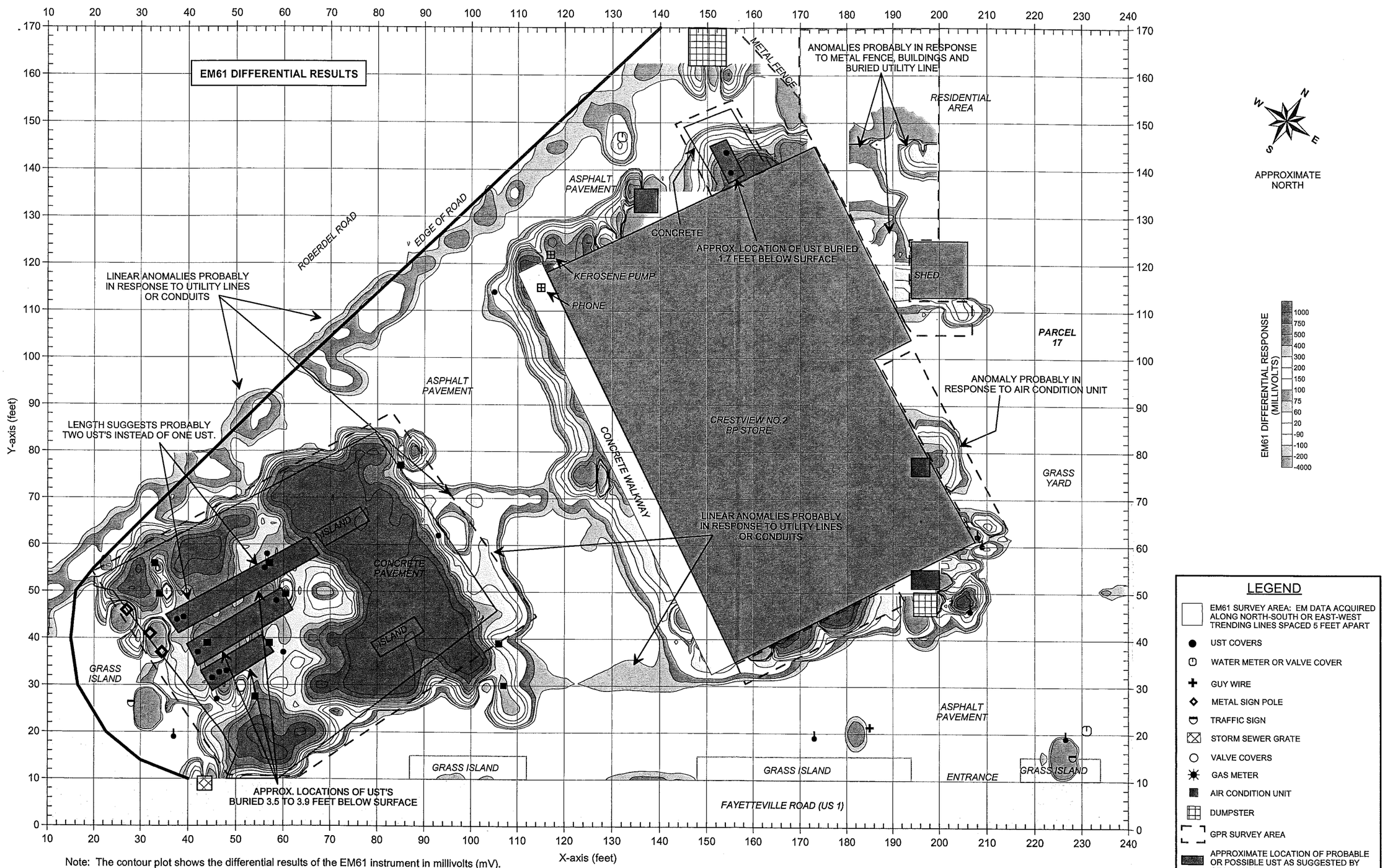
FIGURE 10

EM61 BOTTOM COIL RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/25/05 |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | LAY | |
| CITY | ROCKINGHAM | DWG | |
| TITLE | GEOPHYSICAL RESULTS | J.NO. | 2005-292 |
| DRWN | MJD | CHKD | |
| FIGURE | | | |

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




Note: The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 11

EM61 DIFFERENTIAL RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHK'D | |
| DATE | 11/25/05 |
| LAY | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

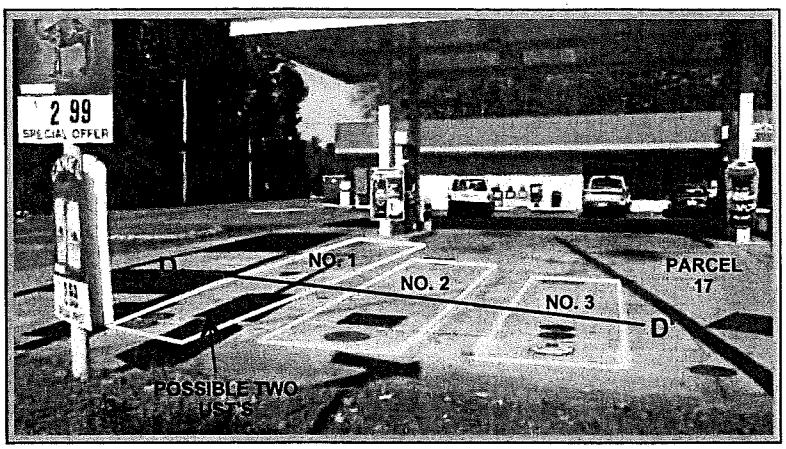
SITE: HARVEY E. MELTON PROPERTY (PARCEL 17)

CITY: ROCKINGHAM

STATE: NORTH CAROLINA

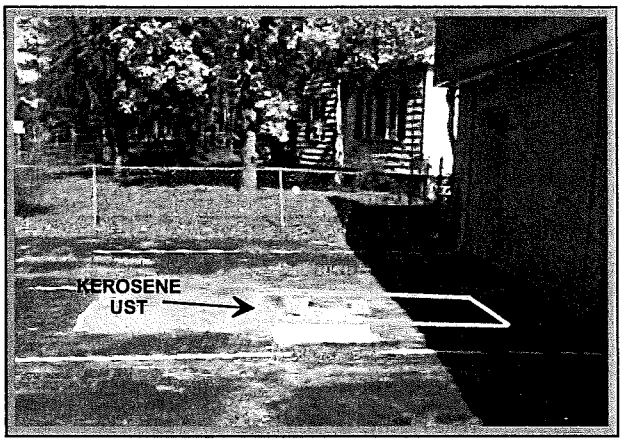
TITLE: GEOPHYSICAL RESULTS

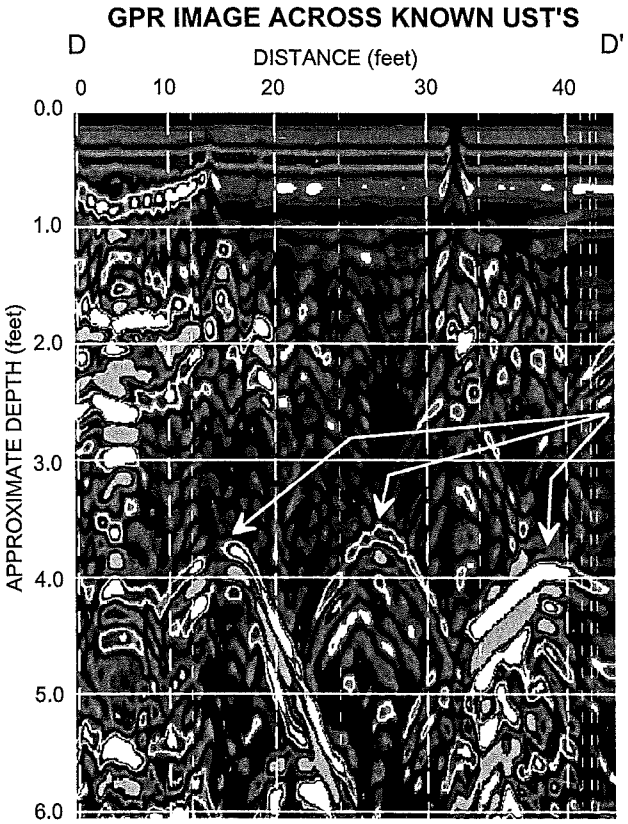
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approxiamte location of the three or four known and active UST's, as suggested by the geophysical results, at Parcel 17. The UST's appear to be approximately 3.5 to 3.9 feet below surface.

The photo shows the approximate location of the kerosene UST, as suggested by the geophysical results, at Parcel 17. The UST is located along the northwest wall of the store and is buried approximately 2.4 feet below surface.




**GPR ANOMALIES PROBABLY IN RESPONSE TO THREE UST'S BURIED 3.5 TO 3.9 FEET BELOW SURFACE**

The GPR image is obtained along a traverse line oriented perpendicular to the axis of the UST's. The three GPR anomalies in response to the probable UST's suggest that the UST's are buried approximately 3.5 to 3.9 feet below surface.

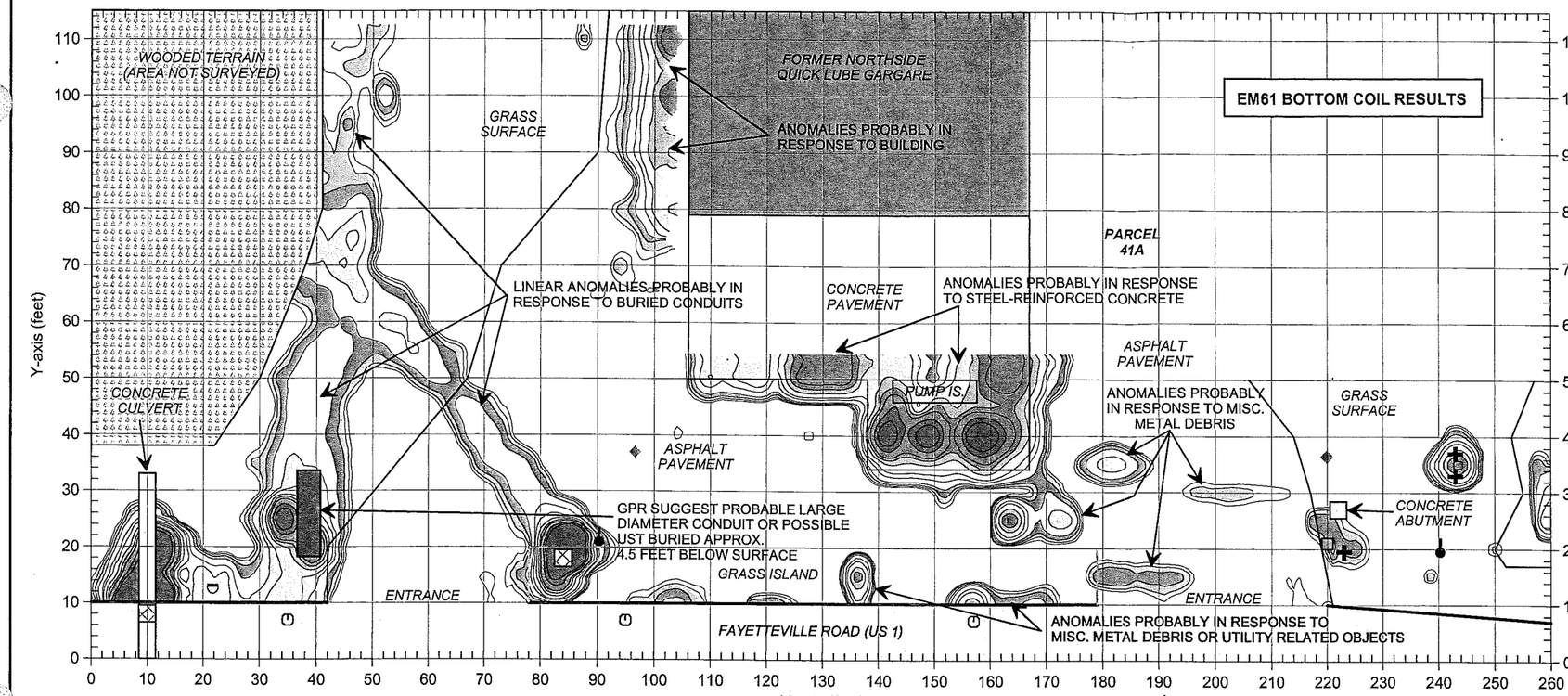
**PYRAMID**
ENVIRONMENTAL & ENGINEERING, P.C.

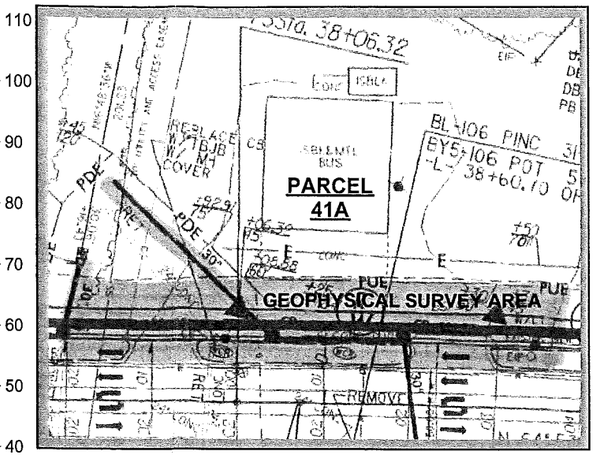
| | | | | | |
|---|---|---|---|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | DATE | 11/28/05 | DRWN | |
| SITE | HARVEY E. MELTON PROPERTY (PARCEL 17) | LAY | | CHKD | |
| CITY | ROCKINGHAM — STATE: NORTH CAROLINA | DWG | | | |
| TITLE | GEOPHYSICAL RESULTS | J.NO. | 2005-292 | FIGURE | |

GRAPHIC SCALE IN METERS

PHOTOS & GPR IMAGE OF UST LOCATIONS

FIGURE 12

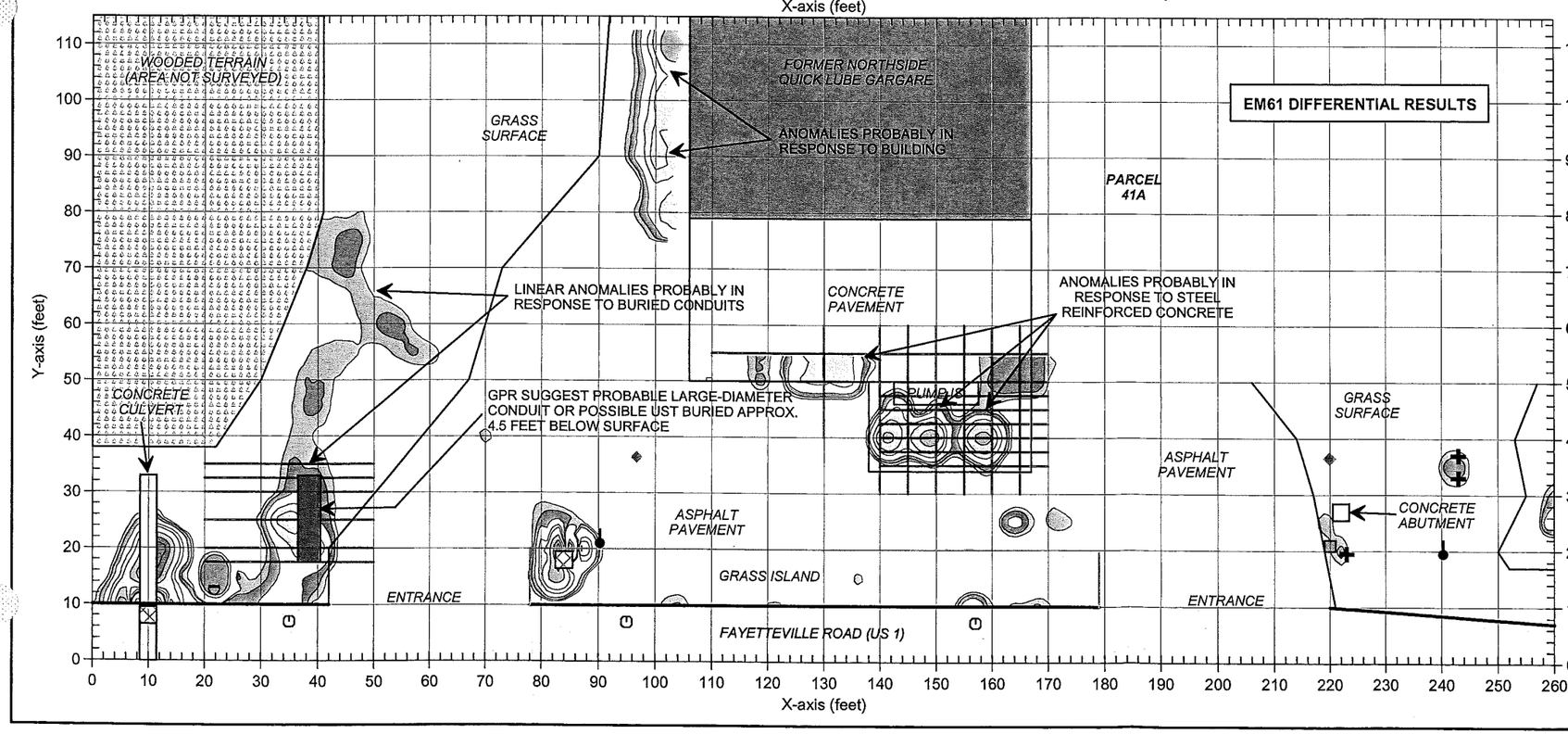



APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- STORM SEWER GRATE
- MAIL BOX
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE LARGE DIAMETER CONDUIT OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 13

EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| JNO. | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

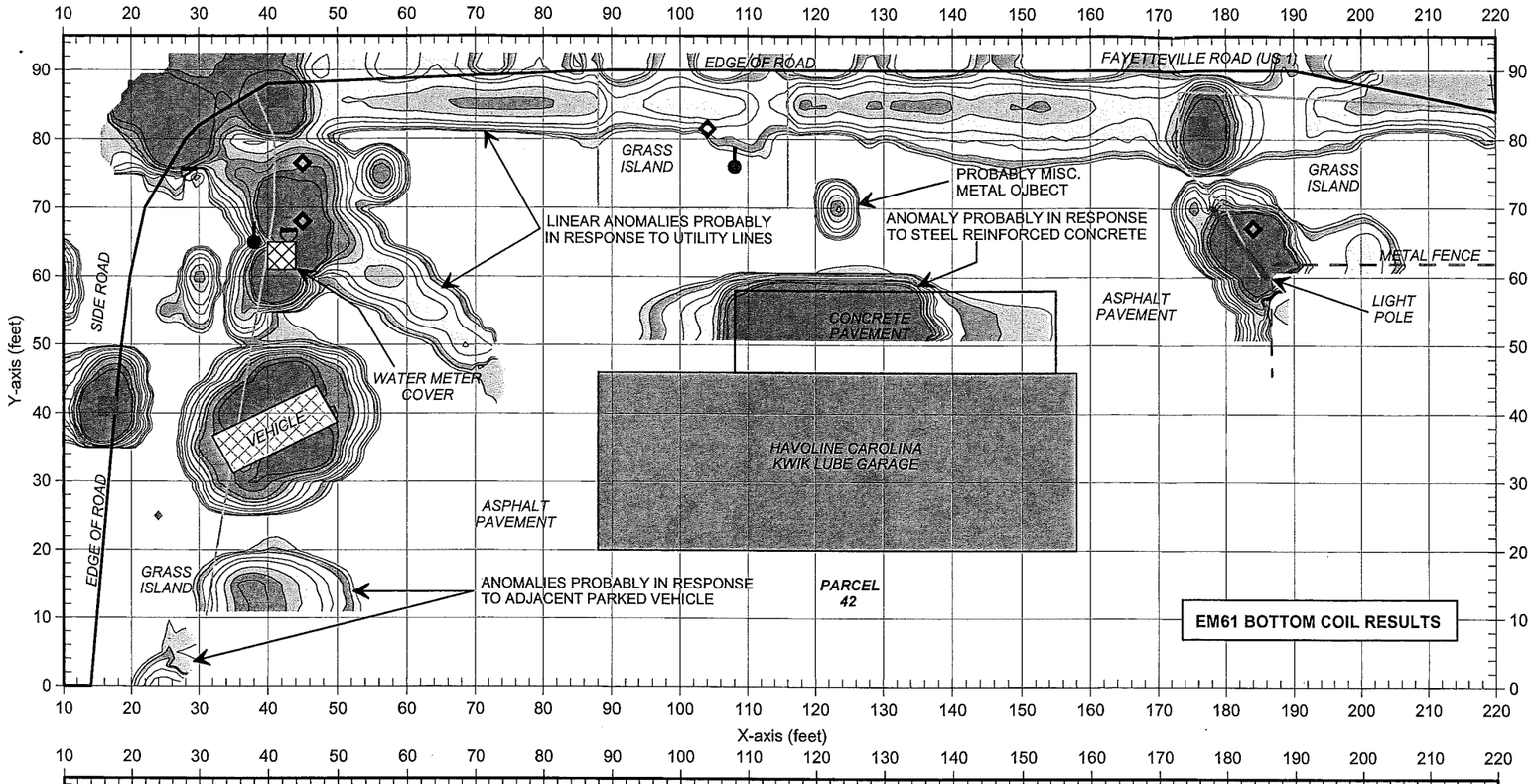
SITE: W.J. BARNHART PROPERTY (PARCEL 41A)

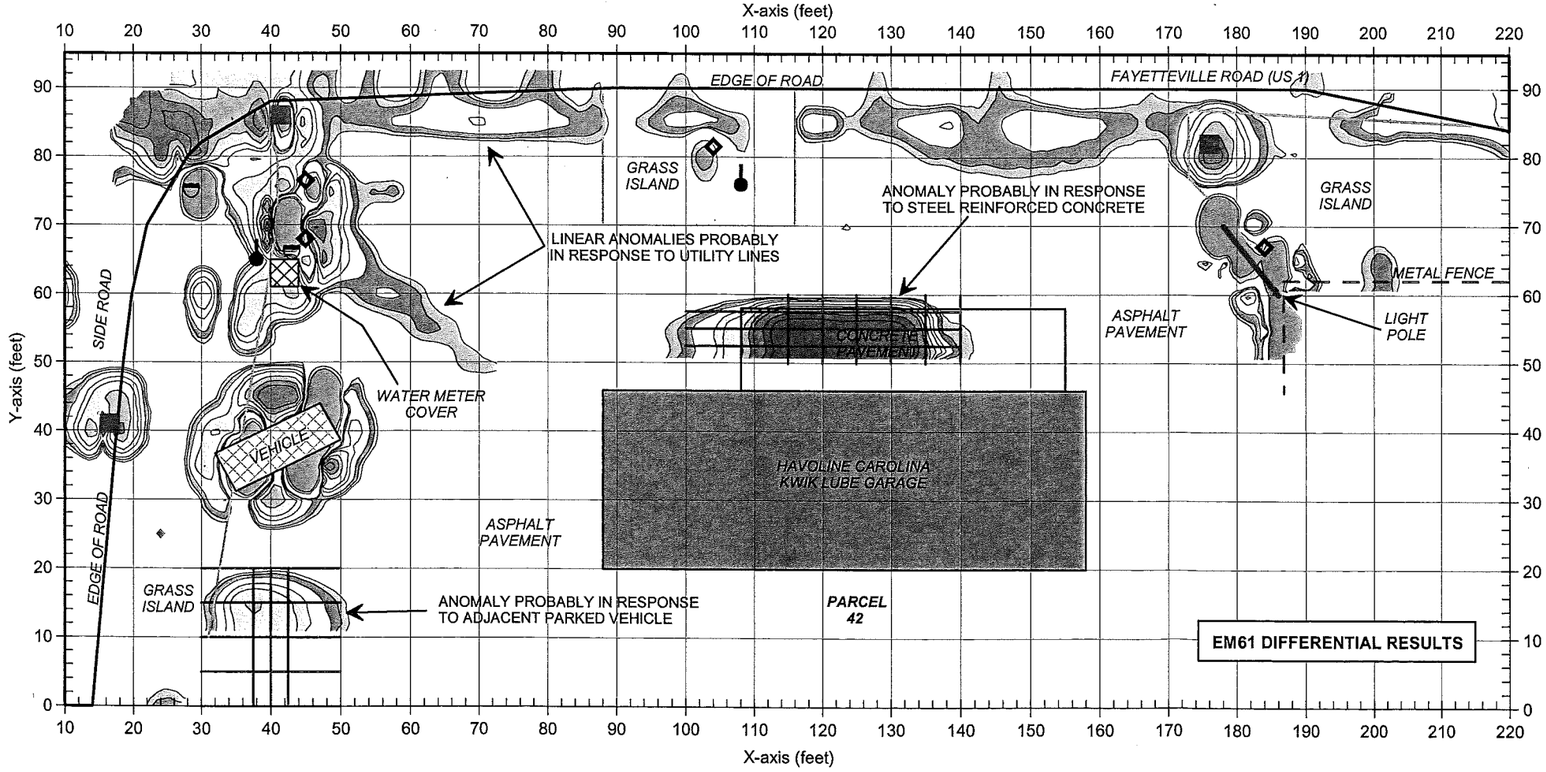
CITY: ROCKINGHAM

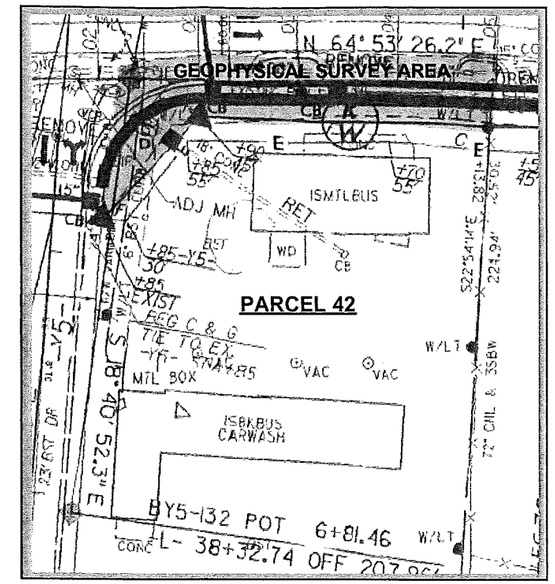
STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

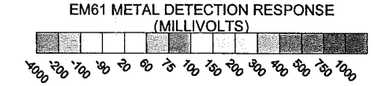


APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- METAL SIGN POLE
- STORM SEWER GRATE
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 15, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 14

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | |
|---|---|
| DRAWN | MJD |
| CHKD | |
| DATE | 11/26/05 |
| LAY | |
| DWG | |
| FIGURE | |
| JNO. | 2005-292 |

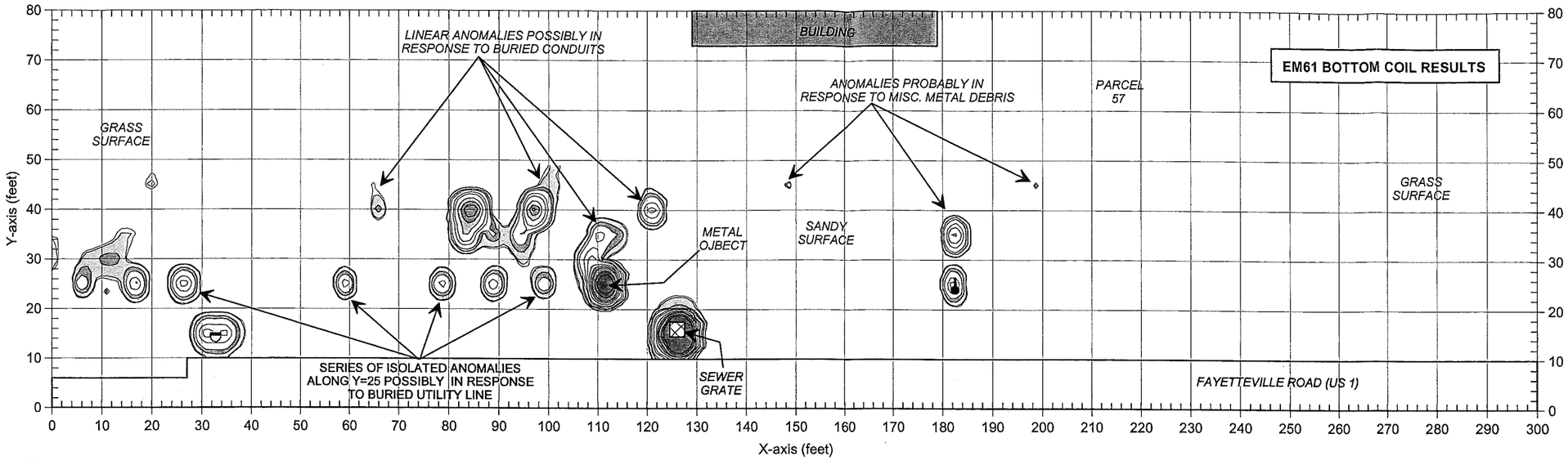
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

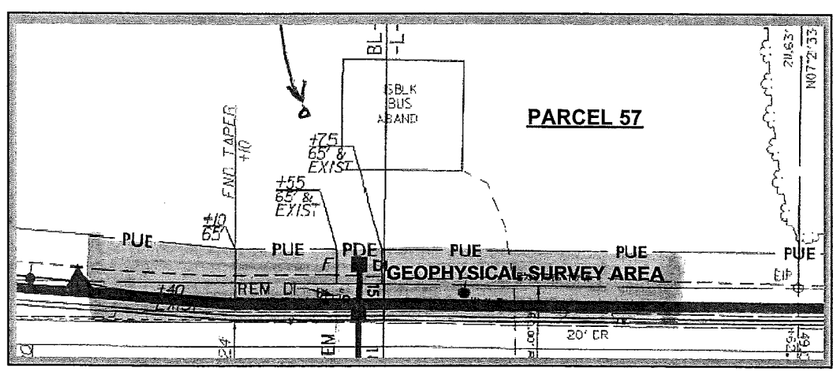
SITE: WESLEY DENHAM PROPERTY (PARCEL 42)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -90 -45 -50 -75 -100 -150 -200 -300 -400 -500 -750 -1000

N W E S

APPROXIMATE NORTH

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) surveys were not conducted at this site.

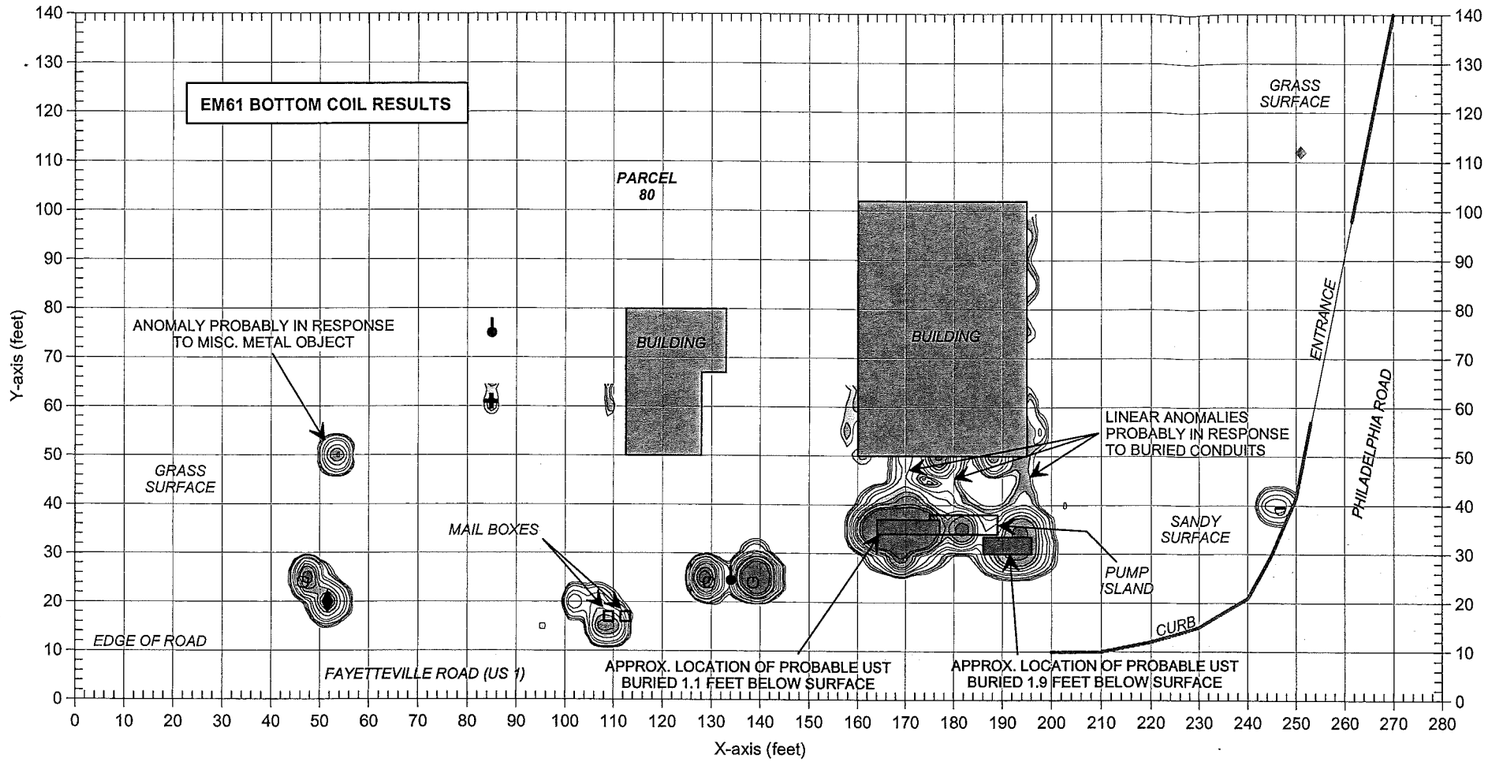
EM61
METAL DETECTION
RESULTS

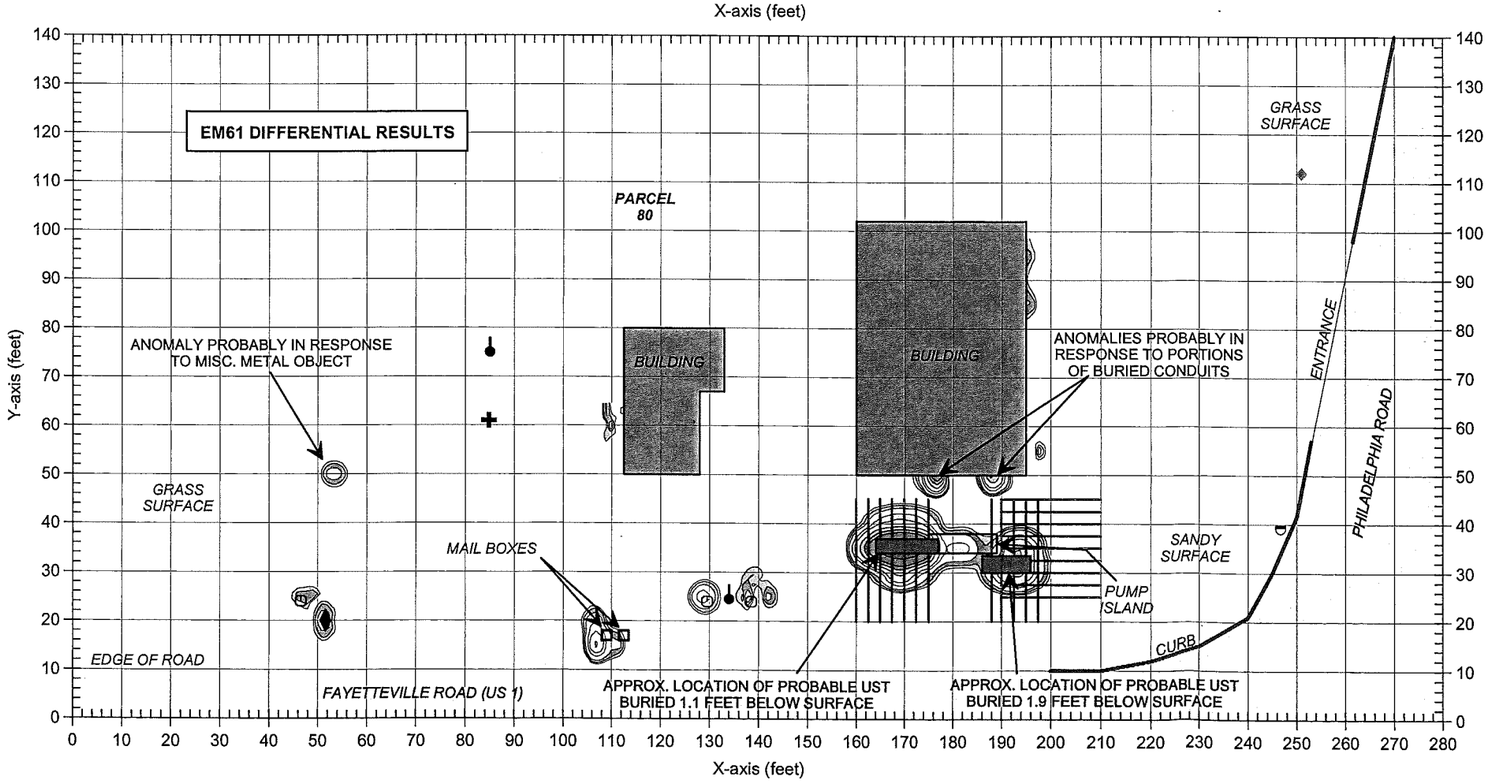
FIGURE 15

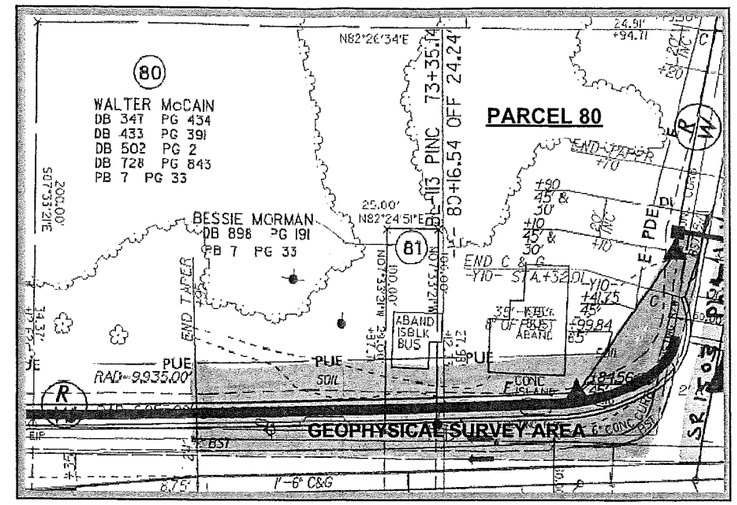
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | WILLIAM USSERY PROPERTY (PARCEL 57) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/18/05 |
| DRWN | MJD |
| LAY | |
| CHKD | |
| DWG | |
| FIGURE | |
| J.NO. | 2005-292 |

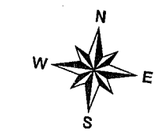
GRAPHIC SCALE IN METERS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -20 60 75 100 150 200 300 400 500 750 1000

## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- RIGHT-OF-WAY MARKER
- FIRE HYDRANT
- TRAFFIC SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 16

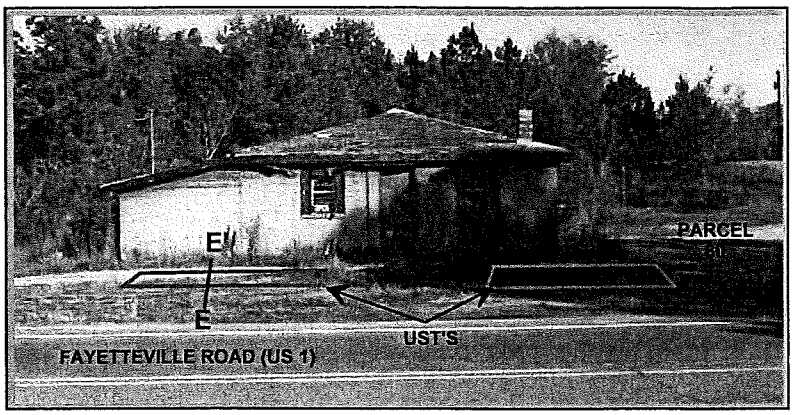
EM61 METAL DETECTION RESULTS

GRAPHIC SCALE IN METERS

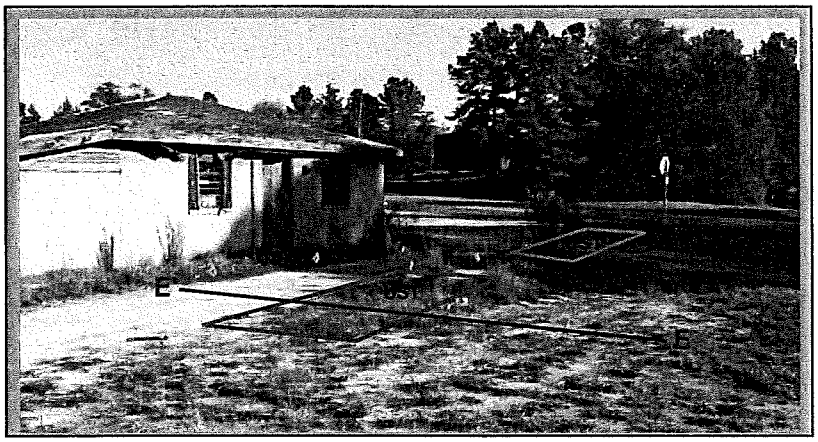
| DATE | DRAWN | SIGNATURE |
|---|---|---|
| 11/25/05 | MJD | |
| LAY | CHKD | |
| DWG | | |
| J.NO. | 2005-292 | |

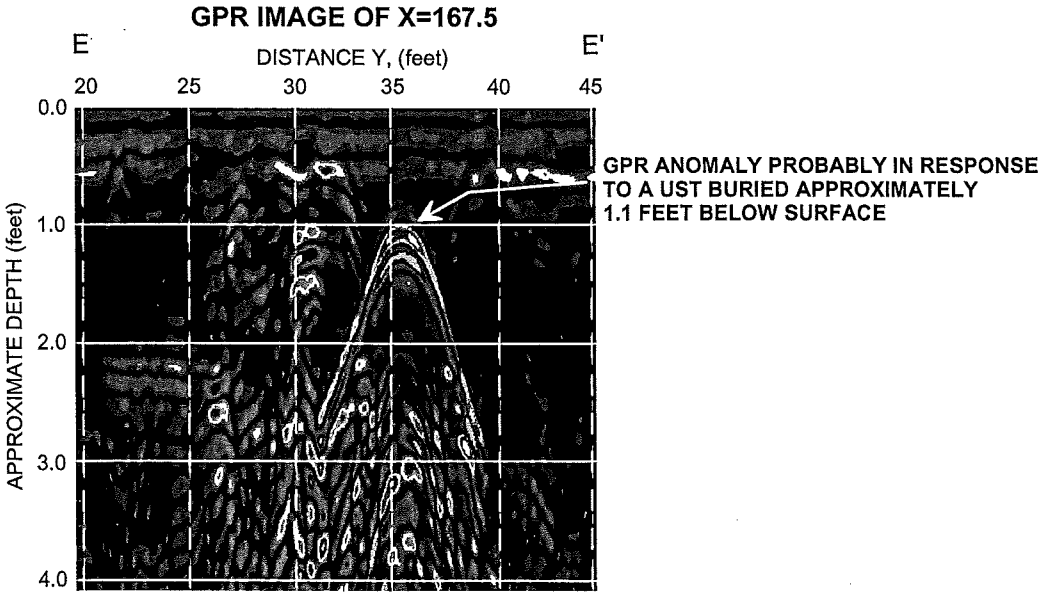
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: WALTER McCAIN PROPERTY (PARCEL 80)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.




The two photos show the approximate locations of the two probable UST's at Parcel 80, as suggested by the geophysical results. The UST's appear to be buried approximately 1 to 2 feet below surface. A former pump island lies between the two probable UST's.

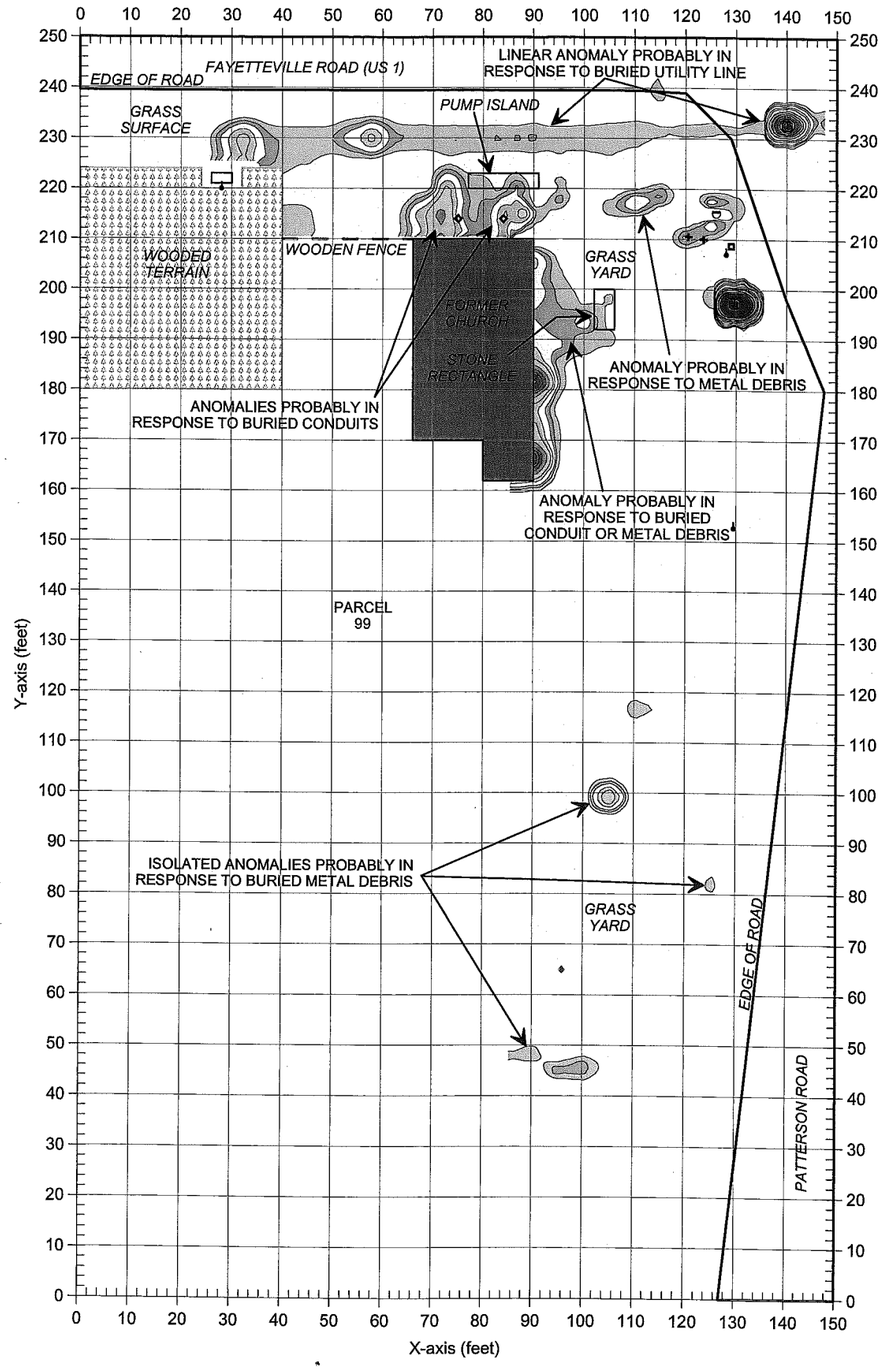


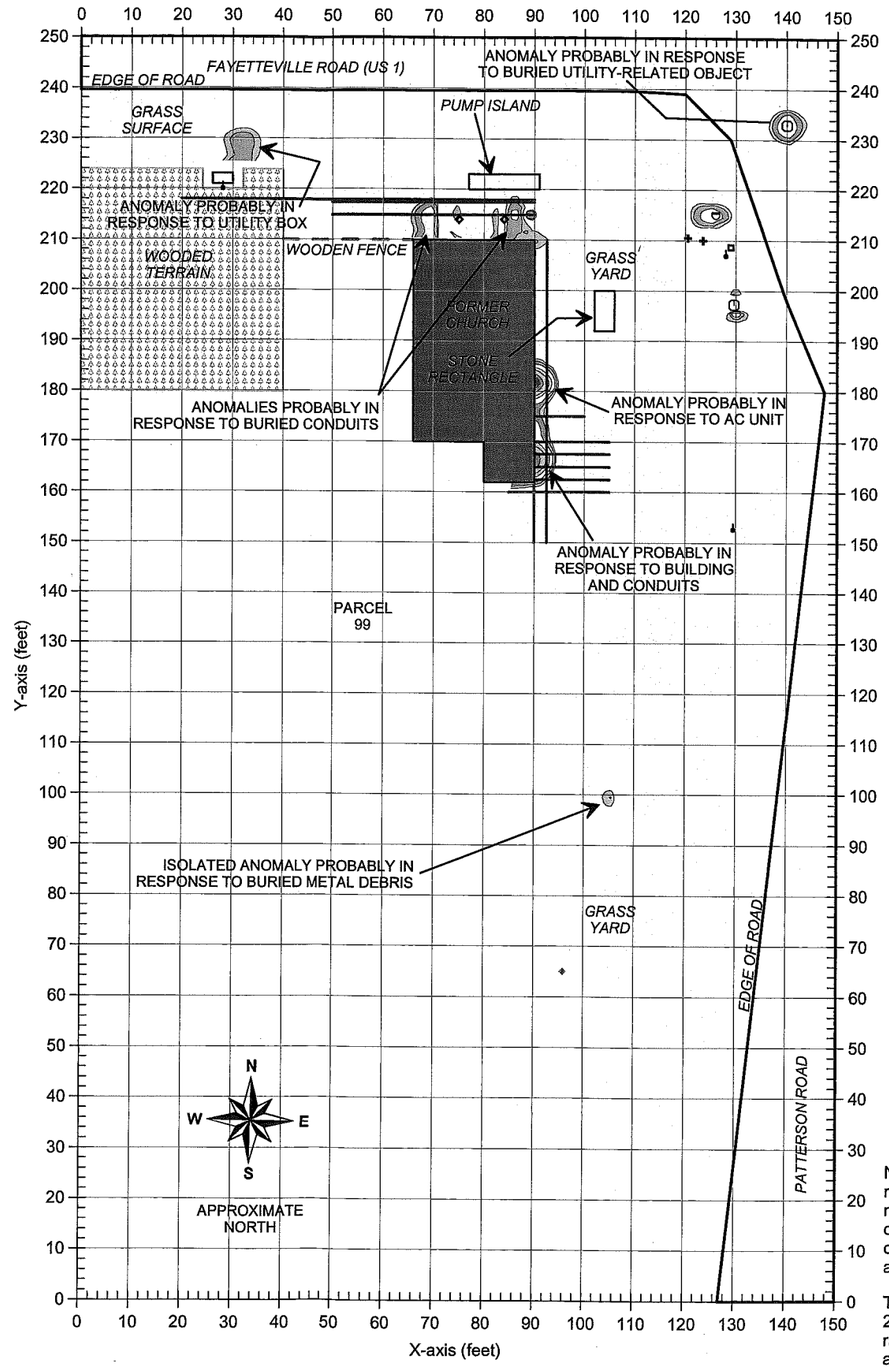

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTOS & GPR IMAGE OF UST LOCATIONS |
| | SITE: WALTER McCAIN PROPERTY (PARCEL 80) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JNO: 2005-292 | FIGURE: | FIGURE 17 |

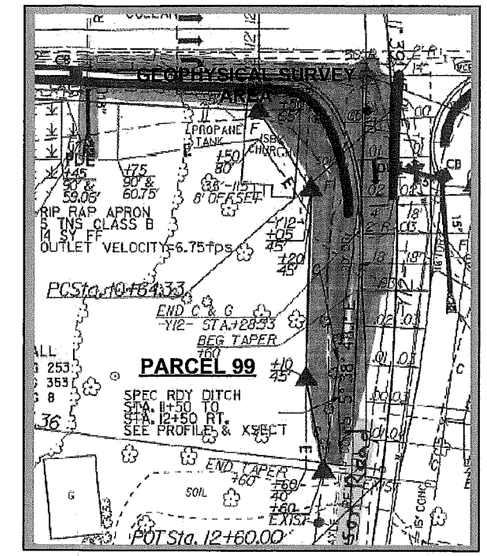
GRAPHIC SCALE IN METERS

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-400 -200 -100 -50 -20 20 50 75 100 150 200 300 400 500 750 1000

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTH-SOUTH OR EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- CANOPY POLE
- RIGHT-OF-WAY MARKER
- TRAFFIC SIGN
- GPR SURVEY LINE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 12, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 22, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 18

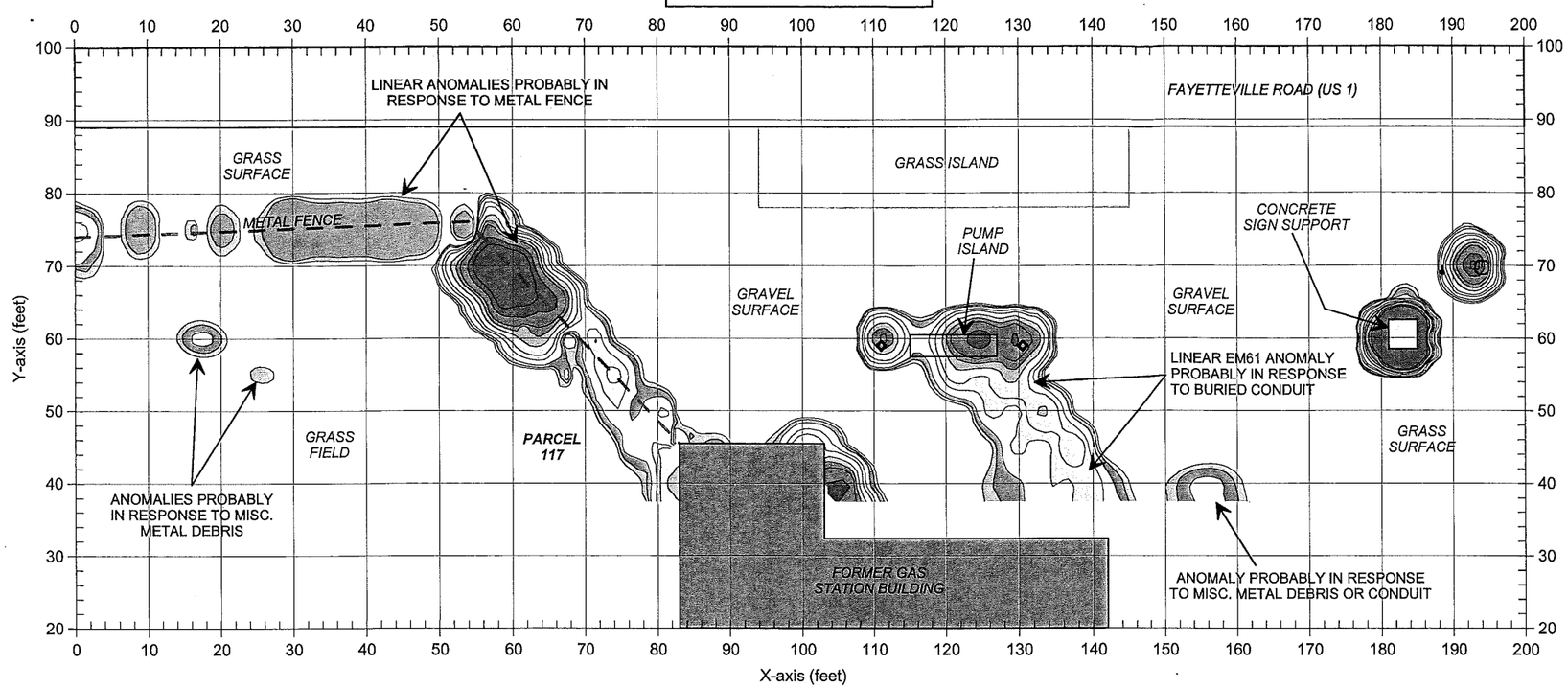
# EM61 METAL DETECTION RESULTS

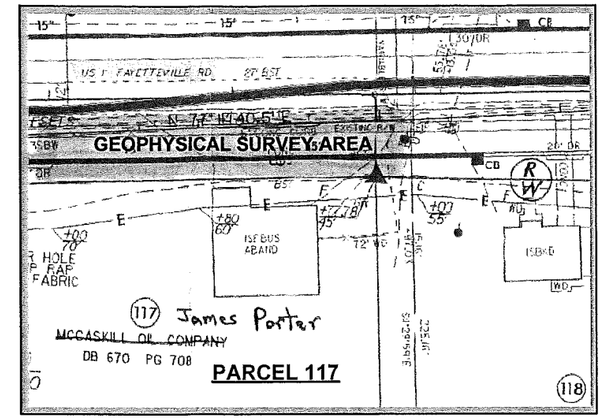
| | |
|---|---|
| CLIENT | SOLUTIONS INDUSTRIAL & ENVIRONMENTAL |
| SITE | LEON WALL PROPERTY (PARCEL 99) |
| CITY | ROCKINGHAM |
| STATE | NORTH CAROLINA |
| TITLE | GEOPHYSICAL RESULTS |
| DATE | 11/26/05 |
| DRWN | MJD |
| JOB NO. | 2005-292 |
| FIGURE | |

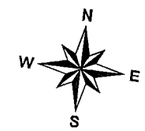
GRAPHIC SCALE IN METERS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS

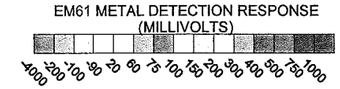


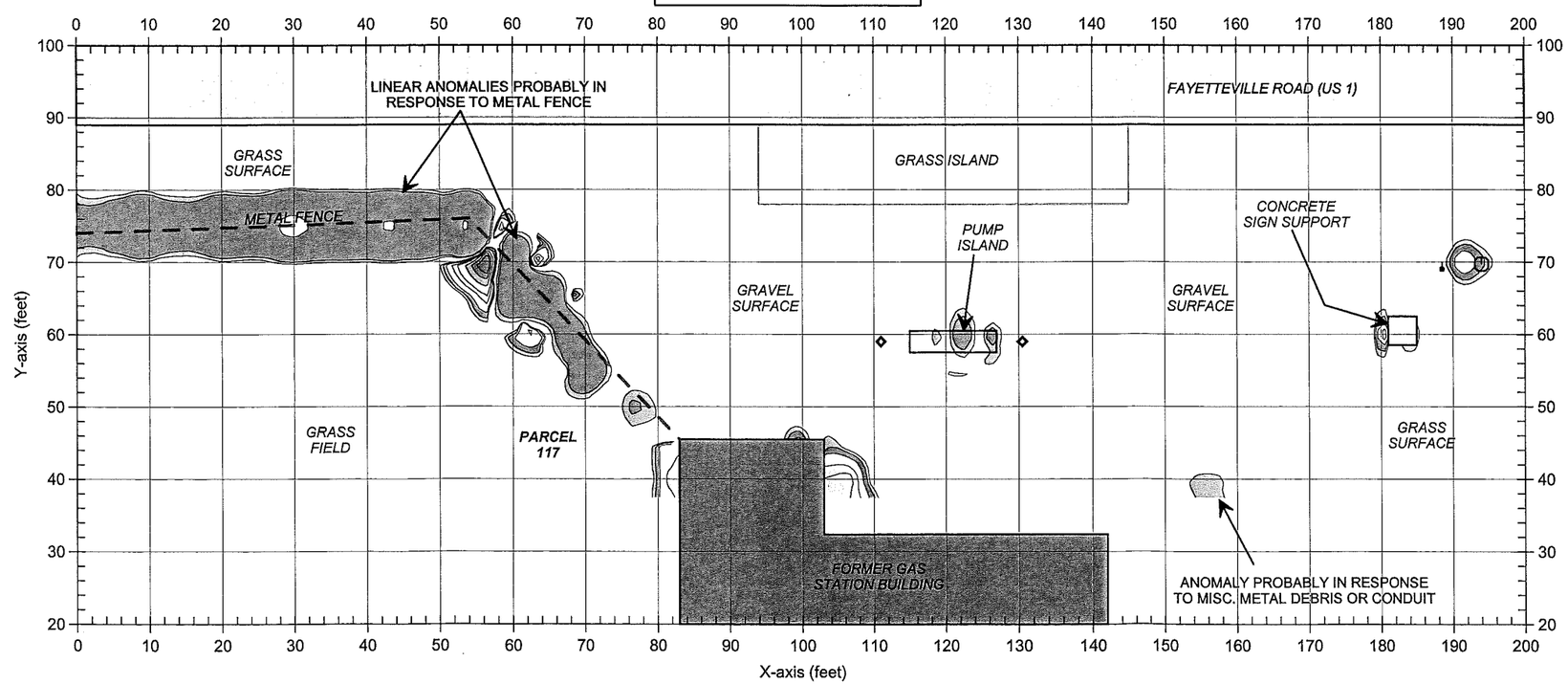




APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)




## EM61 DIFFERENTIAL RESULTS




### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SUPPORT POLE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar surveys were not conducted at this site.

FIGURE 19

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| DRWN | CHKD | FIGURE |
|---|---|---|
| MJD | | |

| DATE | LAY | DWG | JNO. |
|---|---|---|---|
| 11/26/05 | | | 2005-292 |

CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

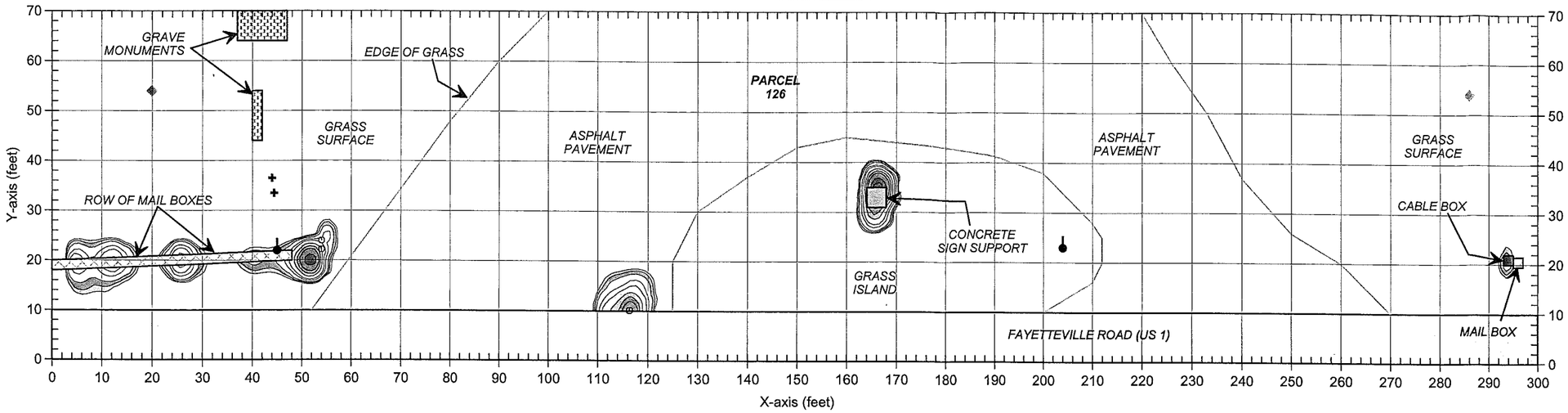
SITE: JAMES PORTER PROPERTY (PARCEL 117)

CITY: ROCKINGHAM STATE: NORTH CAROLINA

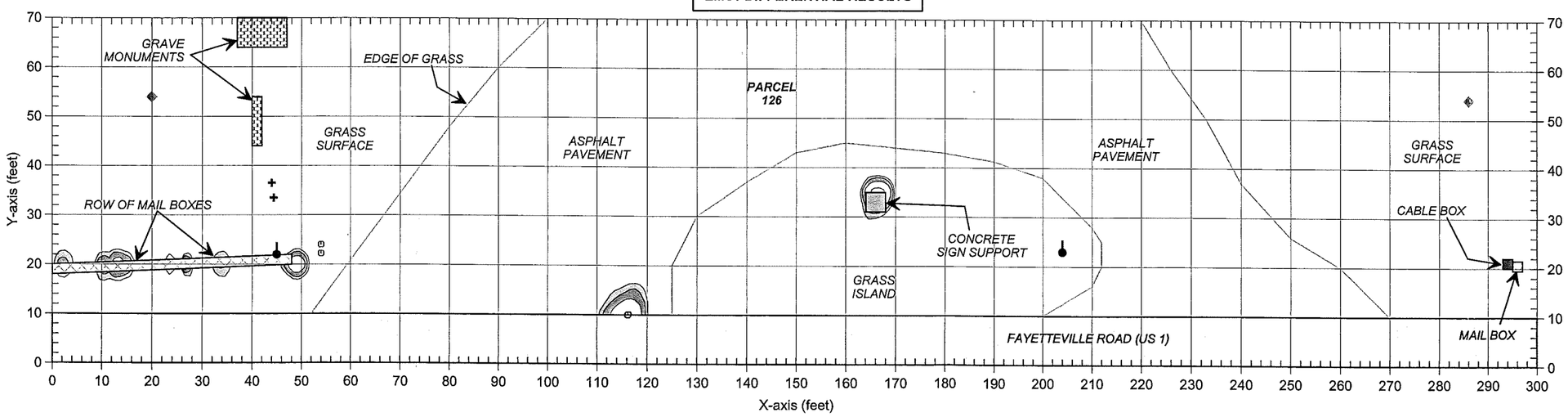
TITLE: GEOPHYSICAL RESULTS

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

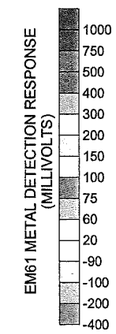
## EM61 BOTTOM COIL RESULTS

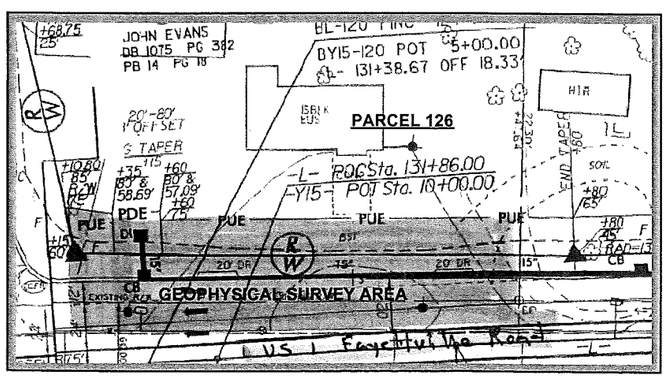



## EM61 DIFFERENTIAL RESULTS



APPROXIMATE NORTH




## LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- UTILITY POLE
- WATER METER OR VALVE COVER
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- GUY WIRE

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data surveys were not conducted at this site

FIGURE 20

EM61
METAL DETECTION
RESULTS

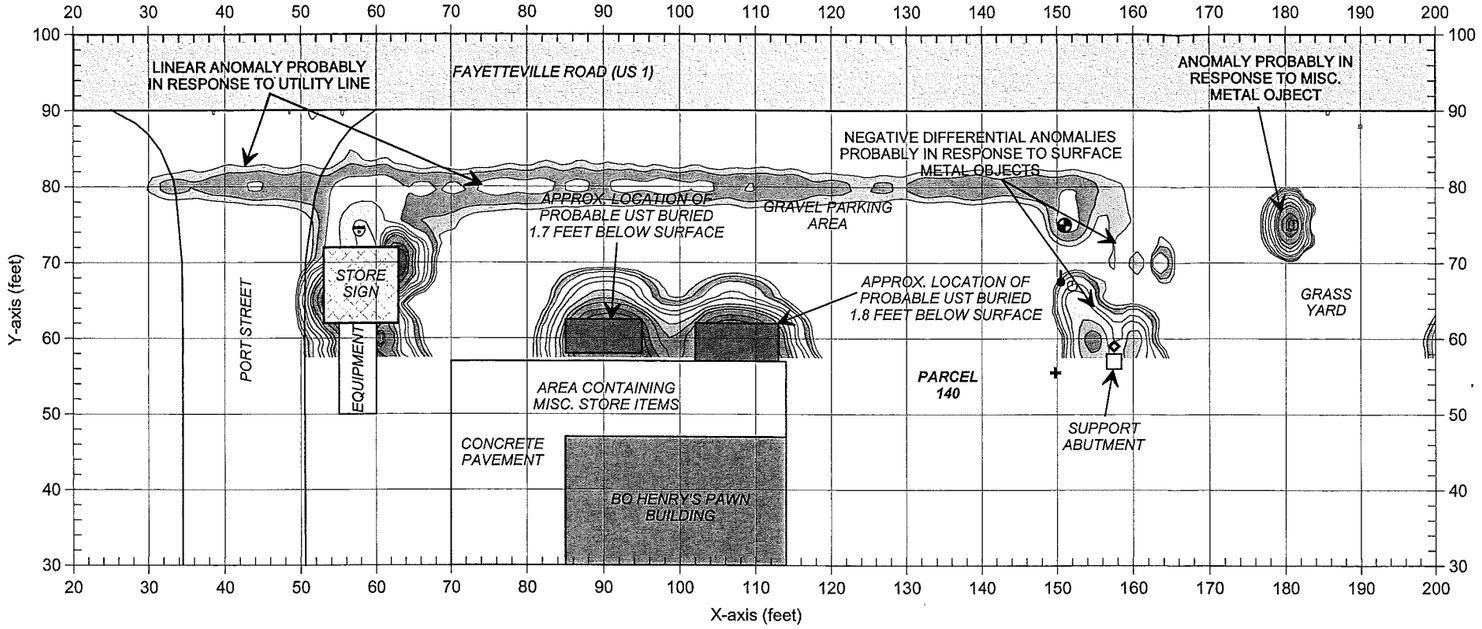
GRAPHIC SCALE IN METERS

| DATE | LAY | DWG | J.NO. |
|---|---|---|---|
| 11/26/05 | | | 2005-292 |
| DRAWN | CHKD | | FIGURE |
| MJD | | | |

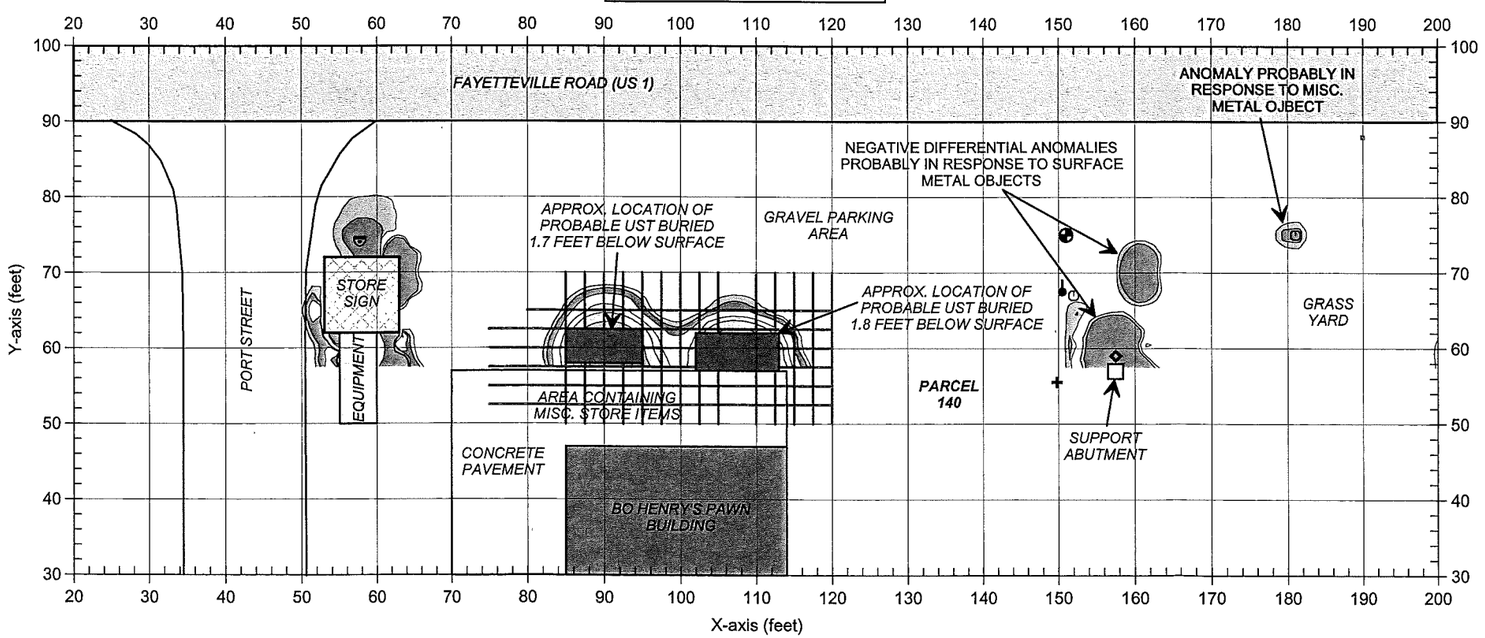
CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL
SITE: JOHN EVANS PROPERTY (PARCEL 126)
CITY: ROCKINGHAM
STATE: NORTH CAROLINA
TITLE: GEOPHYSICAL RESULTS

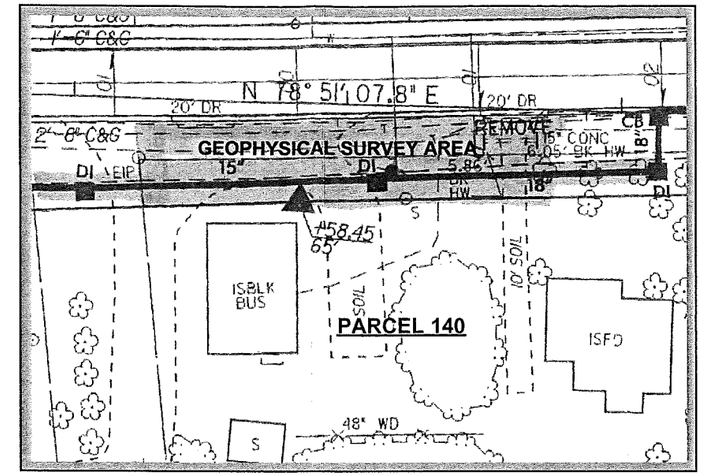
PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

## EM61 BOTTOM COIL RESULTS




## EM61 DIFFERENTIAL RESULTS




EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-4000 -200 -100 -50 20 60 75 100 150 200 300 400 500 750 1000

N W E S

APPROXIMATE NORTH

### LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EAST-WEST TRENDING LINES SPACED 5 FEET APART
- BUILDING
- UTILITY POLE
- WATER METER OR VALVE COVER
- GUY WIRE
- SIGN POLE
- STORM SEWER GRATE
- TRAFFIC SIGN
- FIBER OPTIC LINE SIGN
- GPR SURVEY LINE
- APPROXIMATE LOCATION OF PROBABLE OR POSSIBLE UST AS SUGGESTED BY GEOPHYSICAL SURVEYS

Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential results in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and UST's and ignores smaller miscellaneous, buried, metal debris.

The EM metal detection data were collected on November 14, 2005 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on November 23, 2005 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

FIGURE 21

EM61
METAL DETECTION
RESULTS

GRAPHIC SCALE IN METERS

| | | | |
|---|---|---|---|
| MJD | | | |
| DRAWN | CHKD | | FIGURE |
| 11/25/05 | | | 2005-292 |
| DATE | LAY | DWG | J.NO. |

SOLUTIONS INDUSTRIAL & ENVIRONMENTAL

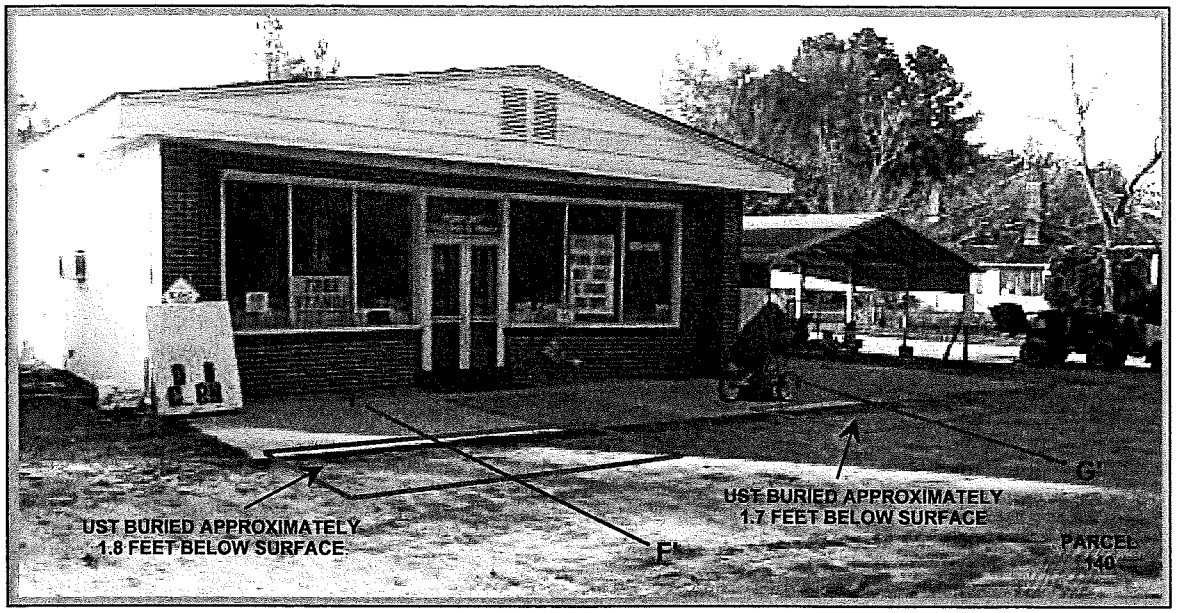
HENRY USSERY PROPERTY (PARCEL 140)

ROCKINGHAM — NORTH CAROLINA

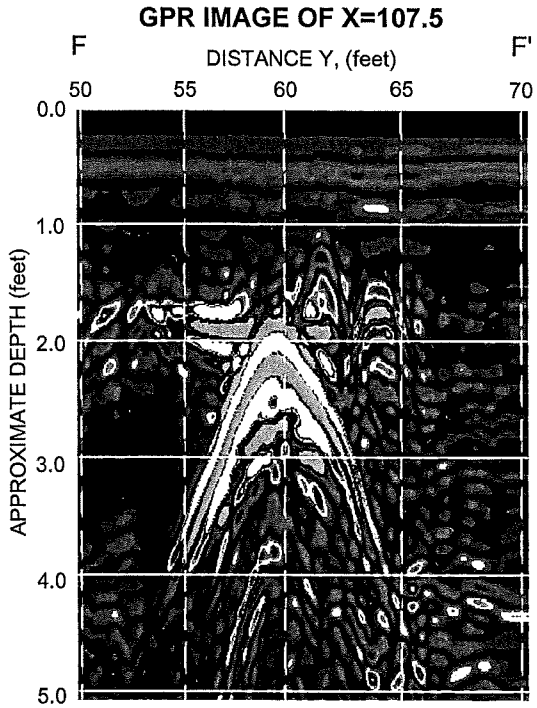
GEOPHYSICAL RESULTS

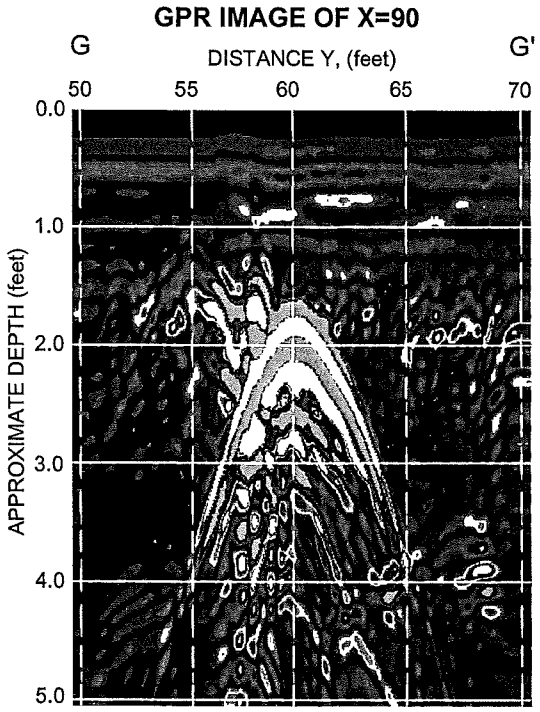
CLIENT — SITE — CITY — STATE — TITLE

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.




The photo shows the approximate locations of the two UST's, as suggested by the geophysical results at Parcel 140. The UST's appear to be approximately 1.8 and 1.7 feet below surface.




The GPR images obtained along survey lines X=107.5 and X=90 show the anomalies that are probably in response to the two UST's buried at Parcel 140. The GPR data suggest the UST's are buried approximately 1.8 feet and 1.7 feet below surface, respectively.

| | | | | | |
|---|---|---|---|---|---|
| PYRAMID ENVIRONMENTAL & ENGINEERING, P.C. | CLIENT: SOLUTIONS INDUSTRIAL & ENVIRONMENTAL | | DATE: 11/28/05 | DRWN: | PHOTO & GPR IMAGES OF UST LOCATIONS |
| | SITE: HENRY USSERY PROPERTY (PARCEL 140) | | LAY: | CHKD: | |
| | CITY: ROCKINGHAM | STATE: NORTH CAROLINA | DWG: | | |
| | TITLE: GEOPHYSICAL RESULTS | | JOB: 2005-292 | FIGURE: | FIGURE 22 |

GRAPHIC SCALE IN METERS

# APPENDIX C

# BORING LOGS

# Log of Soil Boring 99-1

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-1
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* 7.3'
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DA/SK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0 | | ***SP*** Dry, brown, fine sand, some organic matter | | | | | | |
| 1 | | ***SP*** Dry, tan, fine sand | | MC | 50 | 0 | | |
| 2 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 3 (1) | | | | MC | 50 | 0 | | |
| 4 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 5 | | ***SP*** Dry, tan/orange, fine sand | | MC | 75 | 0 | | |
| 6 | | ***SP*** Dry, tan/orange, fine sand | | | | | | |
| 7 (2) | | ***Asphalt*** | | MC | 100 | 0 | | ▼ |
| 8 | | ***SC*** Dry, tan/yellow, clayey fine sand | | | | | | |
| 9 | | Boring terminated at 8 feet. | | | | | | |
| 10 (3) | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 (4) | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

**Solutions-IES, Inc.**
**1101 Nowell Road**
**Raleigh, NC 27607**
**(919) 873-1060**

Solutions-IES
Industrial & Environmental Services

# Log of Soil Boring 99-2

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-2
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* 6.7'
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* AJ/SWK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| | | ***SP*** Dry, brown, fine sand, some organic matter | | MC | 75 | 0 | | |
| 1 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3 / 1 | | | | | | | | |
| 4 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 5 | | | | | | | | |
| 6 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | ▼ |
| 7 / 2 | | | | | | | | |
| 8 | | ***SC*** Dry, clayey fine sand | | | | | | |
| 9 | | Boring terminated at 8 feet. | | | | | | |
| 10 / 3 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 / 4 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-3

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-3
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DKH/SCK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| | | ***SP*** Dry, brown, fine sand, some organic matter | | | | | | |
| 1 | | ***SP*** Dry, tan, fine sand | | MC | 50 | 0 | | |
| 2 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 3 / 1 | | | | MC | 100 | 0 | | |
| 4 | | ***SP*** Dry, tan/orange, fine sand | | | | | | |
| 5 | | | | MC | 100 | 0 | | |
| 6 | | ***SC*** Dry, tan/orange, clayey fine sand | | | | | | |
| 7 / 2 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 8 | | | | | | | | |
| 9 | | Boring terminated at 8 feet. | | | | | | |
| 10 / 3 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 / 4 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-4

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-4
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DMH/SUK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen ppm (250 500 750) / FID Field Screen ppm (250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0 | | ***SP*** Dry, brown, fine sand, some organic matter | | MC | 100 | 0 | | |
| 1 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3 (1 m) | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 4 | | ***SC*** Dry, tan/orange, clayey fine sand | | MC | 100 | 0 | | |
| 5 | | | | | | | | |
| 6 (2 m) | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 (3 m) | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 (4 m) | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-5

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-5
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* [signature] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| | | ***SP*** Dry, brown, fine sand, some organic matter | | | | | | |
| 1 | | ***SC*** Dry, tan, clayey medium sand | | MC | 100 | 0 | | |
| 2 | | ***SC*** Dry, tan, clayey medium sand | | | | | | |
| 3 / 1 | | | | MC | 100 | 0 | | |
| 4 | | ***SC*** Dry, tan, clayey medium sand | | | | | | |
| 5 | | ***SC*** Dry, orange, clayey medium sand | | MC | 100 | 0 | | |
| 6 / 2 | | ***SC*** Dry, orange, clayey medium sand | | MC | 100 | 0 | | |
| 7 | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 / 3 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 / 4 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-6

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-6
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DKH / SLK *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm, 250 500 750) / FID Field Screen (ppm, 250 500 750) | Lab Sample Depth | Well Data |
| 0 / 0 | | Ground Surface | | | | | | |
| | | ***SP*** Dry, brown, fine sand, some organic matter | | MC | 100 | 0 | | |
| 1 | | ***SP*** Dry, tan, fine with some coarse sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine with some coarse sand | | MC | 100 | 0 | | |
| 3 / 1 | | | | | | | | |
| 4 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 5 | | | | | | | | |
| 6 / 2 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 7 | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 / 3 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 / 4 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-7

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-7
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DLA / SVA *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750) | Lab Sample Depth | Well Data |
| 0 | | Ground Surface | | | | | | |
| 0 | | ***SP*** Dry, brown, fine sand, some organic matter | | MC | 50 | 0 | | |
| 1 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3 (1) | | | | | | | | |
| 4 | | ***SP*** Dry, black, fine sand | | MC | 100 | 0 | | |
| 5 | | ***SC*** Dry, orange, clayey fine sand | | | | | | |
| 6 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 7 (2) | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 (3) | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 (4) | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# Log of Soil Boring 99-8

*Project:* Rockingham Sites (Parcel 099) *Solutions-IES Project No.:* 2730.05A2.NDOT *Boring Number:* 99-8
*Client:* NCDOT
*WBS #* 34950.1.1 *City:* Rockingham *Initial Water Level:* N/A
*State Project #* U-3456 *County:* Richmond *Stabilized Water Level:* N/A
*Drilling Method:* Direct push *Boring Date:* 11/28/05 *Cave In Depth:* N/A
*Sampler Type:* Macro Core
*Logged By:* Dan Hirth *Checked By:* DRA / [illegible] *Total Depth of Boring:* 8 feet

| SUBSURFACE PROFILE | | | SAMPLE | | | PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750 | Lab Sample Depth | Well Data |
|---|---|---|---|---|---|---|---|---|
| Depth (ft / m) | USCS Symbol | Description | Sample Interval | Type | % Recovery | | | |
| 0 / 0 | | Ground Surface | | | | | | |
| | | ***SP*** Dry, brown, fine sand, some organic matter | | MC | 50 | 0 | | |
| 1 | | ***SP*** Dry, tan, fine sand | | | | | | |
| 2 | | ***SP*** Dry, tan, fine sand | | MC | 100 | 0 | | |
| 3 / 1 | | | | | | | | |
| 4 | | ***SP*** Dry, black, fine sand | | MC | 100 | 0 | | |
| 5 | | ***SC*** Dry, orange, clayey fine sand | | | | | | |
| 6 | | ***SC*** Dry, orange, clayey fine sand | | MC | 100 | 0 | | |
| 7 / 2 | | | | | | | | |
| 8 | | Boring terminated at 8 feet. | | | | | | |
| 9 | | | | | | | | |
| 10 / 3 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 / 4 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |

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# APPENDIX D

# LABORATORY ANALYTICAL REPORT

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**Pace Analytical Services, Inc.**
*2225 Riverside Drive*
*Asheville, NC 28804*
*Phone: 828.254.7176*
*Fax: 828.252.4618*

December 15, 2005

Ms. Sheri Knox
Solutions-IES
1101 Nowell Road
Raleigh, NC 27607

RE: Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

Dear Ms. Knox:

Enclosed are the analytical results for sample(s) received by the laboratory on December 1, 2005. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

Inorganic Wet Chemistry and Metals Analyses were performed at our Pace Asheville laboratory and Organic testing was performed at our Pace Charlotte laboratory unless otherwise footnoted.

If you have any questions concerning this report please feel free to contact me.

Sincerely,

Bonnie McKee

Bonnie McKee
Bonnie.McKee@pacelabs.com
Project Manager

Enclosures

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Fax: 828.252.4618

Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

Solid results are reported on a dry weight basis

Lab Sample No: 926398686 | Project Sample Number: 92108542-001 | Date Collected: 11/28/05 16:55
Client Sample ID: 99-3(0-2) | Matrix: Soil | Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 8.3 | % | | 12/01/05 16:28 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | 28. | mg/kg | 27. | 12/09/05 12:38 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 149 | % | | 12/09/05 12:38 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 5.0 | 12/06/05 03:41 | DHW | | | |
| 4-Bromofluorobenzene (S) | 105 | % | | 12/06/05 03:41 | DHW | 460-00-4 | | |



Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC 99030
FL NELAP E87648

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Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

Lab Sample No: 926398694 | Project Sample Number: 92108542-002 | Date Collected: 11/28/05 17:05
Client Sample ID: 99-5(2-4) | Matrix: Soil | Date Received: 12/01/05 13:15

| Parameters | Results | Units | Report Limit | Analyzed | By | CAS No. | Qual | RegLmt |
|---|---|---|---|---|---|---|---|---|
| **Wet Chemistry** | | | | | | | | |
| Percent Moisture | Method: % Moisture | | | | | | | |
| Percent Moisture | 5.8 | % | | 12/01/05 16:29 | TNS | | | |
| **GC Semivolatiles** | | | | | | | | |
| TPH in Soil by 3545/8015 | Prep/Method: EPA 3545 / EPA 8015 | | | | | | | |
| Diesel Fuel | ND | mg/kg | 5.3 | 12/09/05 02:38 | KBS | 68334-30-5 | | |
| n-Pentacosane (S) | 94 | % | | 12/09/05 02:38 | KBS | 629-99-2 | | |
| Date Extracted | 12/06/05 | | | 12/06/05 | | | | |
| **GC Volatiles** | | | | | | | | |
| GAS, Soil, North Carolina | Method: EPA 8015 | | | | | | | |
| Gasoline | ND | mg/kg | 4.0 | 12/06/05 04:09 | DHW | | | |
| 4-Bromofluorobenzene (S) | 89 | % | | 12/06/05 04:09 | DHW | 460-00-4 | | |



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*Fax: 828.252.4618*

Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

## PARAMETER FOOTNOTES

Method 9071B modified to use ASE.

All pH, Free Chlorine, Total Chlorine and Ferrous Iron analyses conducted outside of EPA recommended immediate hold time.

Depending on the moisture content the PRLs can be elevated for all soil samples reported on a dry weight basis.

2-Chloroethyl vinyl ether has been shown to degrade in the presence of acid.

| | |
|---|---|
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| (S) | Surrogate |



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# QUALITY CONTROL DATA

Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

QC Batch: 144394 Analysis Method: EPA 8015
QC Batch Method: EPA 3545 Analysis Description: TPH in Soil by 3545/8015
Associated Lab Samples: 926398686 926398694

METHOD BLANK: 926413055
Associated Lab Samples: 926398686 926398694

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Diesel Fuel | mg/kg | ND | 5.0 | |
| n-Pentacosane (S) | % | 88 | | |

LABORATORY CONTROL SAMPLE: 926413063

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 166.70 | 143.9 | 86 | |
| n-Pentacosane (S) | | | | 116 | |

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 926413071 926413089

| Parameter | Units | 926398934 Result | Spike Conc. | MS Result | MSD Result | MS % Rec | MSD % Rec | RPD | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Diesel Fuel | mg/kg | 2.124 | 172.30 | 144.5 | 131.5 | 83 | 75 | 9 | |
| n-Pentacosane (S) | | | | | | 120 | 110 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

QC Batch: 144145 Analysis Method: EPA 8015
QC Batch Method: EPA 8015 Analysis Description: GAS, Soil, North Carolina
Associated Lab Samples: 926398686 926398694

METHOD BLANK: 926402280
Associated Lab Samples: 926398686 926398694

| Parameter | Units | Blank Result | Reporting Limit | Footnotes |
|---|---|---|---|---|
| Gasoline | mg/kg | ND | 5.0 | |
| 4-Bromofluorobenzene (S) | % | 72 | | |

LABORATORY CONTROL SAMPLE: 926402298

| Parameter | Units | Spike Conc. | LCS Result | LCS % Rec | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 25.00 | 27.64 | 111 | |
| 4-Bromofluorobenzene (S) | | | | 74 | |

MATRIX SPIKE: 926402306

| Parameter | Units | 926400300 Result | Spike Conc. | MS Result | MS % Rec | Footnotes |
|---|---|---|---|---|---|---|
| Gasoline | mg/kg | 1.154 | 30.64 | 38.17 | 121 | |
| 4-Bromofluorobenzene (S) | | | | | 76 | |

SAMPLE DUPLICATE: 926402314

| Parameter | Units | 926400318 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Gasoline | mg/kg | 6.300 | 8.900 | 34 | 1 |
| 4-Bromofluorobenzene (S) | % | 96 | 111 | | |



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# QUALITY CONTROL DATA

Lab Project Number: 92108542
Client Project ID: NCDOT 34950.1.1 Parcel #99

QC Batch: 144072 Analysis Method: % Moisture
QC Batch Method: Analysis Description: Percent Moisture
Associated Lab Samples: 926398686 926398694

SAMPLE DUPLICATE: 926399494

| Parameter | Units | 926399072 Result | DUP Result | RPD | Footnotes |
|---|---|---|---|---|---|
| Percent Moisture | % | 15.60 | 15.50 | 0 | |



Asheville Certification IDs
NC Wastewater 40
NC Drinking Water 37712
SC 99030
FL NELAP E87648

**REPORT OF LABORATORY ANALYSIS**
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Charlotte Certification IDs
NC Wastewater 12
NC Drinking Water 37706
SC 99006
FL NELAP E87627

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## QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines, unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

| | |
|---|---|
| LCS(D) | Laboratory Control Sample (Duplicate) |
| MS(D) | Matrix Spike (Duplicate) |
| DUP | Sample Duplicate |
| ND | Not detected at or above adjusted reporting limit |
| NC | Not Calculable |
| J | Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit |
| MDL | Adjusted Method Detection Limit |
| RPD | Relative Percent Difference |
| (S) | Surrogate |
| [1] | Sample re-analysis confirmed the sample is not homogeneous. |



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# CHAIN-OF-CUSTODY / Analytical Request Document

Pace Analytical®

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

897908

| Section A Required Client Information: | Section B Required Project Information: | Section C Invoice Information: |
|---|---|---|
| Company: Solutions-IES | Report To: Sheri Knox | Attention: ~~Mary Howard~~ |
| Address: 1101 Newell Rd | Copy To: | Company Name: ~~Solutions-IES~~ |
| Raleigh, NC 27607 | | Address: NCDOT |
| Email To: sknox@solutions-ies.com | Purchase Order No.: WBS 34950.1.1 | Pace Quote Reference: |
| Phone: 919 873 1060 Fax: 919 873 1074 | Project Name: NCDOT Parcel 99 | Pace Project Manager: BKM |
| Requested Due Date/TAT: STANDARD | Project Number: 2730.05AZ.NDOT | Pace Profile #: 3869-6 |

**REGULATORY AGENCY**

- ☐ NPDES
- ☒ UST
- ☐ GROUND WATER
- ☐ RCRA
- ☐ DRINKING WATER
- ☐ Other _____

**SITE LOCATION**: ☐GA ☐IL ☐IN ☐MI ☐MN ☒NC ☐OH ☐SC ☐WI ☐OTHER _____

**Section D** Required Client Information

**SAMPLE ID**

One Character per box. (A-Z, 0-9 / .-) Samples IDs MUST BE UNIQUE

Valid Matrix Codes

| MATRIX | CODE |
|---|---|
| DRINKING WATER | DW |
| WATER | WT |
| WASTE WATER | WW |
| PRODUCT | P |
| SOIL/SOLID | SL |
| OIL | OL |
| WIPE | WP |
| AIR | AR |
| OTHER | OT |
| TISSUE | TS |

Filtered (Y/N)

Requested Analysis: GRO 5030/8015, DRO 3545/8015

Residual Chlorine (Y/N)

92108542

Pace Project Number

| ITEM # | SAMPLE ID | MATRIX CODE | SAMPLE TYPE G=GRAB C=COMP | COLLECTED 2005 COMPOSITE START DATE | COMPOSITE START TIME | COMPOSITE END/GRAB DATE | COMPOSITE END/GRAB TIME | SAMPLE TEMP AT COLLECTION | # OF CONTAINERS | Unpreserved | $H_2SO_4$ | $HNO_3$ | HCl | NaOH | $Na_2S_2O_3$ | Methanol | Other | GRO | DRO | Residual Chlorine (Y/N) | Lab I.D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 99-3(0-2) | SL | G | 11/28 | 1655 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 924 398684 |
| 2 | 99-5(2-4) | SL | G | 11/28 | 1705 | | | | 4 | 2 | | | | | | 2 | | 1 | 1 | | 8694 |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

**Additional Comments:**

| RELINQUISHED BY / AFFILIATION | DATE | TIME | ACCEPTED BY / AFFILIATION | DATE | TIME | SAMPLE CONDITION | | | |
|---|---|---|---|---|---|---|---|---|---|
| D. Hirth / Solutions-IES | 12/1 | 1030 | [signature] | 12-1-05 | 1100 | | Y/N | Y/N | Y/N |
| [signature] | 12-1-05 | 1315 | [signature] | 12/1/05 | 1715 | 3.0 | Y/N | Y/N | Y/N |
| | | | | | | | Y/N | Y/N | Y/N |
| | | | | | | | Y/N | Y/N | Y/N |
| | | | | | | Temp in °C | Received on Ice | Custody Sealed Cooler | Samples Intact |

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: SEAN JARVATH

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY): 11/30/05

SEE REVERSE SIDE FOR INSTRUCTIONS