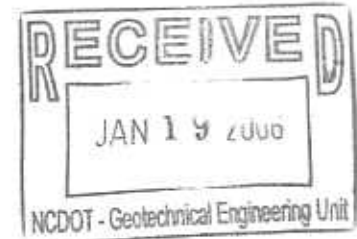


January 19, 2006

Mr. Greg Smith  
North Carolina Department of Transportation  
Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589



Reference: Preliminary Site Assessment  
Jack Cherry Property  
5957 US 17 North  
Old Ford, Beaufort County, North Carolina  
NCDOT Project R-2510C  
WBS Element 34440.1.1  
Earth Tech Project No. 90389

Dear Mr. Smith:

Earth Tech of North Carolina, Inc., (Earth Tech) has completed the Preliminary Site Assessment conducted at the above-referenced property. The work was performed in accordance with the Technical and Cost proposal dated November 17, 2005, and the North Carolina Department of Transportation's (NCDOT's) Notice to Proceed dated November 22, 2005. Activities associated with the assessment consisted of collecting soil and groundwater samples for laboratory analysis, and reviewing applicable North Carolina Department of Environment and Natural Resources (NCDENR) records. The purpose of this report is to document the field activities, present the laboratory analyses, and provide recommendations regarding the property.

### **Location and Description**

The Jack Cherry Property is located at 5957 US 17 North in Old Ford, North Carolina. The property is situated on the west side of US 17 approximately 100 feet south of the intersection of US 17 and NC 171 (Figure 1). Based on information supplied by the NCDOT and the site visit, Earth Tech understands that the site is a residence where no underground storage tanks (USTs) or pump islands are in evidence. However, the adjoining property owner has alleged that the property was once used as a gas station "many years ago." The property consists of a two-story residential building with a gravel drive (Figure 2). Because of the unknown status of potential USTs, the NCDOT requested a Preliminary Site Assessment to evaluate the soils on the property.

Earth Tech reviewed the North Carolina Department of Environment and Natural Resources (NCDENR) Incident Management database and no incident number was listed for this location. Earth Tech also reviewed the UST registration database to evaluate if USTs were present at the location. No USTs were registered for this address.

### **Geophysical Survey**

Prior to Earth Tech's mobilization to the site, Schnabel Engineering conducted a geophysical survey to evaluate if USTs were present on the property. The geophysical survey consisted of an electromagnetic survey with a follow up with a ground penetrating radar (GPR) survey.

Several anomalies were detected in the geophysical survey. However, no anomaly was attributed to possible USTs. The locations of the borings for the site assessment were based on this information. A detailed report of the geophysical survey is presented in Attachment A.

### **Site Assessment Activities**

On December 20, 2005, Earth Tech mobilized to the site to conduct a Geoprobe<sup>®</sup> direct push investigation to evaluate soil conditions on the property. Continuous sampling using direct push technology (Regional Probing of Wake Forest, North Carolina) resulted in generally good recovery of soil samples from the direct-push holes. Soil samples were collected and contained in 4-foot long acetate sleeves inside the direct push sampler. Each of these sleeves was divided in half for soil sample screening. Each 2-foot interval was placed in a resealable plastic bag and the bag was set aside for a sufficient amount of time to allow volatilization of organic compounds from the soil to the bag headspace. The probe of a flame-ionization detector (FID) was inserted into the bag and the reading was recorded. After terminating the sample hole, the soil sample from the depth interval with the highest FID reading was submitted to Paradigm Analytical Laboratories, Inc., in Wilmington, North Carolina, using standard chain-of-custody procedures. The laboratory analyzed the soil samples for total petroleum hydrocarbons (TPH) using extraction methods 3550 (diesel range organics) and 5030 (gasoline range organics).

Although the geophysical survey did not detect USTs, a continuous geophysical line onto the adjacent property indicated the presence of possible USTs close to the property line. Six direct-push holes (CH-1 through CH-6) were advanced at the site to a depth of 4 feet as shown in Figure 2 and Attachment B. The borings were located to evaluate if the potential USTs on the adjacent property impacted the Cherry site (Attachment C). Borings CH-1 and CH-2 were located to evaluate the adjacent property potential UST anomaly. Borings CH-3 through CH-6 were located to assess the horizontal extent of the potential soil contamination as defined by the field screening readings. The lithology encountered by the direct-push samples generally was consistent throughout the site. The ground surface for the boring locations was covered with about 4 inches of topsoil or gravel. Below the surface treatment to a depth of 2 feet was a medium brown silty clay. From a depth of 2 to 4 feet, the soil consisted of a medium to dark brown silty sand. Groundwater was encountered in the initial boring at a depth of about 4 feet. As a result the remaining borings were terminated at a depth of 4

feet. Based on field screening, soil samples were submitted for laboratory analysis, which are summarized in Table 1.

The shallow groundwater depth suggests that any contamination present in the soil would impact the groundwater. To evaluate the groundwater conditions, a water sample was collected from boring CH-4 (Figure 2), which was in a location that appeared to be representative of subsurface conditions outside the impacted area associated with the possible UST on the adjacent property. The groundwater sample was collected using the direct-push equipment. The direct push probe was advanced into the groundwater and the screen exposed. The water sample was collected with a peristaltic sampling pump. After purging the well to reduce turbidity, the water sample was transferred directly into laboratory-supplied containers. The containers were placed on ice and transported to the laboratory for analysis of volatile organic compounds using EPA Method 6230D and semivolatile organic compounds using EPA Method 625.

### **Analytical Results**

Based on the soil laboratory reports, summarized in Table 1 and presented in Attachment D, petroleum hydrocarbon compounds were detected in four of the six soil samples collected from the site (Figure 3). The soil sample collected from boring CH-1 contained total petroleum hydrocarbons (TPH) identified as diesel fuel (DRO) at a concentration of 31.9 milligrams per kilogram (mg/kg); the soil sample collected from boring CH-2 contained DRO at a concentration of 24 mg/kg; the soil sample collected from boring CH-3 contained a DRO concentration of 24.7 mg/kg; and the soil sample collected from boring CH-4 contained a DRO concentration of 29.8 mg/kg. No TPH concentrations identified as gasoline (GRO) were detected in these soil samples. No TPH concentrations were detected in any of the remaining soil samples. According to the North Carolina Underground Storage Tank Section's Underground Storage Tank Closure Policy dated August 24, 1998, the action level for TPH analyses is 10 mg/kg for both gasoline and diesel fuel. However, that agency's "Guidelines for Assessment and Corrective Action," dated April 2001, does not allow for use of TPH analyses for confirmation of the extent of petroleum contamination or its cleanup. As a result, while TPH concentrations are no longer applicable in determining if soil contamination is present, this analysis is a legitimate screening tool. Based on the TPH action level for UST closures, the assumed action level for this report is 10 mg/kg for both DRO and GRO. The soil samples from borings CH-1, CH-2, CH-3, and CH-4 contained DRO concentrations above the 10 mg/kg assumed action level.

The laboratory reports for the groundwater, summarized in Table 2 and presented in Attachment D, indicate that several compounds were detected in the sample from boring CH-4. The compounds detected in the groundwater sample included volatile organic compounds. None of the compounds detected, which included xylenes, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, isopropyl ether, isopropylbenzene, and n-propylbenzene, were present at concentrations above their respective groundwater quality standards. However, a groundwater sample collected from the adjacent property (submitted to the NCDOT in a separate report) indicated the presence of benzene at a concentration of 15 µg/l, which is above the groundwater quality standard. As a result, groundwater

on the Cherry Property closer to the property line may contain benzene above the groundwater quality standards.

### Conclusions and Recommendations

A Preliminary Site Assessment was conducted to evaluate the Jack Cherry Property located at 5957 US 17 North in Old Ford, Beaufort County, North Carolina. Ten soil borings were advanced to evaluate the soil and groundwater conditions on the property. The laboratory reports of four of the six soil samples from these borings suggest that DRO concentrations are present above the assumed action level. One groundwater sample was collected for analysis. The analytical results of the groundwater sample (boring CH-4) indicated that no compounds were detected above the groundwater quality standards. Verifiable history of the site is insufficient to determine whether the soil contamination is from past activities on the site or from the USTs identified near the adjacent property line.

To evaluate the volume of soil requiring possible remediation, the soil samples with TPH concentrations above 10 mg/kg were considered. The analytical results of the soil samples suggest that the soil from borings CH-1, CH-2, CH-3, and CH-4 contained TPH concentrations above the assumed action level. A review of the field screening readings (Table 1) suggests that a maximum contaminated soil thickness of 4 feet (from ground surface to groundwater at 4 feet) is likely. The volume of potentially affected soil was estimated based on the 10 mg/kg isoconcentration contour shown on Figure 3. With a thickness of 4 feet, an average width of 45 feet, and a length of 80 feet, the estimated volume of contaminated soil is about 533 cubic yards. This volume is estimated from TPH analytical data, which are no longer valid for remediation of sites reported after January 2, 1998. After this date, MADEP EPH/VPH and EPA Method 8260/8270 analyses will likely be required to confirm cleanup. However, these analyses do not correlate exactly with TPH data and, as a result, the actual volume of contaminated soil may be higher or lower.

Earth Tech appreciates the opportunity to work with the NCDOT on this project. Because contamination was detected at the site, Earth Tech recommends that a copy of this report be submitted to the Division of Waste Management, UST Section, in the Washington Regional Office. If you have any questions, please contact me at (919)854-6238.

Sincerely,



Michael W. Branson, P.G.  
Project Manager

Attachments

c: Project File



**TABLE 1**  
**FIELD SCREENING AND ANALYTICAL RESULTS**  
**CHERRY PROPERTY**  
**OLD FORD, BEAUFORT COUNTY, NORTH CAROLINA**  
**NCDOT PROJECT NO. 9.689002T (R-967CA)**  
**EARTH TECH PROJECT NO. 90389**

LOCATION	DEPTH (m)	OVA READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	ACTION LEVEL (mg/kg)
CH-1	0 - 2	34			
	2 - 4	1592	CH-1	<b>DRO (31.9)</b> GRO (BQL)	10 10
CH-2	0 - 2	4.45			
	2 - 4	31	CH-2	<b>DRO (24)</b> GRO (BQL)	10 10
CH-3	0 - 2	2.83			
	2 - 4	3.03	CH-3	<b>DRO (24.7)</b> GRO (BQL)	10 10
CH-4	0 - 2	44			
	2 - 4	331	CH-4	<b>DRO (29.8)</b> GRO (BQL)	10 10
CH-5	0 - 2	28			
	2 - 4	443	CH-5	DRO (BQL) GRO (BQL)	10 10
CH-6	0 - 2	3.69			
	2 - 4	291	CH-6	DRO (BQL) GRO (BQL)	10 10

DRO - Diesel range organics  
GRO - Gasoline range organics  
BQL - Below quantitation limit.  
ppm - parts per million.  
mg/kg - milligrams per kilogram.

**BOLD** values are above the assumed action level.

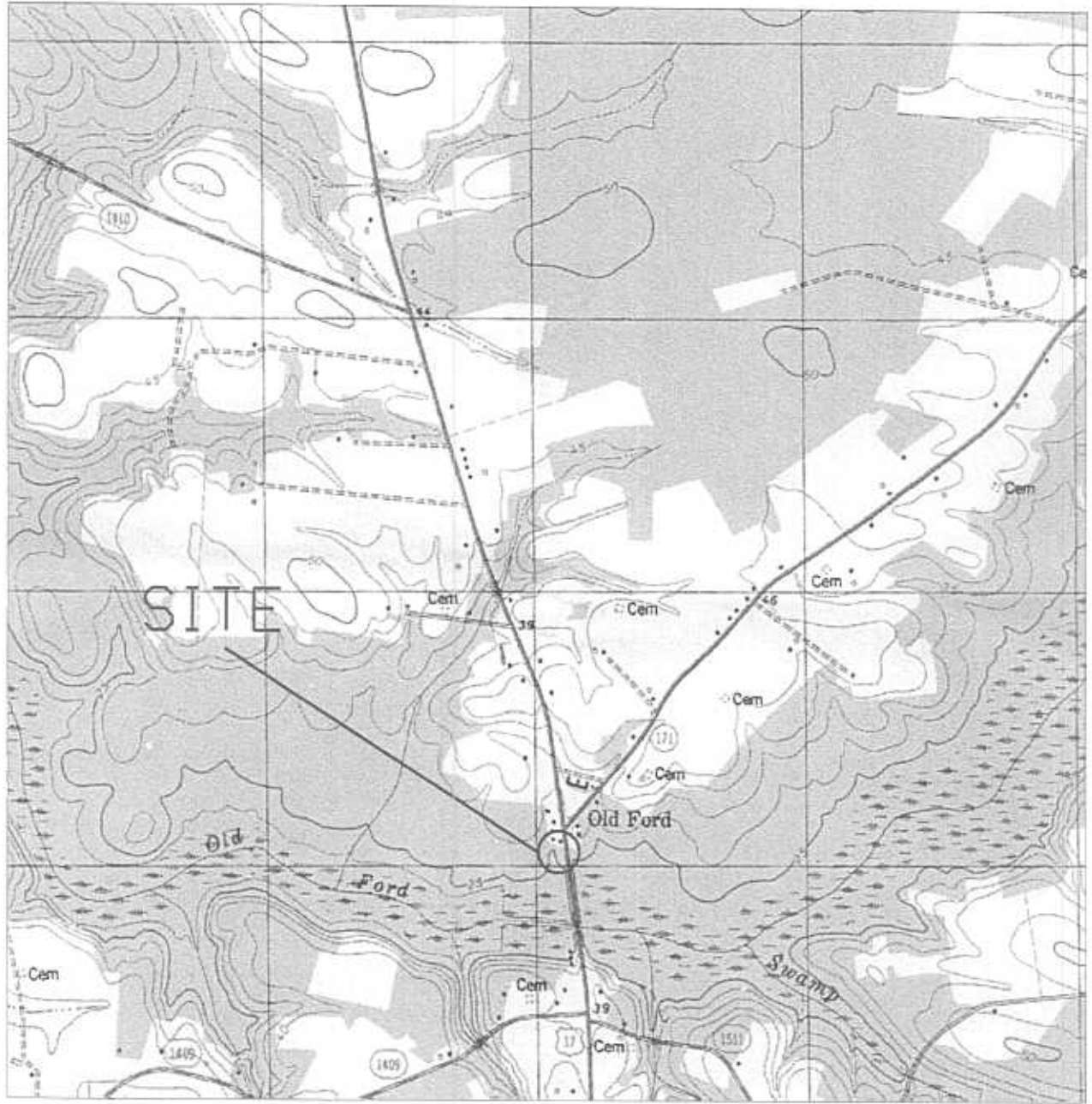
**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS**  
**CHERRY PROPERTY**  
**OLD FORD BEAUFORT COUNTY, NORTH CAROLINA**  
**NCDOT PROJECT NO. 9.689002T (R-967CA)**  
**EARTH TECH PROJECT NO. 90389**

COMPOUND	CONCENTRATION	GROUNDWATER QUALITY STANDARD
Benzene	<0.5	1
Toluene	<0.5	1000
Ethylbenzene	<0.5	550
Xylenes	<b>3.11</b>	530
MTBE	<0.5	200
n-Butylbenzene	<b>2.42</b>	70
sec-Butylbenzene	<b>3.09</b>	70
tert-Butylbenzene	<b>0.833</b>	70
1,3,5-Trimethylbenzene	<0.5	350
1,2,4-Trimethylbenzene	<0.5	350
Isopropyl ether	<b>0.772</b>	70
Isopropylbenzene	<b>5.02</b>	70
n-Propylbenzene	<b>2.68</b>	70
Phenol	<10	300
Naphthalene	<10	21

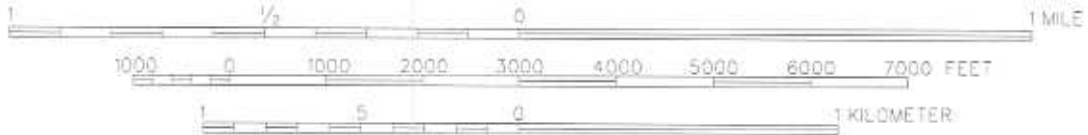
All concentrations expressed as micrograms per liter.

**BOLD** values are above the method detection limit.

**FIGURES**

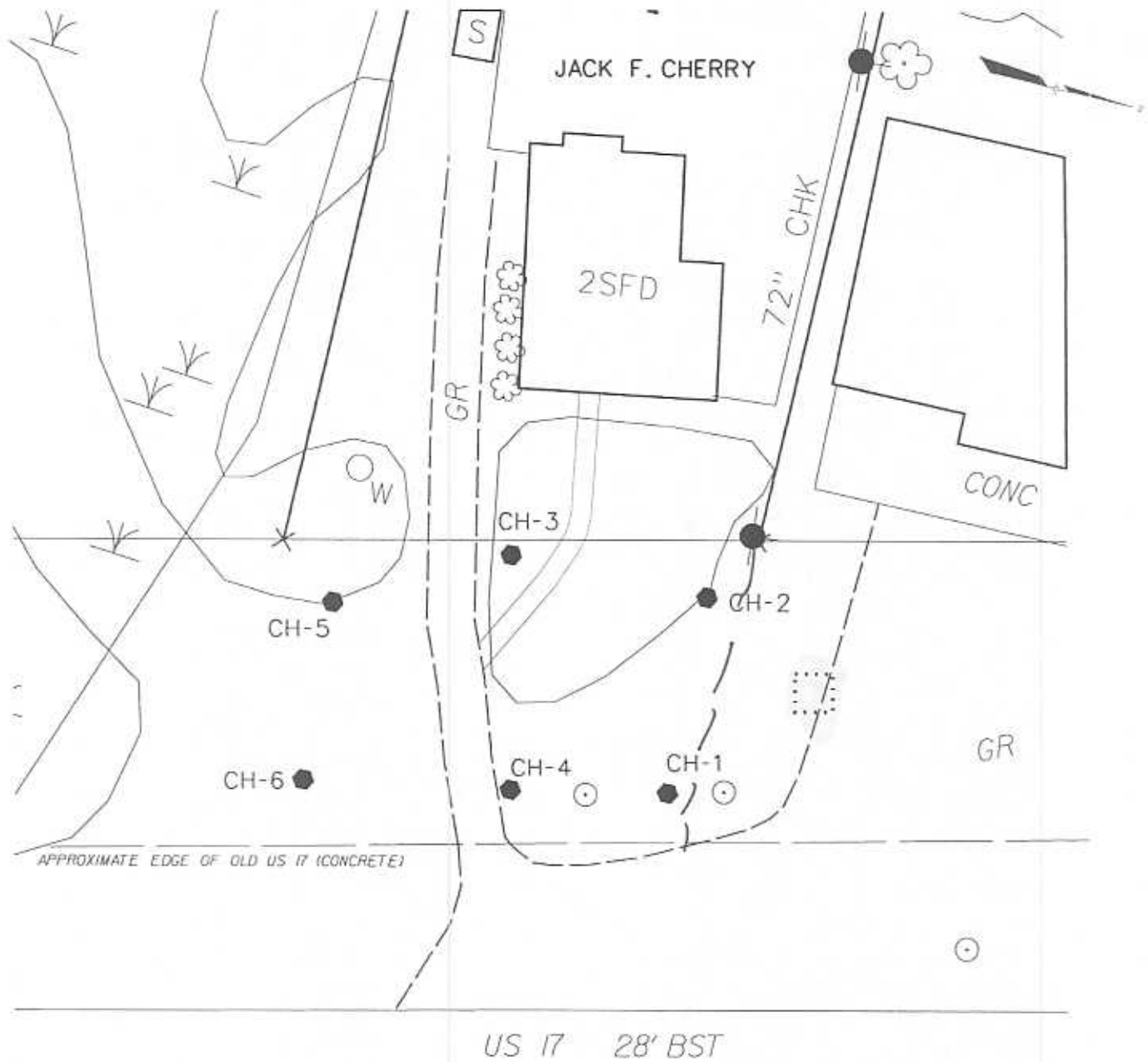


SCALE 1:24,000



SOURCE: U.S. GEOLOGICAL SURVEY 7.5 MIN QUADRANGLE: OLD FORD, NC (1979)

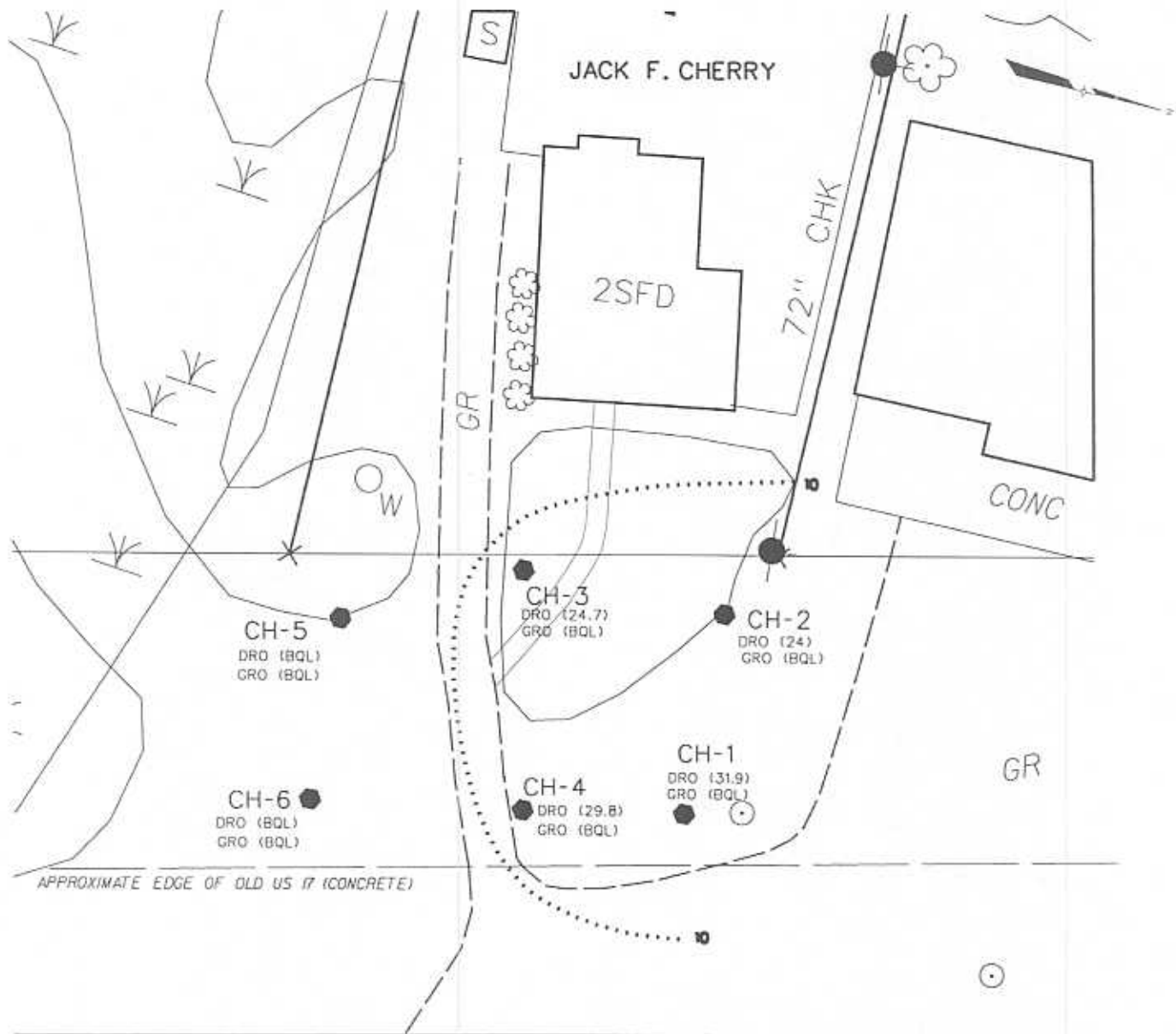




**LEGEND**

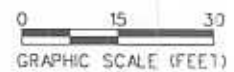
- CH-1 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- ⋯ APPROXIMATE LOCATION OF UST IDENTIFIED BY GEOPHYSICAL SURVEY ON ADJACENT PROPERTY





**LEGEND**

- CH-1 ● SOIL SAMPLE LOCATION AND IDENTIFICATION
- DRO (123) TPH AS DIESEL FUEL IN MG/KG
- GRO (123) TPH AS GASOLINE IN MG/KG
- BQL BELOW QUANTITATION LIMIT
- ● ISOCONCENTRATION CONTOUR IN MG/KG

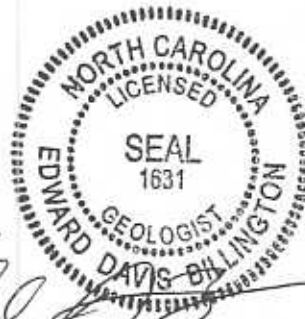


ATTACHMENT A

North Carolina Department of Transportation

**GEOPHYSICAL SURVEYS  
FOR RIGHT-OF-WAY PROPERTIES**

State Project R-2510C, WBS Element 34440.1.1  
US 17 from South of SR 1001 to North of NC 171  
Beaufort County, North Carolina



January 12, 2006  
Project Number 05210014.01-04



11-A Oak Branch Drive, Greensboro, North Carolina 27407  
Phone (336) 274-9456; Fax (336) 274-9486

## **1.0 INTRODUCTION**

The work described in this report was conducted by Schnabel Engineering under our contract with the NCDOT. The work was conducted at the locations indicated to support environmental assessment of the subject parcels. The purpose of the geophysical surveys was to locate possible metal underground storage tanks (UST's) and associated metal product lines in the accessible areas of the sites.

Schnabel Engineering conducted geophysical surveys on November 29 & 30 and December 1, 2, 13 & 14 2005, in the accessible areas of the proposed sections of the parcels owned by [REDACTED], Jack Cherry (5957 US 17 North), T [REDACTED]

Photographs of these properties and the UST'S markouts are included on Figures 1 and 2.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. The EM61 metal detector is used to locate metal objects buried up to about eight feet below ground surface. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were conducted using a Geophysical Survey Systems SIR-2000 system equipped with a 400 MHz antenna. A Fisher Gemini-3 was used in the conduction mode to trace exposed vent pipes and product lines. Photographs of these instruments are shown in Figure 3.

## **2.0 FIELD METHODOLOGY**

### **2.1 Location Control**

Locations of geophysical data points and site features were obtained using a sub-meter Trimble ProXRS DGPS system. References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in feet. The locations of existing site features (building, curbs, signs, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

## 2.2 Data Collection

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced one to two feet apart in two orthogonal directions over anomalous EM readings that did not appear to be caused by known metal objects. The GPR data were reviewed in the field to evaluate the possible presence of UST's. The GPR data also were recorded digitally and later transferred to a desktop computer for further review. The Gemini-3 was used in the conduction mode on some of the properties by grounding the transmitter and clamping it onto an exposed vent pipe or product line, and then tracing the location of the charged pipe out with the receiver.

Preliminary results were sent to Mike Branson of Earth Tech on December 16, 2005.

## 3.0 DISCUSSION OF RESULTS

The contoured EM61 data are shown on Figures 4 through 11. The EM61 early time gate results are plotted on Figures 4, 6, 8, and 10. The early time gate data provide the most sensitive detection of metal object targets, regardless of size. Figures 5, 7, 9, and 11 show the difference between the response of the top and bottom coils of the EM61 instrument (differential response). The difference is taken to remove the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as UST's.

[REDACTED] rty

[REDACTED] Sheppard is located on the west side of US 17 approximately

[REDACTED] EM61 results for

[REDACTED]

[REDACTED]

[REDACTED] provide anomalies caused by

[REDACTED]

### 3.2 Mowbray Lane

The Mowbray Lane is located on the west side of US 17. [REDACTED]

Geophysical data from the Mowbray Lane is shown in Figure 6 (early time gate) and Figure 7 (differential). [REDACTED]

The early time gate results show a number of small, isolated anomalies probably caused by relatively small, insignificant buried metal objects and a large linear anomaly apparently caused by a buried utility along Highway 17. Some of the observed anomalies not attributed to known cultural features are removed in the differential data set. GPR surveys were conducted to investigate four EM61 [REDACTED]

### 3.3 Jack Cherry Property

The parcel owned by Jack Cherry is located on the west side of US 17 at the NC 171 intersection in Oldford, NC. The EM61 results are shown on Figure 8 (early time gate) and Figure 9 (differential). The early time gate results show a number of small, isolated anomalies probably caused by relatively small, insignificant buried metal objects and a large linear anomaly apparently caused by a buried utility along Highway 17. Some of the observed anomalies not attributed to known cultural features are removed in the differential data set. GPR surveys were conducted to investigate four EM61

differential anomalies on the site. The GPR data did not indicate the presence of UST's in the areas surveyed.

[REDACTED]

T  
C  
S  
sc  
c  
a  
P  
[REDACTED]

3 [REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

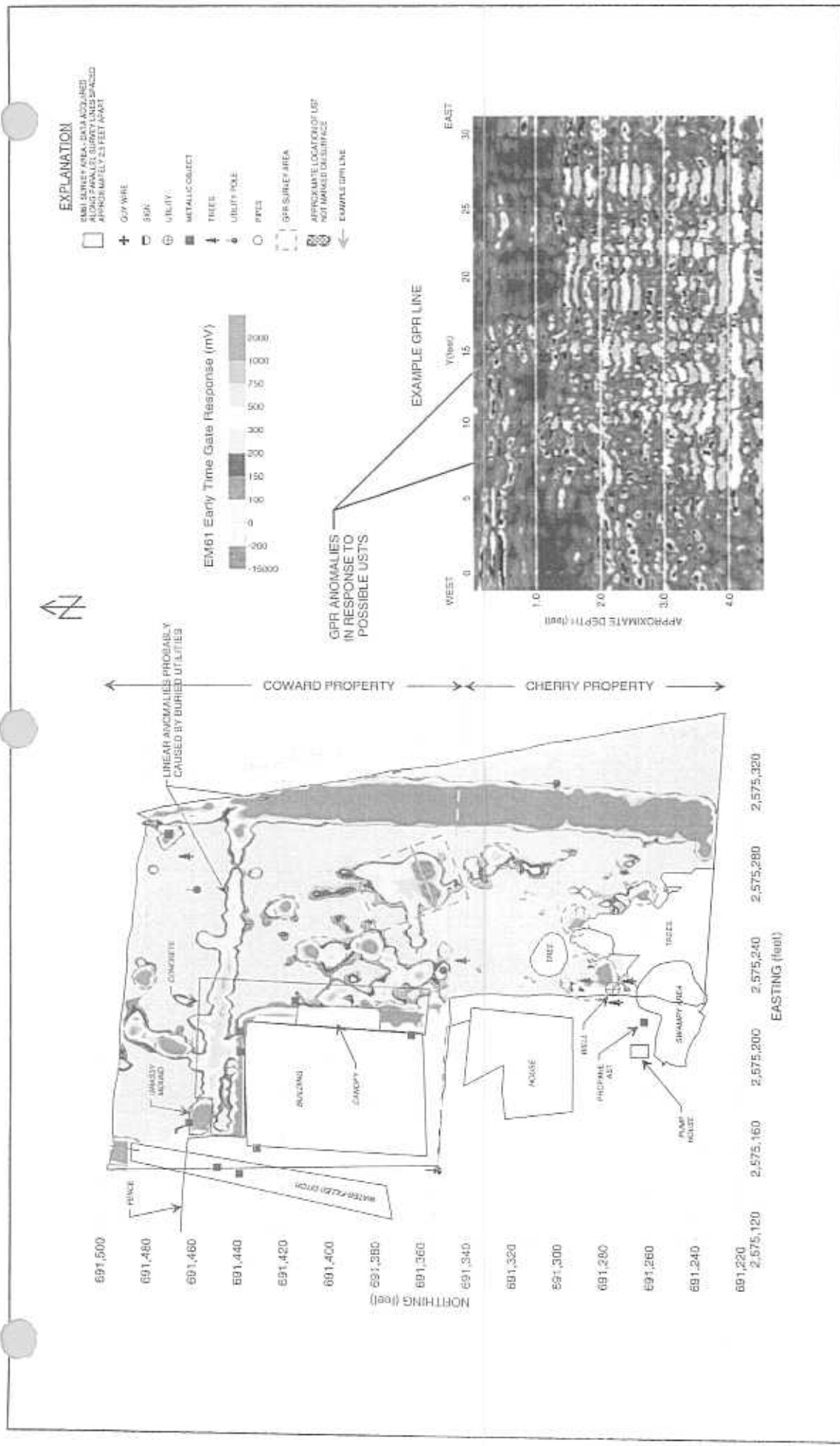
#### 4.0 CONCLUSIONS

Our evaluation of the geophysical data collected over the five parcels on State Project R-2510-C in Beaufort County, NC indicate the following:

- [REDACTED] low.
- [REDACTED] in [REDACTED] as.
- The [REDACTED] property [REDACTED] approximate [REDACTED]
- [REDACTED] to [REDACTED] C [REDACTED]
- The geophysical data do not indicate the presence of UST's in the areas surveyed on the [REDACTED] Cherry properties.

## 5.0 LIMITATIONS

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



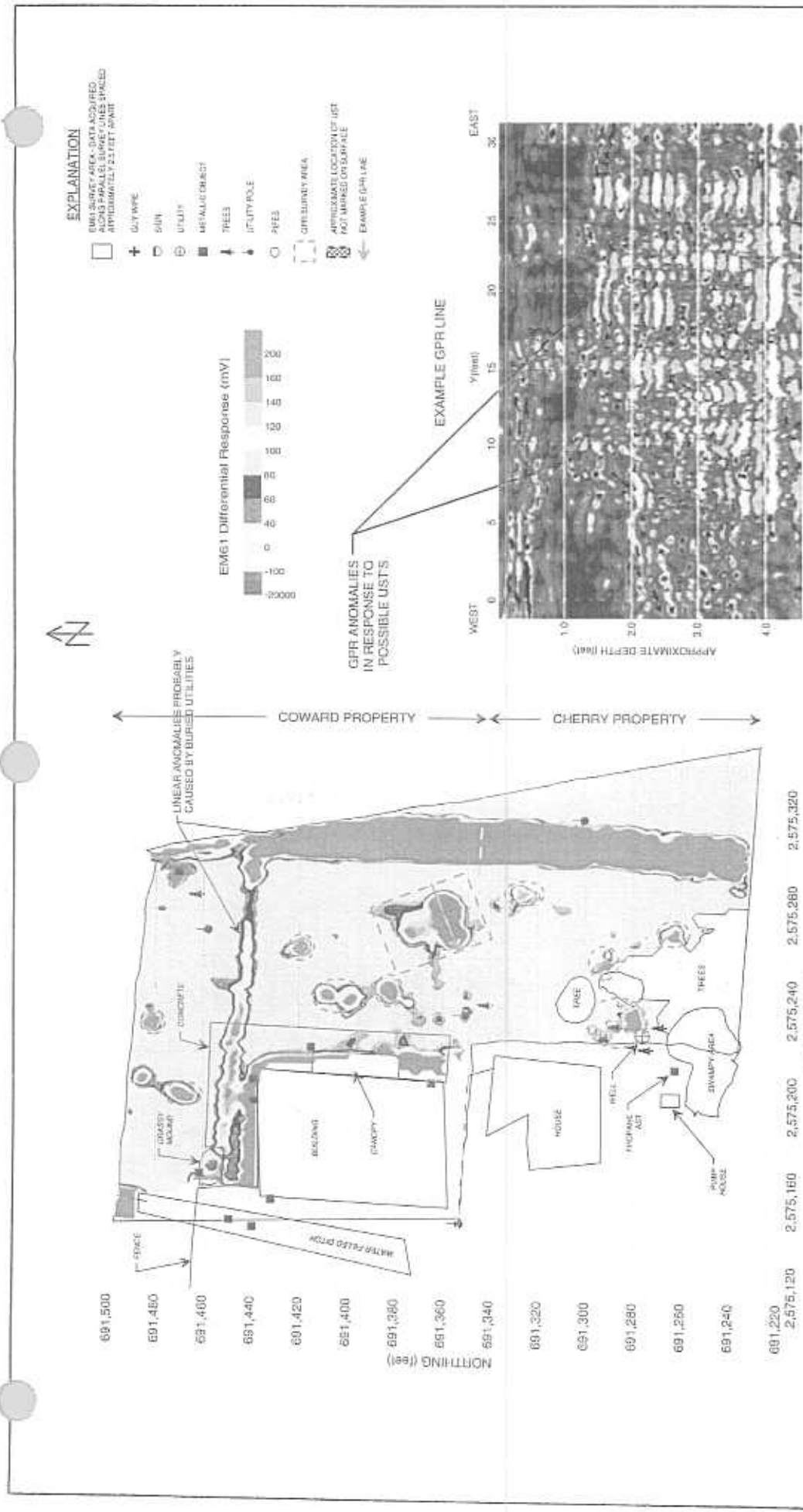
Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil channel in millivolts (mV). The EM data were collected on November 30 through December 2, 2005, using a Geonics EM61-MK2 instrument. Positioning for EM61 survey provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on December 13 & 14, 2005, using a Geophysical Survey Systems, Inc. SIR-2000 equipped with a 400 MHz antenna.

NC Department of Transportation  
Geotechnical Engineering Unit

Slats Project No. P-2510C  
Washington, North Carolina



**COWARD & CHERRY PROPERTIES EM61 EARLY TIME GATE RESPONSE WITH GPR IMAGE**      **FIGURE 6**



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as pipes and tanks. The EM data were collected on November 30 through December 2, 2005, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey provided using a Trimble ProXRS DGPS system. Coordinates are in the US State Plane System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on December 13 and 14, 2005, using a Geophysical Survey Systems, Inc. SIR-2000 equipped with a 400 MHz antenna.

**Schnabel**  
Schnabel Engineering

NC Department of Transportation  
Geotechnical Engineering Unit  
State Project No. R-2510C  
Washington, North Carolina

**COWARD & CHERRY  
PROPERTIES EM61  
DIFFERENTIAL RESPONSE  
WITH GPR IMAGE**

FIGURE 9

**ATTACHMENT B**

# TEST BORING REPORT

PROJECT WASHINGTON PSAs - CHERRY PROPERTY

BORING NUMBER CH-1

CLIENT NCDOT

PAGE 1

PROJECT NUMBER 90389

ELEVATION \_\_\_\_\_

CONTRACTOR REGIONAL PROBING

DATE 12/20/05

EQUIPMENT GEOPROBE

DRILLER OPPER

PREPARED BY BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	34				4" TOPSOIL, TAN SILTY SAND, DRY, NO ODOR.
	1,592				MEDIUM TO DARK BROWN SILTY SAND, MOIST, NO ODOR. SUBMIT TO LABORATORY FOR ANALYSIS.
5.0					GROUNDWATER AT 4 FEET. BORING TERMINATED AT 4 FEET.
10.0					
15.0					
20.0					

# TEST BORING REPORT

**PROJECT** WASHINGTON PSAs - CHERRY PROPERTY  
**CLIENT** NCDOT  
**PROJECT NUMBER** 90389  
**CONTRACTOR** REGIONAL PROBING  
**EQUIPMENT** GEOPROBE

**BORING NUMBER** CH-2  
**PAGE** 1  
**ELEVATION** \_\_\_\_\_  
**DATE** 12/20/05  
**DRILLER** OPPER  
**PREPARED BY** BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	4.45				4" TOPSOIL, MEDIUM BROWN SILTY CLAY, DRY, NO ODOR.  AS ABOVE, DRY TO MOIST, NO ODOR. SUBMIT FOR LABORATORY ANALYSIS.  BORING TERMINATED AT 4 FEET.
	31				
5.0					
10.0					
15.0					
20.0					

# TEST BORING REPORT

**PROJECT** WASHINGTON PSAs - CHERRY PROPERTY  
**CLIENT** NCDOT  
**PROJECT NUMBER** 90389  
**CONTRACTOR** REGIONAL PROBING  
**EQUIPMENT** GEOPROBE

**BORING NUMBER** CH-3  
**PAGE** 1  
**ELEVATION** \_\_\_\_\_  
**DATE** 12/20/05  
**DRILLER** OPPER  
**PREPARED BY** BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	2.83				4" TOPSOIL, MEDIUM BROWN SILTY CLAY, DRY TO MOIST, NO ODOR.
	3.03				MEDIUM TO DARK BROWN SILTY CLAY, MOIST, NO ODOR. SUBMIT TO LABORATORY FOR ANALYSIS.
5.0					BORING TERMINATED AT 4 FEET.
10.0					
15.0					
20.0					



# TEST BORING REPORT

**PROJECT** WASHINGTON PSAs - CHERRY PROPERTY  
**CLIENT** NCDOT  
**PROJECT NUMBER** 90389  
**CONTRACTOR** REGIONAL PROBING  
**EQUIPMENT** GEOPROBE

**BORING NUMBER** CH-4  
**PAGE** 1  
**ELEVATION** \_\_\_\_\_  
**DATE** 12/20/05  
**DRILLER** OPPER  
**PREPARED BY** BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	44				4" TOPSOIL, MEDIUM TO DARK BROWN SILT/CLAY FILL, DRY, NO ODOR.  AS ABOVE, MOIST, NO ODOR. SUBMIT FOR LABORATORY ANALYSIS.  BORING TERMINATED AT 4 FEET.
	331				
5.0					
10.0					
15.0					
20.0					

# TEST BORING REPORT

**PROJECT** WASHINGTON PSAs - CHERRY PROPERTY  
**CLIENT** NCDOT  
**PROJECT NUMBER** 90389  
**CONTRACTOR** REGIONAL PROBING  
**EQUIPMENT** GEOPROBE

**BORING NUMBER** CH-5  
**PAGE** 1  
**ELEVATION** \_\_\_\_\_  
**DATE** 12/20/05  
**DRILLER** OPPER  
**PREPARED BY** BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	28				4" TOPSOIL, OLIVE BROWN MEDIUM- TO COARSE-GRAINED SAND, DRY TO MOIST, NO ODOR.  AS ABOVE, MOIST, NO ODOR. SUBMIT FOR LABORATORY ANALYSIS.  BORING TERMINATED AT 4 FEET.
	443				
5.0					
10.0					
15.0					
20.0					

# TEST BORING REPORT

**PROJECT** WASHINGTON PSAs - CHERRY PROPERTY  
**CLIENT** NCDOT  
**PROJECT NUMBER** 90389  
**CONTRACTOR** REGIONAL PROBING  
**EQUIPMENT** GEOPROBE

**BORING NUMBER** CH-6  
**PAGE** 1  
**ELEVATION** \_\_\_\_\_  
**DATE** 12/20/05  
**DRILLER** OPPER  
**PREPARED BY** BRANSON

DEPTH IN FEET	OVA (ppm)	BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	3.69				4" TOPSOIL, MULTICOLORED SAND/CLAY FILL, DRY, NO ODOR.  MEDIUM TO DARK GRAY MEDIUM-GRAINED SAND, MOIST, NO ODOR. SUBMIT TO LABORATORY FOR ANALYSIS.  BORING TERMINATED AT 4 FEET.
	291				
5.0					
10.0					
15.0					
20.0					

ATTACHMENT C





**ATTACHMENT D**

PARADIGM ANALYTICAL LABORATORIES, INC.

5500 Business Drive  
Wilmington, North Carolina 28405  
(910) 350-1903  
Fax (910) 350-1557

Mr. Mike Branson  
Earth Tech  
701 Corporate Dr. Suite 475  
Raleigh NC 27607

Report Number: G204-503

Client Project: NCDOT-Cherry

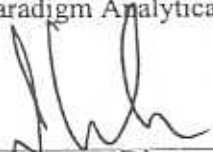
Dear Mr. Branson:

Enclosed are the results of the analytical services performed under the referenced project. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or the services performed during this project, please call Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,  
Paradigm Analytical Laboratories, Inc.

  
\_\_\_\_\_  
Laboratory Director  
J. Patrick Weaver

1/6/06  
\_\_\_\_\_  
Date



PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: CH-1  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-1  
Lab Project ID: G204-503  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 12/20/05 15:00  
Date Received: 12/22/05  
Matrix: Soil  
Solids 87.82

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.83	5030	1	12/29/05
Diesel Range Organics	31.9	6.82	3545	1	12/29/05

Reviewed By:       
TPH\_LIMS\_v1 82.XLS2 of 13

**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: CH-2  
 Client Project ID: NCDOT-Cherry  
 Lab Sample ID: G204-503-2  
 Lab Project ID: G204-503  
 Report Basis: Dry Weight

Analyzed By: MJC  
 Date Collected: 12/20/05 15:10  
 Date Received: 12/22/05  
 Matrix: Soil  
 Solids 80.72

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.43	5030	1	12/29/05
Diesel Range Organics	24	7.42	3545	1	12/29/05

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: CH-3  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-3  
Lab Project ID: G204-503  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 12/20/05 15:20  
Date Received: 12/22/05  
Matrix: Soil  
Solids 74.26

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	8.08	5030	1	12/29/05
Diesel Range Organics	24.7	7.97	3545	1	12/29/05

Reviewed By:             
TPH\_LIMS\_v1.82.XLS4 of 13

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: CH-4  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-4  
Lab Project ID: G204-503  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 12/20/05 15:30  
Date Received: 12/22/05  
Matrix: Soil  
Solids 80.31

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.47	5030	1	12/29/05
Diesel Range Organics	29.8	7.53	3545	1	12/29/05

Reviewed By: RJP  
TPH\_LIMS\_v1 82.XLS5 of 13

**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: CH-5  
 Client Project ID: NCDOT-Cherry  
 Lab Sample ID: G204-503-5  
 Lab Project ID: G204-503  
 Report Basis: Dry Weight

Analyzed By: MJC  
 Date Collected: 12/20/05 15:40  
 Date Received: 12/22/05  
 Matrix: Soil  
 Solids 83.91

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.15	5030	1	12/29/05
Diesel Range Organics	BQL	6.87	3545	1	12/29/05

Reviewed By: RTM  
 TPH\_LIMS\_v1.62.XLS 6 of 13

**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: CH-6  
 Client Project ID: NCDOT-Cherry  
 Lab Sample ID: G204-503-6  
 Lab Project ID: G204-503  
 Report Basis: Dry Weight

Analyzed By: MJC  
 Date Collected: 12/20/05 15:50  
 Date Received: 12/22/05  
 Matrix: Soil  
 Solids 85.03

Analyte	Result MG/KG	Report Limit MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.06	5030	1	12/29/05
Diesel Range Organics	BQL	7.22	3545	1	12/29/05

Reviewed By:       
 TPH\_LIMS\_v1 82.XLS7 of 13

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles

by GC 6230D

Client Sample ID: CH-4-GW  
 Client Project ID: NCDOT-Cherry  
 Lab Sample ID: G204-503-7A  
 Lab Project ID: G204-503

Analyzed By: MJC  
 Date Collected: 12/20/05 16:00  
 Date Received: 12/22/05  
 Matrix: Water

Analyte	Result ug/L	RL ug/L	Dilution Factor	Date Analyzed
Benzene	BQL	0.500	1	12/23/05
Bromobenzene	BQL	0.500	1	12/23/05
Bromochloromethane	BQL	0.500	1	12/23/05
Bromodichloromethane	BQL	0.500	1	12/23/05
Bromoform	BQL	0.500	1	12/23/05
Bromomethane	BQL	0.500	1	12/23/05
n-Butylbenzene	2.42	0.500	1	12/23/05
sec-Butylbenzene	3.09	0.500	1	12/23/05
tert-Butylbenzene	0.833	0.500	1	12/23/05
Carbon tetrachloride	BQL	0.500	1	12/23/05
Chlorobenzene	BQL	0.500	1	12/23/05
Chloroethane	BQL	0.500	1	12/23/05
Chloroform	BQL	0.500	1	12/23/05
Chloromethane	BQL	0.500	1	12/23/05
2-Chlorotoluene	BQL	0.500	1	12/23/05
4-Chlorotoluene	BQL	0.500	1	12/23/05
Dibromochloromethane	BQL	0.500	1	12/23/05
1,2-Dibromo-3-chloropropane	BQL	0.500	1	12/23/05
1,2-Dibromoethane (EDB)	BQL	0.500	1	12/23/05
Dibromomethane	BQL	0.500	1	12/23/05
1,2-Dichlorobenzene	BQL	0.500	1	12/23/05
1,3-Dichlorobenzene	BQL	0.500	1	12/23/05
1,4-Dichlorobenzene	BQL	0.500	1	12/23/05
Dichlorodifluoromethane	BQL	0.500	1	12/23/05
1,1-Dichloroethane	BQL	0.500	1	12/23/05
1,2-Dichloroethane	BQL	0.500	1	12/23/05
1,1-Dichloroethene	BQL	0.500	1	12/23/05
cis-1,2-Dichloroethene	BQL	0.500	1	12/23/05
trans-1,2-Dichloroethene	BQL	0.500	1	12/23/05
1,2-Dichloropropane	BQL	0.500	1	12/23/05
2,2-Dichloropropane	BQL	0.500	1	12/23/05
cis-1,3-Dichloropropene	BQL	0.500	1	12/23/05
trans-1,3-Dichloropropene	BQL	0.500	1	12/23/05
Diisopropyl ether (DIPE)	0.772	0.500	1	12/23/05
Ethylbenzene	BQL	0.500	1	12/23/05
Hexachlorobutadiene	BQL	0.500	1	12/23/05
Isopropylbenzene	5.02	0.500	1	12/23/05
p-Isopropyltoluene	BQL	0.500	1	12/23/05
Methyl-tert butyl ether (MTBE)	BQL	0.500	1	12/23/05

Reviewed By: RTV  
 GC\_LIMS\_v2.0.XLS

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Volatiles  
by GC 6230D

Client Sample ID: CH-4-GW  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-7A  
Lab Project ID: G204-503

Analyzed By: MJC  
Date Collected: 12/20/05 16:00  
Date Received: 12/22/05  
Matrix: Water

Analyte	Result ug/L	RL ug/L	Dilution Factor	Date Analyzed
Methylene Chloride	BQL	5.00	1	12/23/05
Naphthalene	BQL	0.500	1	12/23/05
n-Propylbenzene	2.68	0.500	1	12/23/05
Styrene	BQL	1.00	1	12/23/05
1,1,1,2-Tetrachloroethane	BQL	0.500	1	12/23/05
1,1,2,2-Tetrachloroethane	BQL	0.500	1	12/23/05
Tetrachloroethene	BQL	0.500	1	12/23/05
Toluene	BQL	0.500	1	12/23/05
1,2,3-Trichlorobenzene	BQL	0.500	1	12/23/05
1,2,4-Trichlorobenzene	BQL	0.500	1	12/23/05
1,1,1-Trichloroethane	BQL	0.500	1	12/23/05
1,1,2-Trichloroethane	BQL	0.500	1	12/23/05
Trichloroethene	BQL	0.500	1	12/23/05
Trichlorofluoromethane	BQL	0.500	1	12/23/05
1,2,3-Trichloropropane	BQL	0.500	1	12/23/05
1,2,4-Trimethylbenzene	BQL	0.500	1	12/23/05
1,3,5-Trimethylbenzene	BQL	0.500	1	12/23/05
Vinyl Chloride	BQL	0.500	1	12/23/05
m/p-Xylene	3.11	1.00	1	12/23/05
o-Xylene	BQL	1.00	1	12/23/05

Surrogate Spike Recoveries

	Spike Added	Spike Result	Percent Recovery
Trifluorotoluene	40	39.4	98.6
1,4-Dichlorobutane	40	42.6	107

Comments:

All values corrected for dilution.  
BQL = Below quantitation limit.

Reviewed By:           
GC\_LIMS\_v2.0.XLS 9 of 13



PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles  
by GCMS 625

Client Sample ID: CH-4-GW  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-7E  
Lab Project ID: G204-503

Analyzed By: MRC  
Date Collected: 12/20/2005 16:00  
Date Received: 12/22/2005  
Date Extracted: 12/27/2005  
Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	Dilution Factor	Date Analyzed
Acenaphthene	BQL	10.0	1	12/30/2005
Acenaphthylene	BQL	10.0	1	12/30/2005
Anthracene	BQL	10.0	1	12/30/2005
Benzo[a]anthracene	BQL	10.0	1	12/30/2005
Benzo[a]pyrene	BQL	10.0	1	12/30/2005
Benzo[b]fluoranthene	BQL	10.0	1	12/30/2005
Benzo[g,h,i]perylene	BQL	10.0	1	12/30/2005
Benzo[k]fluoranthene	BQL	10.0	1	12/30/2005
Bis(2-chloroethoxy)methane	BQL	10.0	1	12/30/2005
Bis(2-chloroethyl)ether	BQL	10.0	1	12/30/2005
Bis(2-chloroisopropyl)ether	BQL	10.0	1	12/30/2005
Bis(2-ethylhexyl)phthalate	BQL	10.0	1	12/30/2005
4-bromophenyl phenyl ether	BQL	10.0	1	12/30/2005
Butylbenzylphthalate	BQL	10.0	1	12/30/2005
2-Chloronaphthalene	BQL	10.0	1	12/30/2005
2-Chlorophenol	BQL	10.0	1	12/30/2005
4-Chloro-3-methylphenol	BQL	10.0	1	12/30/2005
4-Chlorophenyl phenyl ether	BQL	10.0	1	12/30/2005
Chrysene	BQL	10.0	1	12/30/2005
Dibenzo[a,h]anthracene	BQL	10.0	1	12/30/2005
Di-n-Butylphthalate	BQL	10.0	1	12/30/2005
1,2-Dichlorobenzene	BQL	10.0	1	12/30/2005
1,3-Dichlorobenzene	BQL	10.0	1	12/30/2005
1,4-Dichlorobenzene	BQL	10.0	1	12/30/2005
3,3'-Dichlorobenzidine	BQL	20.0	1	12/30/2005
2,4-Dichlorophenol	BQL	10.0	1	12/30/2005
Diethylphthalate	BQL	10.0	1	12/30/2005
Dimethylphthalate	BQL	10.0	1	12/30/2005
2,4-Dimethylphenol	BQL	10.0	1	12/30/2005
Di-n-octylphthalate	BQL	10.0	1	12/30/2005
4,6-Dinitro-2-methylphenol	BQL	50.0	1	12/30/2005
2,4-Dinitrophenol	BQL	50.0	1	12/30/2005
2,4-Dinitrotoluene	BQL	10.0	1	12/30/2005
2,6-Dinitrotoluene	BQL	10.0	1	12/30/2005
Diphenylamine *	BQL	10.0	1	12/30/2005
Fluoranthene	BQL	10.0	1	12/30/2005
Fluorene	BQL	10.0	1	12/30/2005
Hexachlorobenzene	BQL	10.0	1	12/30/2005
Hexachlorobutadiene	BQL	10.0	1	12/30/2005
Hexachlorocyclopentadiene	BQL	20.0	1	12/30/2005
Hexachloroethane	BQL	10.0	1	12/30/2005
Indeno(1,2,3-c,d)pyrene	BQL	10.0	1	12/30/2005

PARADIGM ANALYTICAL LABORATORIES, INC.

Results for Semivolatiles  
by GCMS 625

Client Sample ID: CH-4-GW  
Client Project ID: NCDOT-Cherry  
Lab Sample ID: G204-503-7E  
Lab Project ID: G204-503

Analyzed By: MRC  
Date Collected: 12/20/2005 16:00  
Date Received: 12/22/2005  
Date Extracted: 12/27/2005  
Matrix: Water

Compound	Result ug/L	Quantitation Limit ug/L	Dilution Factor	Date Analyzed
Isophorone	BQL	10.0	1	12/30/2005
Naphthalene	BQL	10.0	1	12/30/2005
Nitrobenzene	BQL	10.0	1	12/30/2005
2-Nitrophenol	BQL	10.0	1	12/30/2005
4-Nitrophenol	BQL	50.0	1	12/30/2005
N-Nitrosodi-n-propylamine	BQL	10.0	1	12/30/2005
Pentachlorophenol	BQL	50.0	1	12/30/2005
Phenanthrene	BQL	10.0	1	12/30/2005
Phenol	BQL	10.0	1	12/30/2005
Pyrene	BQL	10.0	1	12/30/2005
1,2,4-Trichlorobenzene	BQL	10.0	1	12/30/2005
2,4,6-Trichlorophenol	BQL	10.0	1	12/30/2005

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	7.2	72
2-Fluorophenol	10	6.9	69
Nitrobenzene-d5	10	7.1	71
Phenol-d6	10	7.1	71
2,4,6-Tribromophenol	10	7.7	77
4-Terphenyl-d14	10	8.6	86

Comments:

\* N-Nitrosodiphenylamine is reported as the breakdown product Diphenylamine.

Flags:

BQL = Below Quantitation Limits.

Reviewed By:

List of Reporting Abbreviations  
and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation Limit

DF = Dilution Factor

Dup = Duplicate

D = Detected, but RPD is > 40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL = Reporting Limit

RPD = Relative Percent Difference

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% solids = Percent Solids

Special Notes:

- 1) Metals and mercury samples are digested with a hot block, see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

Client: EMERY TEST Project ID: NC01-CHERRY Date: 12/20/05 Report To: MICHAEL BARTON

Address: 701 COPPOCK CIRCLE DR. CONTACT: MICE BARTON Turnaround: 57400000

Address: 54th 475 Phone: 9198546238 Job Number: 90389

Quote #: Raleigh NC 27607 Fax: 9198546259 P.O. Number: 4185# 34440.1.1 Invoice To: EMERY TEST

Sample ID	Date	Time	Matrix	Preservatives		Analyses		Comments: Please specify any special reporting requirements
CH-1	12/20/05	1500	Soil					
CH-2	}	1510	Soil					G204-503
CH-3		1520	Soil					
CH-4		1530	Soil					
CH-5		1540	Soil					
CH-6		1550	Soil					
CH-4-GAL		1600	Water					INVOICE AFTER USE BARTON PO
Relinquished By	Date	Time	Received By	Date	Time	Temperature	State Certification Requested	
<u>M Barton</u>	<u>12/21/05</u>	<u>1700</u>	<u>Michael Barton</u>	<u>12/21/05</u>	<u>1330</u>	<u>28°C, 5.8°C, 36°C</u>	NC <u>X</u> SC <u>X</u> Other <u>    </u>	

ORIGINAL

SEE REVERSE FOR TERMS AND CONDITIONS