

# **REPORT OF PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT**

**LOUISE CRUMBLEY PROPERTY, PARCEL # 905  
STATE PROJECT U-5132, TIP NO. 45155.1.1  
1551 LEJEUNE BOULEVARD  
JACKSONVILLE, NORTH CAROLINA**

Prepared for:

**North Carolina Department of Transportation  
Professional Services Management Unit  
1592 Mail Service Center  
Raleigh, North Carolina 27699**

Prepared by:

**MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina 27604**

**MACTEC Project No. 6470-10-0207**

**October 29, 2010**





engineering and constructing a better tomorrow

October 29, 2010

Mr. Cathy Houser, P.E.  
NCDOT Professional Services Management Unit  
1592 Mail Service Center  
Raleigh, North Carolina 27699

Subject: **Report of Preliminary Environmental Site Assessment  
Louise Crumbley Property, Parcel #905  
State Project U-5132, Tip No. 45155.1.1  
1551 Lejeune Boulevard  
Jacksonville, North Carolina  
MACTEC Project No. 6470-10-0207**

Dear Ms. Houser:

As authorized by your acceptance of MACTEC Proposal No. PROP 10-RAL-385 dated September 10, 2010, MACTEC Engineering and Consulting, Inc. (MACTEC) is pleased to submit the attached Report of Preliminary Environmental Site Assessment for the above-referenced site.

This report is intended for the use of NCDOT subject to contractual terms between NCDOT and MACTEC. Reliance on this document by any other party is not allowed without the expressed, written consent of MACTEC. Use of this report for purposes beyond those reasonably intended by NCDOT and MACTEC will be at the sole risk of the user.

This report presents project information and assessment activities conducted, along with our findings, conclusions and recommendations. We appreciate your selection of MACTEC for this project and look forward to assisting you further on this and other projects. If you have any questions, please do not hesitate to contact us.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

Matthew J. Gillis  
Staff Scientist

Robert M. Miller, P.E.  
Senior Project Manager/Principal Engineer



10-29-10

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## **1.0 INTRODUCTION**

MACTEC Engineering and Consulting, Inc. (MACTEC) was contracted by North Carolina Department of Transportation (NCDOT) to perform a Preliminary Environmental Site Assessment of the property owned by Louise Crumbley located at 1551 Lejeune Boulevard in Jacksonville, Onslow County, North Carolina (Figure 1). This property was one of two sites that were investigated by MACTEC in conjunction with State Project U-5132. MACTEC understands that NCDOT is planning road improvements to the area. The entire property is being acquired by NCDOT for this project. NCDOT requested that MACTEC assess the subject site to evaluate the extent (if any) of soil contamination related to activity (past or present) at this location and the impact (if any) on the proposed road improvements. This report presents MACTEC's assessment activities, findings, conclusions and recommendations.

### **1.1 Site Location**

The Louise Crumbley (Crumbley) property is located at 1551 Lejeune Boulevard in Jacksonville, Onslow County, North Carolina. The site consists of approximately 3.75 acres of land and is developed as Chico's New and Used Tires. The Onslow County Geographic Information Services (GIS) identifies the site as parcel identification number (PIN) 438610365121. The site is bound to the north by wooded, undeveloped land and railroad tracks; to the east by wooded, undeveloped land and railroad tracks, across which is a single-family residence; to the south by Lejeune Boulevard, across which is wooded, undeveloped land; and to the west by the Ronnie Henderson Property Parcel #906 and wooded, undeveloped land (Figure 2).

### **1.2 Background Information**

The Crumbley property building is 1,450 square feet in area and is constructed with a concrete slab foundation and concrete block exterior. MACTEC observed a storage garage and a canopy area used to store tires. The asphalt parking lot provides access to Lejeune Boulevard. MACTEC observed a gas station canopy and three former dispenser islands to the east of the building.

During performance of another project, MACTEC learned that the North Carolina Department of Environment and Natural Resources (NCDENR) has identified this parcel as a site with existing groundwater contamination and has rated this site as a "Low" priority, indicating that known contamination is unlikely to impact off-site concerns.

## 2.0 ASSESSMENT ACTIVITIES

Prior to field activities, MACTEC prepared a site health and safety plan in accordance with OSHA 1910.120 requirements. MACTEC contacted ULOCO and contracted Priority Underground Locating to mark the locations of underground utilities at the site. NCDOT contracted with Schnabel Engineering (Schnabel) to perform a geophysical survey to identify suspected USTs on the property and to identify buried utilities at the site. Schnabel provided paint mark outs of buried utilities and suspected UST locations to MACTEC prior to our assessment activities. Schnabel did not identify anomalies that may be USTs. Schnabel's Geophysics Report is included in Appendix A.

### 2.1 Soil Assessment

On September 20, 2010, Troxler Geologic Services, Inc. (Troxler), under contract to MACTEC, advanced 14 soil borings (Nos. SB-1 through SB-14) at the subject site using a Geoprobe™ direct-push technology. Soil boring locations were selected based on the results of the geophysical investigation and field observations. Figure 2 shows a site layout and the locations of the soil borings. Coordinates of the soil boring locations were recorded using a hand-held GPS.

MACTEC collected soil samples from each boring using the procedures outlined in Appendix B. Copies of soil boring records are included in Appendix C.

MACTEC instructed Troxler to advance each soil boring to approximately eight feet below ground surface (bgs), due to the shallow groundwater table. MACTEC screened soil samples from each boring at one-foot intervals for volatile organic vapors using a photoionization detector (PID) and selected one soil sample from each boring for laboratory testing. MACTEC selected the soil sample that exhibited the highest PID measurement or the deepest, unsaturated soil sample if the PID did not detect organic vapors. Soil borings SB-1 through SB-14 were backfilled with the excess soil cuttings and bentonite chips.

### 2.2 Soil Analysis

MACTEC submitted the soil samples to SGS North America, Inc. (SGS) of Wilmington, North Carolina for analysis for total petroleum hydrocarbons (TPH) diesel range organics (DRO) according to EPA Preparation/Test Methods 3550/8015, and TPH gasoline range organics (GRO) according to EPA Preparation/Testing Methods 5035/8015.

## 3.0 LABORATORY RESULTS

The laboratory test results are summarized on Table 1. The laboratory test reports and chain-of-custody records are included in Appendix D.

### 3.1 Soil Sample Analytical Results

The laboratory detected TPH DRO in the soil samples collected from soil borings SB-4, SB-8, and SB-9 at concentrations that exceed NCDENR's Action Level of 10 mg/Kg. The laboratory detected TPH GRO in the soil samples collected from soil borings SB-8 and SB-9 at concentrations that exceed the NCDENR Action Level of 10 mg/Kg.

#### **4.0 CONCLUSIONS AND RECOMMENDATIONS**

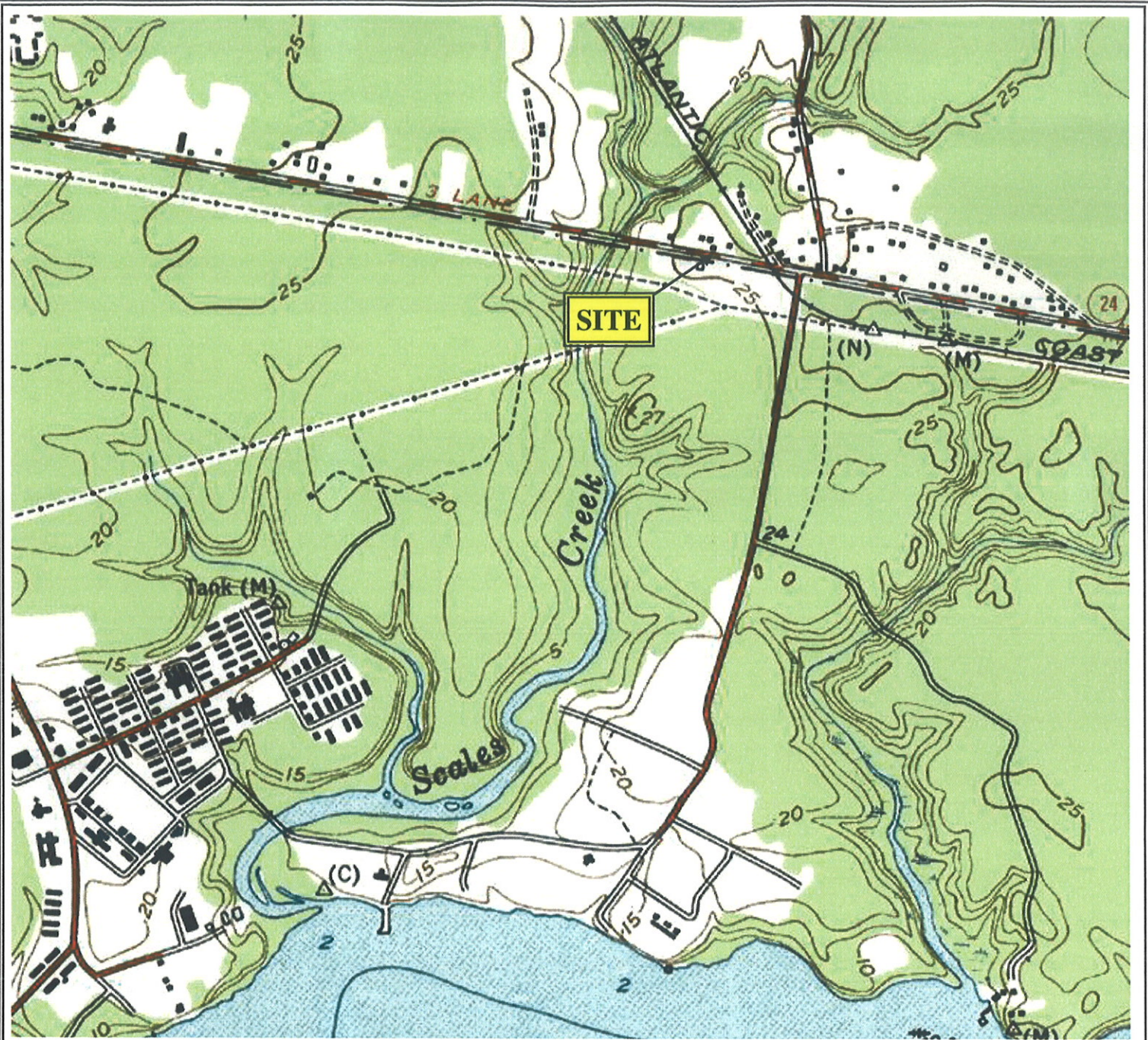
Based on the Preliminary Environmental Site Assessment, MACTEC offers the following conclusions and recommendations:

- The laboratory detected TPH DRO in three soil samples (SB-4, SB-8 and SB-9) and TPH GRO in two soil samples (SB-8 and SB-9) at concentrations which exceed NCDENR's Action Level of 10 mg/Kg.
- If the impacted soil at the location of SB-4 extends up to five feet horizontally in all directions and five feet vertically from the boring location, an estimated total of 15 cubic yards of impacted soil is present at this location. Figure 2 shows the extent of impacted soil.
- Soil borings SB-8 and SB-9 are contiguous. If all soil between these borings is considered impacted to a depth of five vertical feet, and for a width of five feet on either side of the boring extending five feet beyond each boring, a total of approximately 47 cubic yards of soil is impacted in this area. Figure 2 shows the extent of impacted soil.
- The presence of TPH is evidence of a release of petroleum. MACTEC recommends notifying the property owner of this finding, who should then report this evidence to the Wilmington Regional Office of NCDENR.

#### **5.0 QUALIFICATIONS**

This assessment was performed under a limited scope for those purposes described above. The conclusions and recommendations presented in this report are based upon the data that were reviewed and documented in this report along with our experience on similar projects. The discovery of any additional information concerning environmental conditions at the site should be reported to MACTEC for additional review so that potential environmental impacts can be reassessed and the conclusions and recommendations modified, if appropriate.

## **FIGURES**



**JACKSONVILLE SOUTH, NC**

1997

NIMA 5553 III NW-Series V 842

CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGLE LOCATION

NOTE: SITE LOCATION IS APPROXIMATE



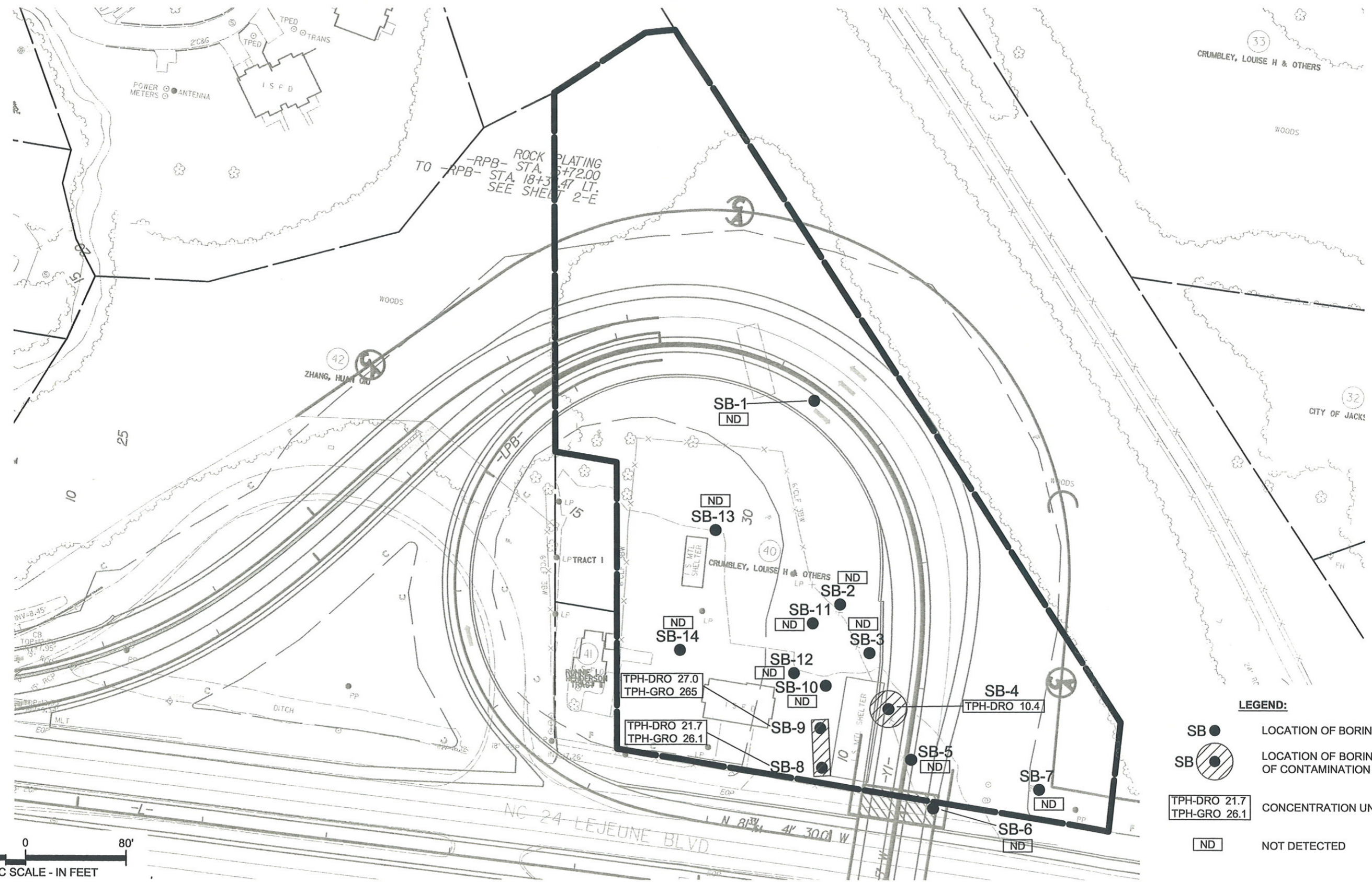
MACTEC ENGINEERING AND CONSULTING, INC.  
3301 ATLANTIC AVENUE  
RALEIGH, NORTH CAROLINA

**TOPOGRAPHIC SITE MAP**  
**LOUISE CRUMBLEY PROPERTY**  
**PARCEL #905**  
**JACKSONVILLE, NORTH CAROLINA**

DRAWN: MJG	DATE: OCTOBER 2010	FIGURE <b>1</b>
ENG CHECK: CBS	SCALE: 1 : 12000	
APPROVAL: [Signature]	JOB: 6470-10-0207	



F:\6470\10\0207 U-5132 PSAs in Onslow County\Drawings\Site Location Map- Parcel 905.dwg Thu, 28 Oct 2010 - 10:20am rrahle



**SITE LOCATION MAP**  
**LOUISE CRUMBLEY PROPERTY, PARCEL #905**  
**PROJECT No. U-5132 TIP No. 45155.1.1**  
**JACKSONVILLE, NORTH CAROLINA**

DRAWN:	R.R.	DATE:	OCTOBER 2010
ENG CHECK:	<i>MJB</i>	SCALE:	AS SHOWN
APPROVAL:	<i>[Signature]</i>	JOB No.:	6470-10-0207

FIGURE  
**2**

REFERENCE: MACTEC FIELD NOTES; LABORATORY TEST RESULTS.

## **TABLE**

**Table 1**  
**Summary of Laboratory Test Results**  
**State Project U-5132, TIP No. 45155.1.1**  
**Louise Crumbley Property, Parcel #905**  
**Jacksonville, North Carolina**  
**MACTEC Job No. 6470-10-0207**

Analytical Method →			EPA 8015	EPA 8015
Contaminant of Concern →			TPH-DRO	TPH-GRO
Sample ID	Date Collected	Sample Depth	mg/Kg	
SB-1	9/20/2010	7'-8'	<7.43	<4.96
SB-2	9/20/2010	7'-8'	<7.90	<5.98
SB-3	9/20/2010	7'-8'	<7.77	<5.55
SB-4	9/20/2010	7'-8'	<b>10.4</b>	<5.44
SB-5	9/20/2010	7'-8'	<8.39	<5.95
SB-6	9/20/2010	7'-8'	<7.62	<5.30
SB-7	9/20/2010	7'-8'	<6.46	<6.45
SB-8	9/20/2010	0'-1'	<b>21.7</b>	<b>26.1</b>
SB-9	9/20/2010	5'-6'	<b>27.0</b>	<b>265</b>
SB-10	9/20/2010	7'-8'	<7.80	<5.40
SB-11	9/20/2010	7'-8'	<7.16	<4.74
SB-12	9/20/2010	7'-8'	<7.64	<6.33
SB-13	9/20/2010	7'-8'	<6.76	<5.71
SB-14	9/20/2010	7'-8'	<7.90	<5.68
<i>NCDENR Action Level</i>			<i>10</i>	<i>10</i>

Notes:

- NCDENR      North Carolina Department of Environment and Natural Resources
- Bold**      Concentration exceeds Reporting Limit (RL)
- Bold**      Concentration exceeds the NCDENR Action Level
- <#          Analyte not detected above the RL

Prepared by: MJG Date: 10-1-10

Checked by: CBS Date: 10/28/10

**APPENDIX A**

**SCHNABEL GEOPHYSICS REPORT**



October 14, 2010

Terry W. Fox, LG  
NCDOT, Geotechnical Engineering Unit  
1020 Birch Ridge Drive  
Raleigh, NC 27610

RE:           State Project:   U-5132  
              WBS Element:  45155.1.1  
              County:       Onslow  
              Description:  Jacksonville – NC 24 (Lejeune Blvd) Trumpet Interchange between SR  
                                  1308 (Bell Fork Road) and the US 17 Bypass

**Subject:       Project 09210013.28 Report on Geophysical Surveys  
                  Parcels 905 and 906, Onslow County, North Carolina**

Dear Mr. Fox:

**SCHNABEL ENGINEERING SOUTH, PC** (Schnabel) is pleased to present this report on the geophysical surveys we conducted on the subject site. The report includes two 8.5x11 and two 11x17 color figures.

## **INTRODUCTION**

The work described in this report was conducted on September 13, 14, and 15, 2010, by Schnabel under our 2009 contract with the NCDOT. The work was conducted over the accessible areas of the parcels as indicated by the NCDOT to support their environmental assessment of the subject properties (Louise Crumbley Property and Ronnie Henderson Property). Photographs of the parcels are included on Figure 1. The properties are located on the north side of NC 24 between SR 1308 (Bell Fork Road) and the US 17 Bypass in Jacksonville, NC. 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 right-of-way and/or easement.

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, including areas of reinforced concrete, were conducted using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna. Photographs of the equipment used are shown on Figure 2.

## **FIELD METHODOLOGY**

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

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 orthogonal directions over anomalous EM readings not attributed to cultural features. 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.

## **DISCUSSION OF RESULTS**

The contoured EM61 data collected over Parcels 905 and 906 are shown on Figures 3 and 4. The EM61 early time gate results are plotted on Figure 3. The early time gate data provide the more sensitive detection of metal objects. Figure 4 shows the difference between the response of the top and bottom coils of the EM61 instrument (differential response). The difference is taken to remove the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as UST's.

The early time gate and differential results show anomalies apparently caused by buried utilities and known site features (Figures 3 and 4). The GPR data collected at the site do not indicate the presence of metallic UST's within the areas surveyed.

## **CONCLUSIONS**

Our evaluation of the geophysical data collected on the subject properties on Project U-5132 in Jacksonville, NC indicates the following:

The geophysical data do not indicate the presence of metallic UST's in the areas surveyed on the subject properties.

**LIMITATIONS**

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

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

Sincerely,

**SCHNABEL ENGINEERING SOUTH, PC**



Jeremy S Strohmeyer, LG  
Project Manager



Edward D Billington, LG  
Senior Vice President

JW:JS:NB

Attachments: Figures (4)

FILE: G:\2009 PROJECTS\09210013 (NCDOT 2009 GEOTECH UNIT SERVICES)\09210013.28 (U-5132, ONSLOW COUNTY)\REPORT\SCHNABEL GEOPHYSICAL REPORT ON U-5132.DOCX



Parcel 905 – Louise Crumbley Property, looking east



Parcel 906 – Ronnie Henderson Property, looking north

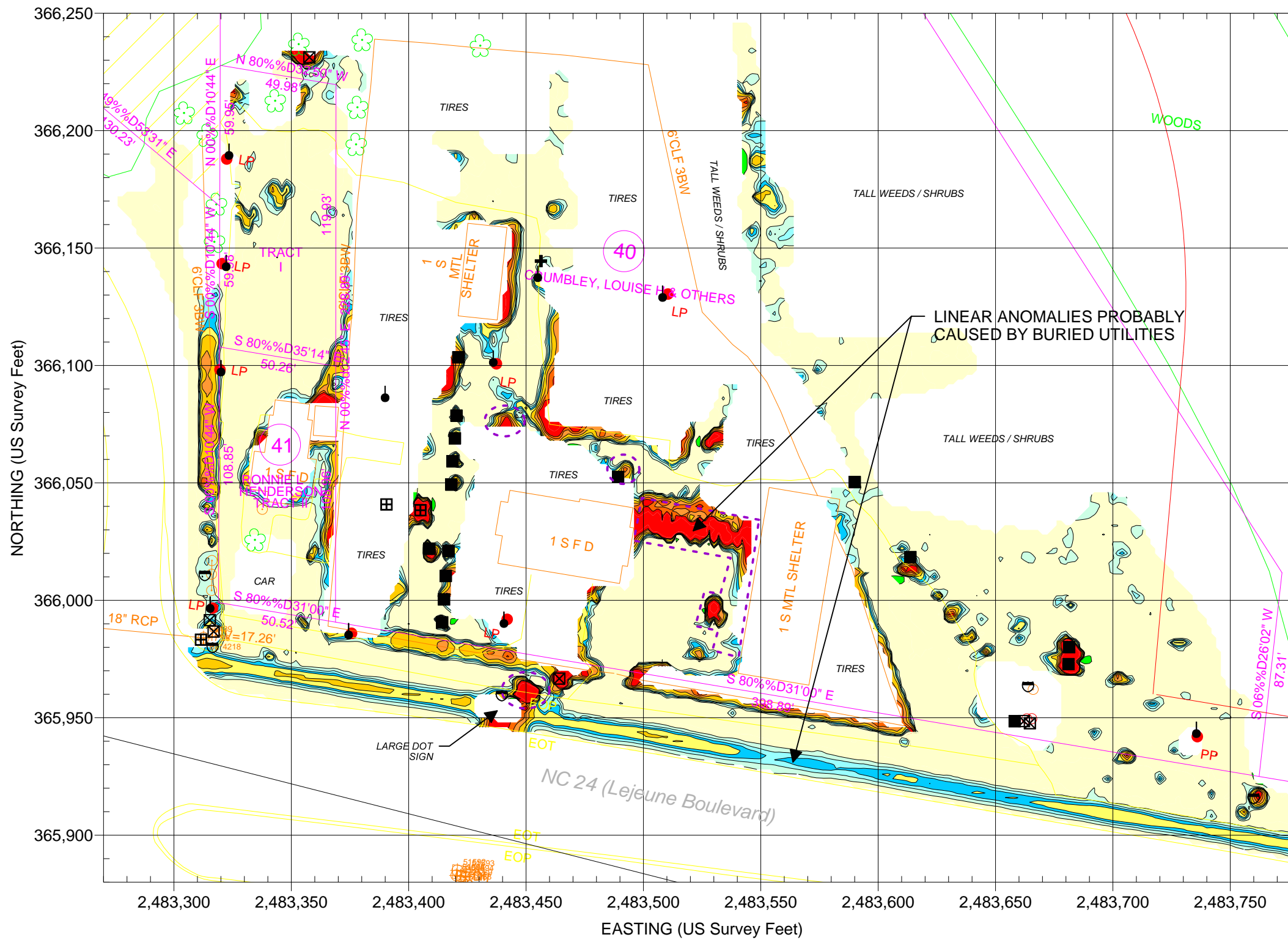




Geonics EM61-MK2

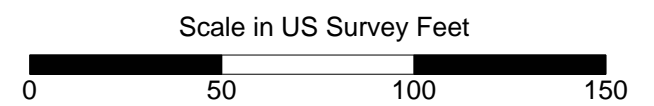
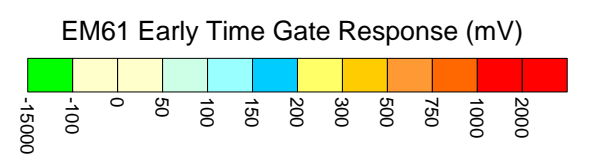


GSSI SIR-3000



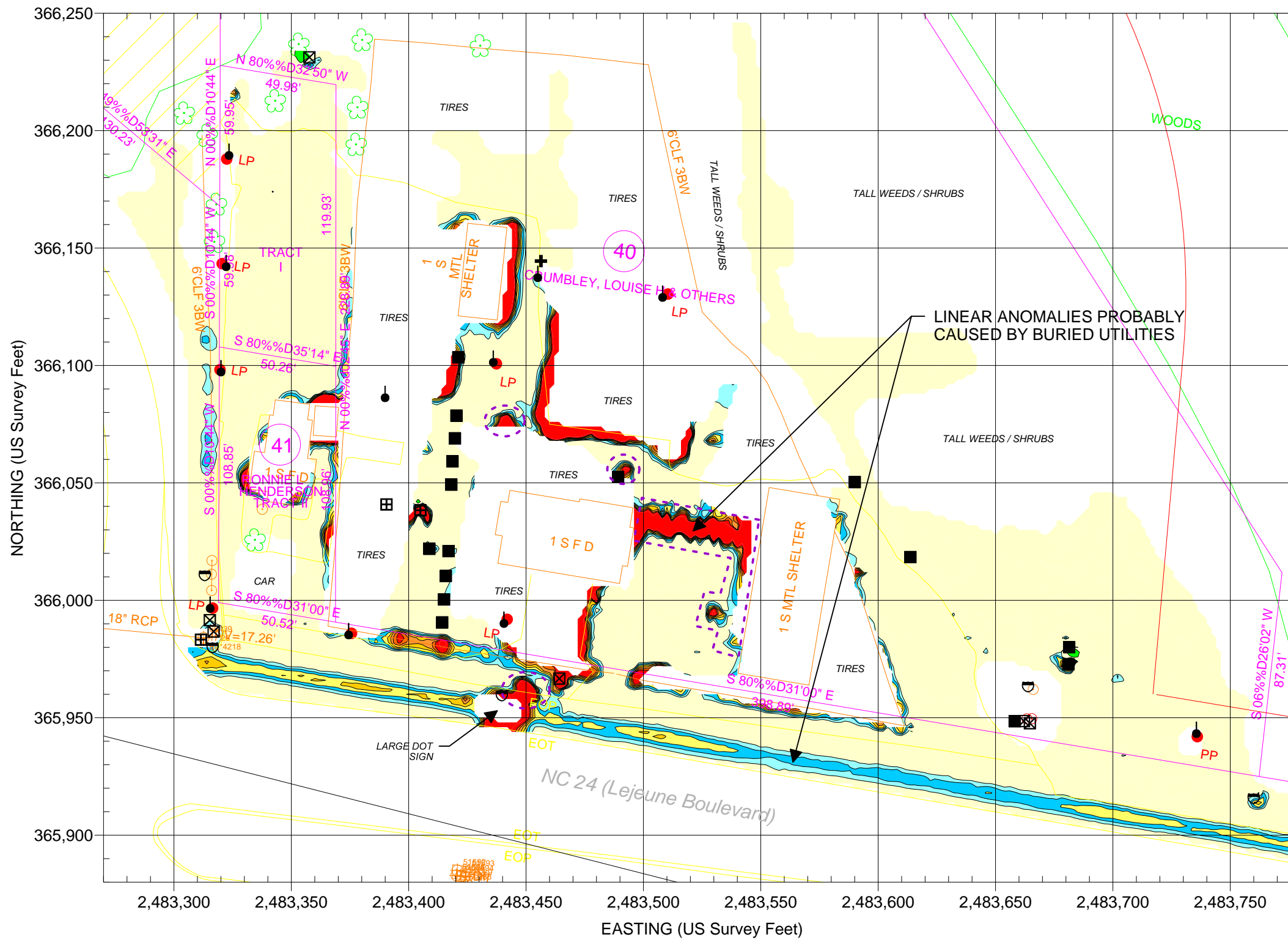
EXPLANATION	
	SIGN
	UTILITY POLE
	GUY WIRE
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	STORM SEWER INLET
	DOT PROPOSED RW
	PROPERTY LINE
	GPR SURVEY AREA

REF.: NCDOT FILE: u5132\_rdy\_psh06.dgn  
(FOR SOME SITE FEATURES)



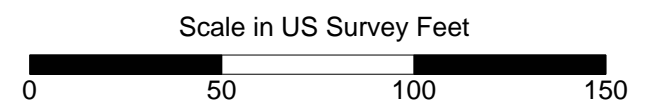
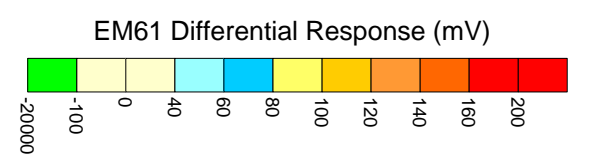
Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on September 13 through 15, 2010, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on September 15, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT U-5132	PARCELS 905 & 906
	NC DEPARTMENT OF TRANSPORTATION	EM61 EARLY TIME GATE
	ONSLow COUNTY, NORTH CAROLINA	RESPONSE
	PROJECT NO. 09210013.28	FIGURE 3



EXPLANATION	
	SIGN
	UTILITY POLE
	GUY WIRE
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	STORM SEWER INLET
	DOT PROPOSED RW
	PROPERTY LINE
	GPR SURVEY AREA

REF.: NCDOT FILE: u5132\_rdy\_psh06.dgn  
(FOR SOME SITE FEATURES)



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on September 13 through 15, 2010, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on September 15, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT U-5132	PARCELS 905 & 906
	NC DEPARTMENT OF TRANSPORTATION	EM61 DIFFERENTIAL RESPONSE
	ONSLow COUNTY, NORTH CAROLINA	
	PROJECT NO. 09210013.28	FIGURE 4

## **APPENDIX B**

### **PROCEDURES FOR COLLECTING SOIL SAMPLES**

### **Procedure for Collecting Soil Samples for Laboratory Testing Using the Geoprobe**

- MACTEC will collect the soil samples using the Geoprobe hammer impact system. Downforce or percussion will be utilized to advance the sampler to the desired depth to obtain the soil sample.
- Soil cores will be retrieved from the sampler and classified by an on-site geologist or engineer. The one-inch diameter cores are approximately four feet in length and are contained within a pre-cleaned, disposable plastic sleeve.
- Soil samples from the boring soil cores will be placed in pre-labeled, airtight, plastic "twin" bags.
- After several minutes, the gas contained in the "headspace" or void area within one of the twin bags will be tested with a photoionization detector (PID) or flame ionization detector (FID).
- The duplicate of the sample that exhibits the highest headspace reading will be submitted to the laboratory for testing. The remaining portion of the soil core will be utilized for classification purposes.
- The soils will be classified in accordance with the Unified Soils Classification System.
- The soil sample will be placed into laboratory-supplied bottles.
- Sample bottles will be labeled prior to sample collection.
- Caps will be secured on bottles.
- All sample containers will be placed in plastic bags and the bags sealed.
- Documentation, including chain-of-custody record and laboratory analytical request form, will be completed for all samples.
- Samples will be packed in coolers with "bubble wrap" and ice packs for shipment to the laboratory.
- The chain-of-custody record and analytical request form will be placed inside the cooler, which will be sealed with security tape.
- Samples will be sent to the analytical laboratory by overnight courier.

**APPENDIX C**  
**SOIL BORING RECORDS**



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207  
 MACTEC Field Representative  
 Gillis

Date: 9-20-10  
 Boring ID: SB-1

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Dark brown clayey, silty fine to medium sand		0.0		
1-2	Dark brown clayey, silty fine to medium sand		0.0		
2-3	Light brown clayey, silty fine to medium sand		0.0		
3-4	Light brown clayey, silty fine to medium sand		0.0		
4-5	Light brown clayey, silty fine to medium sand		0.0		
5-6	Light brown clayey, silty fine to medium sand		0.0		
6-7	Light brown clayey, silty fine to medium sand		0.0		
7-8	Light brown clayey, silty fine to medium sand	1050	0.0		Sample

Prepared by: MJG Date: 10-1-10  
 Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207  
 Date: 9-20-10  
 Boring ID: SB-2  
 MACTEC Field Representative  
 Gillis

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Dark brown silty fine to medium sand		0.0		
1-2	Dark brown silty fine to medium sand		0.0		
2-3	Brown clayey, silty fine to medium sand		0.0		
3-4	Brown clayey, silty fine to medium sand		0.0		
4-5	Brown clayey, silty fine to medium sand		0.0		
5-6	Brown clayey, silty fine to medium sand		0.0		
6-7	Brown clayey, silty fine to medium sand		0.0		
7-8	Brown clayey, silty fine to medium sand	1100	0.0		Sample

Prepared by: MSG Date: 10-1-10

Checked by: CBS Date: 10/28/10





MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207

MACTEC Field Representative  
 Gillis

Date: 9-20-10

Boring ID: SB-3

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Brown silty fine to medium sand		0.0		
1-2	Brown silty fine to medium sand		0.0		
2-3	Light brown clayey, silty fine to medium sand		0.0		
3-4	Light brown clayey, silty fine to medium sand		0.0		
4-5	Light brown clayey fine to medium sand		0.0		
5-6	Light brown clayey fine to medium sand		0.0		
6-7	Light brown clayey fine to medium sand		0.0		
7-8	Light brown clayey fine to medium sand	1120	0.0		Sample

Prepared by: MSG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207

MACTEC Field Representative  
 Gillis

Date: 9-20-10

Boring ID: SB-4

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Brown clayey, silty fine to medium sand		0.0		
1-2	Brown clayey, silty fine to medium sand		0.0		
2-3	Brown clayey, silty fine to medium sand		0.0		
3-4	Light brown clayey fine to medium sand		0.0		
4-5	Light brown clayey fine to medium sand		0.0		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand	1140	5.3		Sample

Prepared by: MJO Date: 10/29/10

Checked by: CBS Date: 10/29/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207  
 Date: 9-20-10  
 Boring ID: SB-5

MACTEC Field Representative  
Gillis

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Light brown clayey, silty fine to medium sand		0.0		
1-2	Light brown clayey, silty fine to medium sand		0.0		
2-3	Light brown clayey, silty fine to medium sand		0.0		
3-4	Light brown clayey, silty fine to medium sand		0.0		
4-5	Light brown to gray clayey fine to medium sand		0.0		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand	1145	0.0		Sample

Prepared by: MSG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207  
 Date: 9-20-10  
 Boring ID: SB-6  
 MACTEC Field Representative  
 Gillis

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Light brown clayey, silty fine to medium sand		0.0		
1-2	Light brown clayey, silty fine to medium sand		0.0		
2-3	Light brown clayey, silty fine to medium sand		0.0		
3-4	Light brown to gray clayey fine to medium sand		0.0		
4-5	Light brown to gray clayey fine to medium sand		0.0		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand	1155	0.0		Sample

Prepared by: MTG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207

MACTEC Field Representative  
 Gillis

Date: 9-20-10

Boring ID: SB-7

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Light brown clayey, silty fine to medium sand		0.0		
1-2	Light brown clayey, silty fine to medium sand		0.0		
2-3	Light brown clayey fine to medium sand		0.0		
3-4	Light brown clayey fine to medium sand		0.0		
4-5	Light brown clayey fine to medium sand		0.0		
5-6	Brown silty fine to medium sand		0.0		
6-7	White fine sand		0.0		
7-8	White fine sand	1210	0.0		Sample

Prepared by: MSG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
MACTEC Project #: 6470-10-0207

MACTEC Field Representative  
Gillis

Date: 9-20-10

Boring ID: SB-8

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Black silty fine to medium sand	1225	31.6		Sample
1-2	Light brown to gray clayey fine to medium sand		2.5		
2-3	Light brown to gray clayey fine to medium sand		1.0		
3-4	Light brown to gray clayey fine to medium sand		2.5		
4-5	Light brown to gray clayey fine to medium sand		0.5		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand		0.0		

Prepared by: MSG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905

MACTEC Field Representative

MACTEC Project #: 6470-10-0207

Gillis

Date: 9-20-10

Boring ID: SB-9

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Black silty fine to medium sand		17.1		
1-2	Brown to light brown clayey fine to medium sand		4.2		
2-3	Brown to light brown clayey fine to medium sand		15.5		
3-4	Brown to light brown clayey fine to medium sand		401		
4-5	Brown to light brown clayey fine to medium sand		418		
5-6	Brown to light brown clayey fine to medium sand	1240	1,004		Sample
6-7	Brown to light brown clayey fine to medium sand		75.4		
7-8	Brown to light brown clayey fine to medium sand		299		

Prepared by: MJS Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207  
 MACTEC Field Representative  
 Gillis

Date: 9-20-10  
 Boring ID: SB-10

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Black silty fine to medium sand		3.2		
1-2	Light brown clayey fine to medium sand		6.4		
2-3	Light brown clayey fine to medium sand		0.5		
3-4	Light brown clayey fine to medium sand		0.2		
4-5	Light brown to gray clayey fine to medium sand		0.8		
5-6	Light brown to gray clayey fine to medium sand		1.1		
6-7	Light brown to gray clayey fine to medium sand		2.0		
7-8	Light brown to gray clayey fine to medium sand	1255	8.0		Sample

Prepared by: MTC Date: 10-1-10

Checked by: CBS Date: 10/28/10





MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905

MACTEC Field Representative

MACTEC Project #: 6470-10-0207

Gillis

Date: 9-20-10

Boring ID: SB-11

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Brown silty fine to medium sand		0.0		
1-2	Brown silty fine to medium sand		0.0		
2-3	Light brown to gray clayey fine to medium sand		0.0		
3-4	Light brown to gray clayey fine to medium sand		0.0		
4-5	Light brown to gray clayey fine to medium sand		0.0		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand	1410	0.0		Sample

Prepared by: MTG Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
 3301 Atlantic Avenue  
 Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
 MACTEC Project #: 6470-10-0207

MACTEC Field Representative  
 Gillis

Date: 9-20-10

Boring ID: SB-12

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Light brown fine to medium sand (Fill)		0.0		
1-2	Light brown fine to medium sand (Fill)		0.0		
2-3	Light brown fine to medium sand (Fill)		0.0		
3-4	Light brown fine to medium sand (Fill)		0.0		
4-5	Light brown fine to medium sand (Fill)		0.0		
5-6	Light brown fine to medium sand (Fill)		0.0		
6-7	Light brown fine to medium sand (Fill)		0.0		
7-8	Light brown fine to medium sand (Fill)	1420	0.0		Sample

Prepared by: MJV Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905

MACTEC Field Representative

MACTEC Project #: 6470-10-0207

Gillis

Date: 9-20-10

Boring ID: SB-13

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Brown silty fine to medium sand		0.0		
1-2	Brown silty fine to medium sand		0.0		
2-3	Light brown clayey fine to medium sand		0.0		
3-4	Light brown clayey fine to medium sand		0.0		
4-5	Light brown clayey fine to medium sand		0.0		
5-6	Light brown to gray fine to medium sand		0.0		
6-7	Light brown to gray fine to medium sand		0.0		
7-8	Light brown to gray fine to medium sand	1430	0.0		Sample

Prepared by: MJB Date: 10-1-10

Checked by: CBS Date: 10/28/10



MACTEC Engineering and Consulting, Inc.  
3301 Atlantic Avenue  
Raleigh, North Carolina

Soil Boring Sample Record

MACTEC Project ID: Louise Crumbley Property, Parcel #905  
MACTEC Project #: 6470-10-0207  
MACTEC Field Representative  
Gillis

Date: 9-20-10  
Boring ID: SB-14

Depth Interval	Soil Description	Time	Headspace Screening Results (in ppm)		Comments
			PID		
0-1	Brown silty fine to medium sand		0.0		
1-2	Brown silty fine to medium sand		0.0		
2-3	Brown silty fine to medium sand		0.0		
3-4	Brown silty fine to medium sand		0.0		
4-5	Light brown to gray clayey fine to medium sand		0.0		
5-6	Light brown to gray clayey fine to medium sand		0.0		
6-7	Light brown to gray clayey fine to medium sand		0.0		
7-8	Light brown to gray clayey fine to medium sand	1445	0.0		Sample

Prepared by: MJG Date: 10-1-10

Checked by: CBS Date: 10/28/10

**APPENDIX D**

**LABORATORY ANALYTICAL REPORTS  
AND CHAIN-OF-CUSTODY RECORDS**



SGS North America, Inc.  
List of Reporting Abbreviations  
And Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantification Limit (RL or MDL)

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/CL = Reporting Limit / Control Limit

RPD = Relative Percent Difference

UJ = Target analytes with recoveries that are  $10\% < \%R < LCL$ ; # of MEs are allowable and compounds are not detected in the sample.

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.

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

Client Sample ID: SB-1  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-1D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 10:50  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 82.89  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.43	mg/Kg	1	09/24/10 12:46
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	32.3	80.8

Comments:

**Batch Information**

Analytical Batch: EP092410  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.49 G  
 Prep Final Vol: 10 mL



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

Client Sample ID: SB-2  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-2D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 11:00  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 75.66  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.90	mg/Kg	1	09/23/10 19:50
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	28.1	70.1

**Comments:**

**Batch Information**

Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 33.44 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-3  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-3D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 11:20  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 77.16  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.77	mg/Kg	1	09/23/10 21:15
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	30.6	76.6

Comments:

**Batch Information**

Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 33.34 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-4  
Client Project ID: NCDOT Jacksonville  
Lab Sample ID: G132-2239-4D  
Lab Project ID: G132-2239

Date Collected: 9/20/2010 11:40  
Date Received: 9/22/2010  
Matrix: Soil  
Solids 76.32  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	10.4	7.88	mg/Kg	1	09/23/10 21:43
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	29.7	74.3

Comments:

**Batch Information**

Analytical Batch: EP092310  
Analytical Method: 8015  
Instrument: GC6  
Analyst: BWS

Prep batch: 17426  
Prep Method: 3541  
Prep Date: 09/23/10  
Initial Prep Wt/Vol: 33.27 G  
Prep Final Vol: 10 mL

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

Client Sample ID: SB-5  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-5D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 11:45  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 74.09  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	8.39	mg/Kg	1	09/23/10 22:12
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.9	77.3

Comments:

**Batch Information**

Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.17 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-6  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-6D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 11:55  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 81.85  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.62	mg/Kg	1	09/23/10 22:40
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.6	76.5

Comments:

**Batch Information**

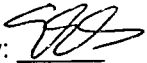
Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.06 G  
 Prep Final Vol: 10 mL

Analyst: FX

NC Certification #481

N.C. Certification #481

Reviewed By:   
DRO.XLS

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

Client Sample ID: SB-7  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-7D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 12:10  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 91.67  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.46	mg/Kg	1	09/24/10 09:53
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	33.2	82.9

**Comments:**

**Batch Information**

Analytical Batch: EP092410  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 33.78 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-8  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-8D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 12:25  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 83.83  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	21.7	7.10	mg/Kg	1	09/23/10 23:08
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31	77.6

**Comments:**

**Batch Information**


Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 33.62 G  
 Prep Final Vol: 10 mL

Analyst: Fal

NC Certification #481

N.C. Certification #481

Reviewed By:   
 DRO.XLS  
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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: SB-9  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-9D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 12:40  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 76.54  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	27.0	8.08	mg/Kg	1	09/23/10 23:36
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.2	75.5

Comments:

**Batch Information**


Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.32 G  
 Prep Final Vol: 10 mL

Analyst: FX

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N.C. Certification #481

Reviewed By:   
 BRO.XLS  
 Page 11 of 44



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

Client Sample ID: SB-10  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-10D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 12:55  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 78.88  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.80	mg/Kg	1	09/24/10 00:04
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.4	78.6

**Comments:**

**Batch Information**

Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.5 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-11  
Client Project ID: NCDOT Jacksonville  
Lab Sample ID: G132-2239-11D  
Lab Project ID: G132-2239

Date Collected: 9/20/2010 14:10  
Date Received: 9/22/2010  
Matrix: Soil  
Solids 87.09  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.16	mg/Kg	1	09/24/10 00:32
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	33.1	82.7

Comments:

**Batch Information**

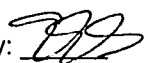
Analytical Batch: EP092310  
Analytical Method: 8015  
Instrument: GC6  
Analyst: BWS

Prep batch: 17426  
Prep Method: 3541  
Prep Date: 09/23/10  
Initial Prep Wt/Vol: 32.08 G  
Prep Final Vol: 10 mL

Analyst: FA

NC Certification #481

N.C. Certification #481

Reviewed By:   
DRO.XLS  
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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: SB-12  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-12D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 14:20  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 79.59  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.64	mg/Kg	1	09/24/10 01:00
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	32.2	80.5

Comments:

**Batch Information**


Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.9 G  
 Prep Final Vol: 10 mL

Analyst: FD

NC Certification #481

N.C. Certification #481

Reviewed By:   
 DRO.XLS

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

Client Sample ID: SB-13  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-13D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 14:30  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 90.52  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.76	mg/Kg	1	09/24/10 01:28
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	32.5	81.3

Comments:

**Batch Information**


Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.67 G  
 Prep Final Vol: 10 mL

Analyst: FX

NC Certification #481

N.C. Certification #481

Reviewed By:   
DRO.XLS

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

Client Sample ID: SB-14  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-14D  
 Lab Project ID: G132-2239

Date Collected: 9/20/2010 14:45  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 77.67  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.90	mg/Kg	1	09/24/10 01:56
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	32.8	81.9

Comments:

**Batch Information**

Analytical Batch: EP092310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BWS

Prep batch: 17426  
 Prep Method: 3541  
 Prep Date: 09/23/10  
 Initial Prep Wt/Vol: 32.6 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: SB-1  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-1A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 9/20/2010 10:50  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 82.89

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.96	mg/Kg	1	09/23/10 17:43

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	108.0	108.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.3 g  
 Final Volume: 5 mL

Analyst: WML

NC Certification #481

Reviewed By: BAO  
GRO.XLS

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

Client Sample ID: SB-2  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-2A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 9/20/2010 11:00  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 75.66

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.98	mg/Kg	1	09/23/10 18:10

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	104.0	104.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.63 g  
 Final Volume: 5 mL

Analyst: mm

NC Certification #481

Reviewed By: BAO  
GRO.XLS

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

Client Sample ID: SB-3  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-3A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 9/20/2010 11:20  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 77.16

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.55	mg/Kg	1	09/23/10 18:37

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	109.0	109.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.01 g  
 Final Volume: 5 mL

Analyst: WML

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS



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

Client Sample ID: SB-4  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-4A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 9/20/2010 11:40  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 76.32

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.44	mg/Kg	1	09/23/10 19:03

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	106.0	106.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.22 g  
 Final Volume: 5 mL

Analyst: uml

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-5  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-5A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 9/20/2010 11:45  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 74.09

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.95	mg/Kg	1	09/23/10 19:30

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	105.0	105.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.8 g  
 Final Volume: 5 mL

Analyst: WML

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-6  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-6A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 11:55  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 81.85

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.30	mg/Kg	1	09/24/10 13:49

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	113.0	113.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.92 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-7  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-7A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 12:10  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 91.67

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.45	mg/Kg	1	09/24/10 14:16

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	107.0	107.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.07 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-8  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-8A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 12:25  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 83.83

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	26.1	5.53	mg/Kg	1	09/24/10 14:43

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	107.0	107.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.47 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-9  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-9A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 12:40  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 76.54

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	265	5.89	mg/Kg	10	09/27/10 21:12

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	107.0	107.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092710  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.65 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-10  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-10A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 12:55  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 78.88

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.40	mg/Kg	1	09/24/10 15:37

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	111.0	111.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 7.04 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-11  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-11A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 14:10  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 87.09

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.74	mg/Kg	1	09/24/10 16:04

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	106.0	106.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 7.27 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS



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

Client Sample ID: SB-12  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-12A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 14:20  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 79.59

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.33	mg/Kg	1	09/24/10 16:31

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	106.0	106.0		70-130

Comments:

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.95 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-13  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-13A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 14:30  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 90.52

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.71	mg/Kg	1	09/24/10 16:58

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	109.0	109.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.8 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
GRO.XLS

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

Client Sample ID: SB-14  
 Client Project ID: NCDOT Jacksonville  
 Lab Sample ID: G132-2239-14A  
 Lab Project ID: G132-2239  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 9/20/2010 14:45  
 Date Received: 9/22/2010  
 Matrix: Soil  
 Solids 77.67

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.68	mg/Kg	1	09/24/10 17:25

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	106.0	106.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP092410  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.8 g  
 Final Volume: 5 mL

Analyst: LMC

NC Certification #481

Reviewed By: [Signature]  
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1 CLIENT: **MACTEC** PHONE NO: **919 1876 0416**

CONTACT: **Matt Gillis**

PROJECT: **NC DOT Jacksonville Project** SITE/BWSID#: **6470-10-0207**

REPORTS TO: **Bob Miller** **rmiller@mactec.com**

INVOICE TO: **NC DOT** QUOTE # **State Project U-5132**

FAX NO.:( ) P.O. NUMBER: **WBS 45155.1.1**

SGS Reference: **91322239** PAGE **1** OF **2**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE	Preservatives Used	Analysis Required	REMARKS
SB-1	Soil	9/20/10	1050	Soil	3	G			
SB-2			1100						
SB-3			1120						
SB-4			1140						
SB-5			1145						
SB-6			1155						
SB-7			1210						
SB-8			1225						
SB-9			1240						
SB-10			1255						

3

4

5

Collected/Relinquished By: (1) **Matthew Miller** Date: **9/20/10** Time: **1330** Received By: **Max Bj**

Relinquished By: (2)

Relinquished By: (3)

Relinquished By: (4) **[Signature]** Date: **9/22/10** Time: **10:05** Received By:

Shipping Carrier: **GRD**

Shipping Ticket No: **20935**

Special Deliverable Requirements:

Special Instructions:

Requested Turnaround Time:  RUSH  STD Date Needed

Samples Received Cold? (Circle) **YES** NO

Temperature C: **20, 3.5**

Chain of Custody Seal: (Circle) **INTACT** **BROKEN** **ABSENT**



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1 CLIENT: **MATEC** PHONE NO: (919) 876 0416

CONTACT: **Watt Gillis**

PROJECT: **NCDOT Jacksonville: 6470-10-0207**

REPORTS TO: **Bob Miller b.miller@mactec.com**

INVOICE TO: **NCDOT**

FAX NO.:( ) **State Paper**

QUOTE #: **U-5132**

P.O. NUMBER: **WBS 45155.1.1**

SGS Reference: **4122-2239**

Preservatives Used: **3**

Analysis Required: **DRD GLO**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE	C= COMP	G= GRAB	REMARKS
SB-11		9/20/10	1410	Soil	3	G			
SB-12			1420						
SB-13			1430						
SB-14			1445						
SB-15			1510						
SB-16			1520						
SB-17			1530						
SB-18			1540						
SB-19			1550						
SB-20			1600						

5 Collected/Relinquished By: (1) **Matt Gillis** Date: **9/20/10** Time: **1330** Received By: **Na Red**

Relinquished By: (2) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (3) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (4) \_\_\_\_\_ Date: **9/20/10** Time: **10:05** Received By: **[Signature]**

Shipping Carrier: \_\_\_\_\_

Shipping Ticket No: \_\_\_\_\_

Special Deliverable Requirements: \_\_\_\_\_

Special Instructions: \_\_\_\_\_

Requested Turnaround Time:  RUSH  STD Date Needed: \_\_\_\_\_

Samples Received Cold? (Circle) YES NO

Temperature °C: **2.0, 3.0**

Chain of Custody Seal: (Circle) INTACT BROKEN **ABSENT**

PAGE \_\_\_\_\_ OF \_\_\_\_\_