

PRELIMINARY SITE ASSESSMENT REPORT

**SR 1406 (Piney Green Road) from NC 24 to US 17
1500 Piney Green Road, Parcel #163
Jacksonville, North Carolina
State Project U-3810
WBS Element # 35801.1.1
Onslow County**

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

April 16, 2010

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Signature Page

This document, entitled "Preliminary Site Assessment Report," has been prepared for Parcel #163, located at 1500 Piney Green Road in Jacksonville, North Carolina (State Project U-3810, WBS Element # 35801.1.1, Onslow County). It has been prepared by GEL Engineering of NC, Inc. in accordance with the Notice to Proceed provided by the North Carolina Department of Transportation-GeoEnvironmental Section, Geotechnical Engineering Unit for the exclusive use of the North Carolina Department of Transportation. It has been prepared in accordance with accepted quality control practices and has been reviewed by the undersigned.

GEL ENGINEERING OF NC, INC.
an Affiliate of The GEL Group, Inc.



Andrew D. Eyer, L.G.
Senior Project Manager



Keith D. McCulloch, P.E.
Senior Staff Engineer

04-16-10

Date

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Executive Summary

The subject site is Parcel #163, located at 1500 Piney Green Road in Jacksonville, North Carolina. The primary purpose of this investigation was to determine the presence or absence of underground storage tanks (USTs) and constituents of concern in soil within the North Carolina Department of Transportation (NCDOT) proposed Rights-of-Way (ROWs) adjacent to Parcel #163. Currently, Parcel #163 contains an operating convenience store and service station, with four petroleum USTs.

GEL Engineering of NC, Inc. (GEL) performed a preliminary site assessment within the NCDOT proposed ROWs of Piney Green Road and Charles Road adjacent to Parcel #163 that included a geophysical survey, and the collection and analysis of soil samples. No subsurface anomalies were identified during the geophysical investigation, and it has been concluded that there are no known, probable, or possible USTs present within the proposed ROWs of Piney Green Road and Charles Road adjacent to the site. However, four "Known" petroleum USTs are located onsite at Parcel #163 beneath a concrete slab in the western portion of the site based on visual evidence.

Soil samples were collected for analysis from seven borings constructed within the NCDOT proposed ROWs for Piney Green Road and Charles Road adjacent to Parcel #163. The soil samples were analyzed for diesel range organics (DRO) and gasoline range organics (GRO). Neither DRO nor GRO was detected in any of the collected soil samples.

Based on the data generated from this investigation, there is no evidence that a release of constituents of concern has occurred within the NCDOT proposed ROWs at Parcel #163. No additional environmental investigation of the soil at the site is recommended at this time.

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1.0 Introduction

This document presents the details of a preliminary site assessment performed within the proposed North Carolina Department of Transportation (NCDOT) Rights-of-Way (ROWs) at Parcel #163 located at 1500 Piney Green Road in Jacksonville, North Carolina. Parcel #163 contains an operating convenience store and service station, with four petroleum underground storage tanks (USTs). The site location is shown on Figure 1, an excerpt from the United States Geological Survey (USGS) 7.5-minute quadrangle map of Camp Lejeune, North Carolina. The preliminary site assessment, which included a geophysical survey, was conducted by GEL Engineering of NC, Inc. (GEL) in accordance with the Notice to Proceed issued by NCDOT on February 9, 2010.

The primary purpose of this investigation was to determine the presence or absence of USTs and onsite constituents of concern in soil within the NCDOT proposed ROWs at the subject site as a result of current and/or former operations.

2.0 Background

NCDOT is planning road improvements to SR 1406 (Piney Green Road) between NC 24 and US 17 in Onslow County, North Carolina. NCDOT wanted to assess the proposed ROWs adjacent to the site to evaluate the presence or absence of USTs and soil contamination related to the current and/or former onsite operations, and the impact (if any) of these operations on the proposed road improvements. Figures 2 and 3 show the general site layout for Parcel #163 and its location on Piney Green Road, respectively.

3.0 Local Geology and Surroundings

Parcel #163 is in a developed area of Jacksonville in Onslow County, North Carolina. Surrounding land uses include residential and commercial activities.

The site is located approximately 6 miles east of the center of Jacksonville, North Carolina. This area is located in the Coastal Plain physiographic province of North Carolina. The land surface of the area is characterized by nearly level, and gently sloping, well drained soils. Coastal Plain geology in the vicinity of the site is

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fc: ncdt00110

characterized by undifferentiated post-Miocene interbedded sand and clay terrace deposits overlain by aqueous and aeolian deposits of marine and non-marine origin (USGS, 1955).

The United States Department of Agriculture's *Soil Survey of Onslow County, North Carolina* (1992) maps the area as Goldsboro-Urban Land Complex (GpB), typically composed of fine sandy loam grading to sandy clay loam with depth. The soils encountered at the site during the preliminary site assessment consisted predominantly of tan/brown/gray silty sand and sandy clay to depths of 8 feet below land surface (bls).

Based on the moisture content of the soil encountered during the preliminary site assessment the water table is located at approximately 7 to 8 feet bls. Based on the USGS topographic map presented as Figure 1, the site is located approximately 25 feet above mean sea level. The topography in Figure 1 indicates that groundwater in the vicinity of Parcel #163 most likely flows in a southwesterly direction towards Little Northeast Creek.

4.0 Subsurface Investigation

To determine the presence or absence of USTs and impact to subsurface soil within the NCDOT ROWs at Parcel #163, GEL performed a limited site assessment that consisted of the following tasks:

- Performance of a geophysical investigation to identify the presence or absence of USTs and associated appurtenances within the proposed southerly ROW of Piney Green Road and the proposed westerly ROW of Charles Road adjacent to Parcel #163.
- Soil vapor screening of soil samples collected from subsurface soil borings at Parcel #163 within the proposed ROWs of Piney Green Road and Charles Road to determine the potential presence or absence of soil impact from petroleum constituents of concern.
- Collection and laboratory analysis of soil samples from the proposed ROWs of Piney Green Road and Charles Road at Parcel #163.

The details of these tasks are discussed in the following sections.

4.1 Geophysical Evaluation at Parcel #163

The geophysical investigation included the deployment of ground penetrating radar (GPR) technology and time domain electromagnetic technology (TDEM) to the site.

These technologies were used in concert with one another in order to identify subsurface

metallic anomalies and, more specifically, to identify the potential presence of USTs on site. A brief description of each technology is presented in the following paragraphs followed by a discussion of the results of the geophysical investigation.

4.1.1 Ground Penetrating Radar Methodology

A RAMAC digital radar control system configured with a 250 Megahertz (MHz) antenna array was used in this investigation. GPR is an electromagnetic geophysical method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of an antenna that houses the transmitter and receiver, a digital control unit that both generates and digitally records the GPR data, and a color video monitor to view data as they are collected in the field.

The transmitter radiates repetitive short-duration electromagnetic waves (at radar frequencies) into the earth from an antenna moving across the ground surface. These radar waves are reflected back to the receiver from the interface of materials with different dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant between the materials, the conductivity of the material through which the wave is traveling, and the frequency of the signal. Subsurface features that commonly cause such reflections are: 1) natural geologic conditions, such as changes in sediment composition, bedding, and cementation horizons and voids; or 2) unnatural changes to the subsurface, such as disturbed soils, soil backfill, buried debris, tanks, pipelines, and utilities. The digital control unit processes the signal from the receiver and produces a continuous cross-section of the subsurface interface reflection events.

GPR data profiles are collected along transects, which are measured paths along which the GPR antenna is moved. During a survey, marks are placed in the data by the operator at designated points along the GPR transects or with a survey wheel odometer. These marks allow for a correlation between the GPR data and the position of the GPR antenna on the ground.

Depth of investigation of the GPR signal is highly site-specific and is limited by signal attenuation (absorption) in the subsurface materials. Signal attenuation is dependent on the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities, such as clays, brackish groundwater, or groundwater with a high dissolved solid content from natural or man-made sources. Signal attenuation is lowest in relatively low-conductivity materials, such as dry sand or rock. Depth of investigation is also dependent on the antenna's transmitting frequency. Depth of investigation generally increases as transmitting

frequency decreases; however, the ability to resolve smaller subsurface features is diminished as frequency is decreased.

The GPR antenna used at this site is internally shielded from aboveground interference sources. Accordingly, the GPR response is not affected by overhead power lines, metallic buildings, or nearby objects.

4.1.2 Time Domain Electromagnetic Methodology

The TDEM methods measure the electrical conductivity of subsurface materials. The conductivity is determined by inducing (from a transmitter) a time or frequency-varying magnetic field and measuring (with a receiver) the amplitude and phase shift of an induced secondary magnetic field. The secondary magnetic field is created by subsurface conductive materials behaving as an inductor as the primary magnetic field is passed through them.

The Geonics EM-61 system used in this investigation operates within these principles. However, the EM-61 TDEM system can discriminate between moderately conductive earth materials and very conductive metallic targets. The EM-61 consists of a portable coincident loop time domain transmitter and receiver with a 0.5-meter by 1.0-meter coil system. The EM-61 generates 150 pulses per second and measures the response from the ground after transmission or between pulses. The secondary EM responses from metallic targets are of longer duration than those created by conductive earth materials. By recording the later time EM arrivals, only the response from metallic targets is measured, rather than the field generated by the earth material.

4.1.3 Field Procedures

The GPR and TDEM field investigation was performed at Parcel #163 on March 4, 2010. The extent of the investigation covers only the proposed ROW indicated by NCDOT. A GPR system time range setting of 90 nanoseconds (ns) was used during the entire investigation. This range was determined after a series of test lines were conducted to evaluate the GPR response in the local geologic section. A preliminary interpretation of the GPR data was conducted in the field and potential USTs were marked on the ground. Following the completion of the fieldwork, the data were post-processed and analyzed in more detail. GPR data processing typically included band pass filtering, background removal, horizontal smoothing, and gain adjustments.

TDEM was also used to scan the project site. Electromagnetic anomalies indicative of buried metallic objects were marked in the field.

It should be noted that “One Call” underground utility locations had been performed within the southerly ROW of Piney Green Road and the westerly ROW of Charles Road at Parcel #163 prior to the initiation of the preliminary site assessment field activities at the site. Several underground utilities were marked by “One Call” within both ROWs at Parcel #163.

As shown on Figure 4, no EM or GPR anomalies indicating the potential presence of USTs were identified; therefore, no USTs are suspected to be present in the subsurface of the investigation area. It should be noted that Parcel #163 is an active gas station with onsite USTs located in the western portion of the property beneath a concrete slab, but the USTs are located outside of the investigation area.

4.2 Subsurface Soil Investigation at Parcel #163

To determine the presence or absence of impact to subsurface soil by constituents of concern, GEL collected soil samples from seven subsurface soil borings, S11-1 through S11-7, at Parcel #163 on March 11, 2010, for analysis of total petroleum hydrocarbon indicator parameters. The soil borings were constructed within the NCDOT proposed ROWs of Piney Green Road and Charles Road, as shown on Figure 2 and in the photographs in Appendix III. The longitude and latitude coordinates for the boring locations are listed in the table below.

All borings were advanced to a total depth of 8 feet bls. Soil samples were collected at 3-4 feet and 7-8 feet bls from each borehole. All soil samples were inspected for indications of impact by constituents of concern, including petroleum hydrocarbons, such as odors, discoloration, or visible sheen. This sampling was accomplished using direct push technology (DPT) provided by Regional Probing Services of Wake Forest, North Carolina (Regional Probing). Soil boring lithologic logs are attached as Appendix I of this document.

The soil samples were screened for the presence of organic vapors using a portable photoionization detector (PID). The PID measures the concentration of organic compounds in the vapor space above a soil sample resulting from volatilization of organic compounds contained in the soil. To screen the soils, each sample was placed in a clean, resealable polyethylene bag. The bag was sealed, and the sample was allowed to equilibrate for approximately 5 minutes, after which time a small opening was made in the bag. The probe of the PID was then inserted into the bag, and the airspace above the soil was screened for organic vapors.

To assess the subsurface soil quality, one soil sample was collected from each soil boring at the sampled depth interval with the highest PID reading and submitted for laboratory analysis. The depth intervals and PID measurements of the collected soil samples submitted to the laboratory for analysis are listed below.

**Summary of Location Data and PID Measurements
for Soil Samples Collected for Analysis at Parcel No. 163**

Soil Boring	Depth Interval of Soil Sample Collected for Analysis (feet bls)	PID Reading (ppm)	Latitude/Longitude (NAD83)
S11-1	3-4	0.4	34°45'31.26"N / 77°20'03.48"W
S11-2	7-8	1.0	34°45'30.72"N / 77°20'02.58"W
S11-3	3-4	1.0	34°45'30.54"N / 77°20'01.92"W
S11-4	3-4	0.6	34°45'30.00"N / 77°20'01.50"W
S11-5	7-8	1.2	34°45'29.40"N / 77°20'01.86"W
S11-6	3-4	0.8	34°45'28.68"N / 77°20'02.10"W
S11-7	3-4	1.1	34°45'28.14"N / 77°20'02.40"W

Notes:

- 1) Coordinates are based on North American Datum of 1983 (NAD83)
- 2) bls = below land surface
- 3) PID = photoionization detector
- 4) ppm = parts per million

Following completion of the soil sampling activities, all borings were abandoned by filling the boreholes with soil cuttings and hydrated bentonite. Soil samples were submitted to SGS Laboratories, Inc. in Wilmington, North Carolina (North Carolina Certification No. 481) for analysis of diesel range organics (DRO) by EPA Method 8015 with EPA Method 3545 sample preparation, and gasoline range organics (GRO) by EPA Method 8015 with EPA Method 5035A/5030B sample preparation. The analytical results are included on the Certificates of Analysis provided in Appendix II. Neither DRO nor GRO was detected in any of the collected soil samples.

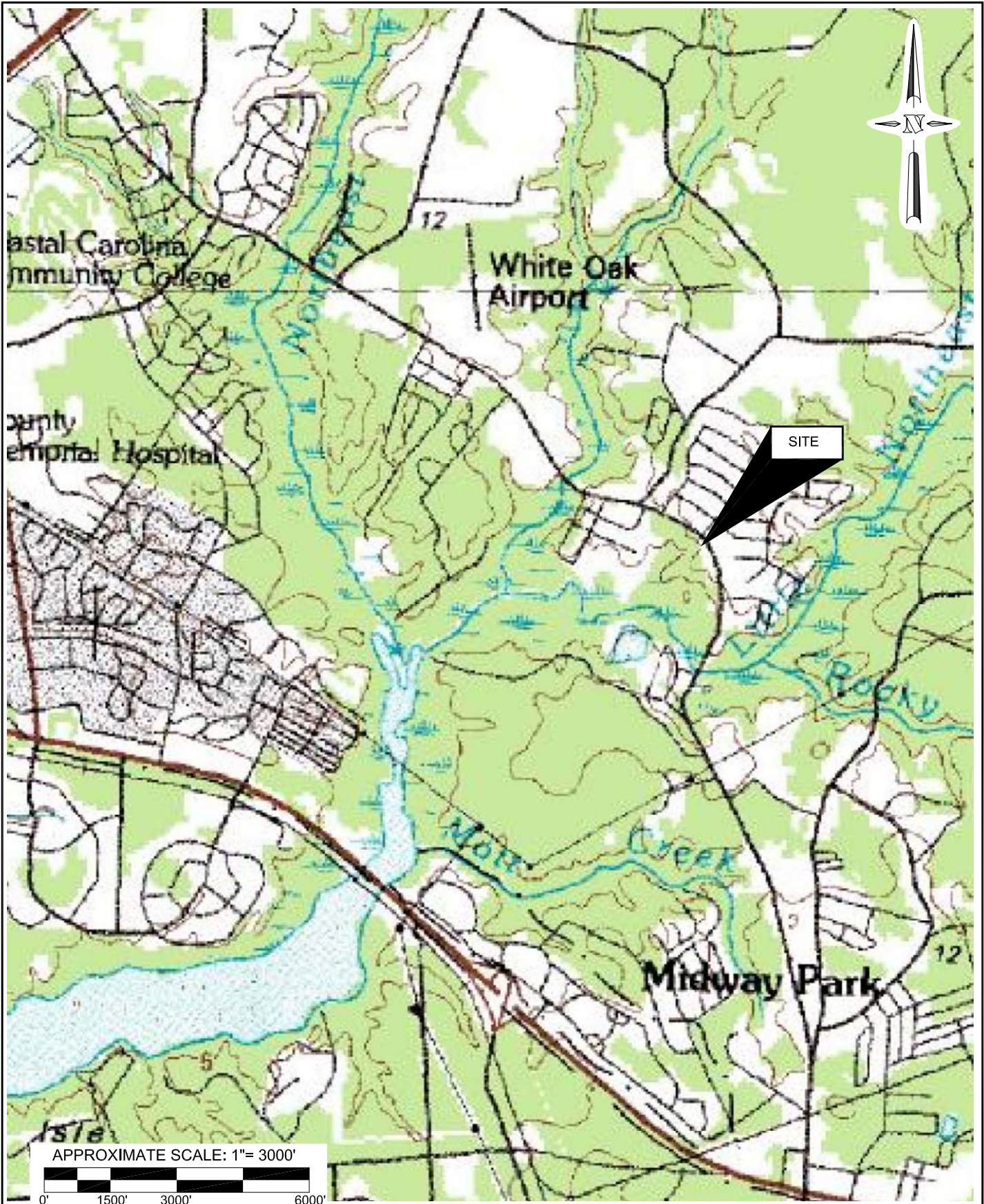
5.0 Conclusions and Recommendations

GEL performed a preliminary site assessment within the NCDOT proposed ROWs of Piney Green Road and Charles Road adjacent to Parcel #163 that included a geophysical survey, and the collection and analysis of soil samples. No subsurface anomalies were identified during the geophysical investigation, and it has been concluded that there are no known, probable, or possible USTs present within the proposed ROWs


of Piney Green Road and Charles Road adjacent to the site. However, four "Known" petroleum USTs are located onsite at Parcel #163, beneath a concrete slab in the western portion of the site based on visual evidence.

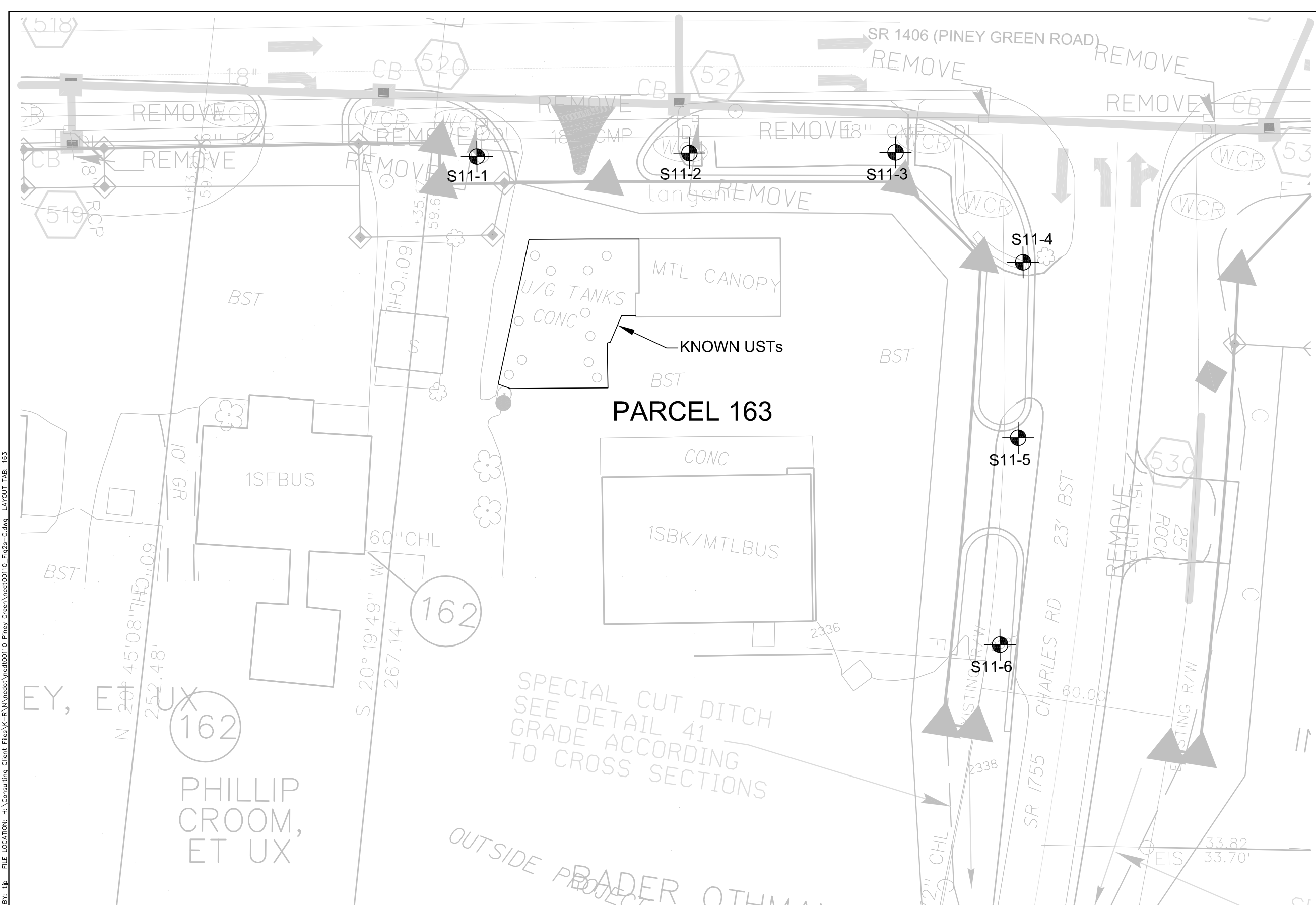
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Based on the data generated from this investigation, there is no evidence that a release of constituents of concern has occurred within the NCDOT proposed ROWs at Parcel #163. No additional environmental investigation of the soil at the site is recommended at this time.



DRAWING TAKEN FROM USGS 7.5 MINUTE TOPOGRAPHIC MAP (CAMP LEJEUNE, NC QUADRANGLE)

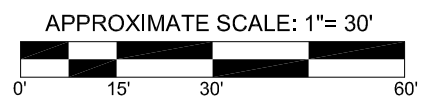
 Engineering of NC Inc. an affiliate of THE GEL GROUP INC. problem solved	P.O. Box 14262 RTP, NC 27709 P: 919.544.1100 F: 919.406.1807 www.gel.com	PROJECT: ncdt00110	USGS TOPOGRAPHIC LOCATION MAP	FIGURE 1
		PRELIMINARY SITE ASSESSMENT REPORT PARCEL 163 JACKSONVILLE, NORTH CAROLINA STATE PROJECT U-3810, WBS# 35801.1.1		



LEGEND

S11-2 SOIL BORING LOCATION

NOTE:
SEE FIGURE 3 FOR KEY MAP
SHOWING PARCEL LOCATIONS



PLOTTED: May 07, 2010 - 8:36am BY: tjp FILE LOCATION: H:\Consulting Client Files\K-R\N\ncdt00110_Piney Green\ncdt00110_Fig2s-C.dwg LAYOUT TAB: 163

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problem solved

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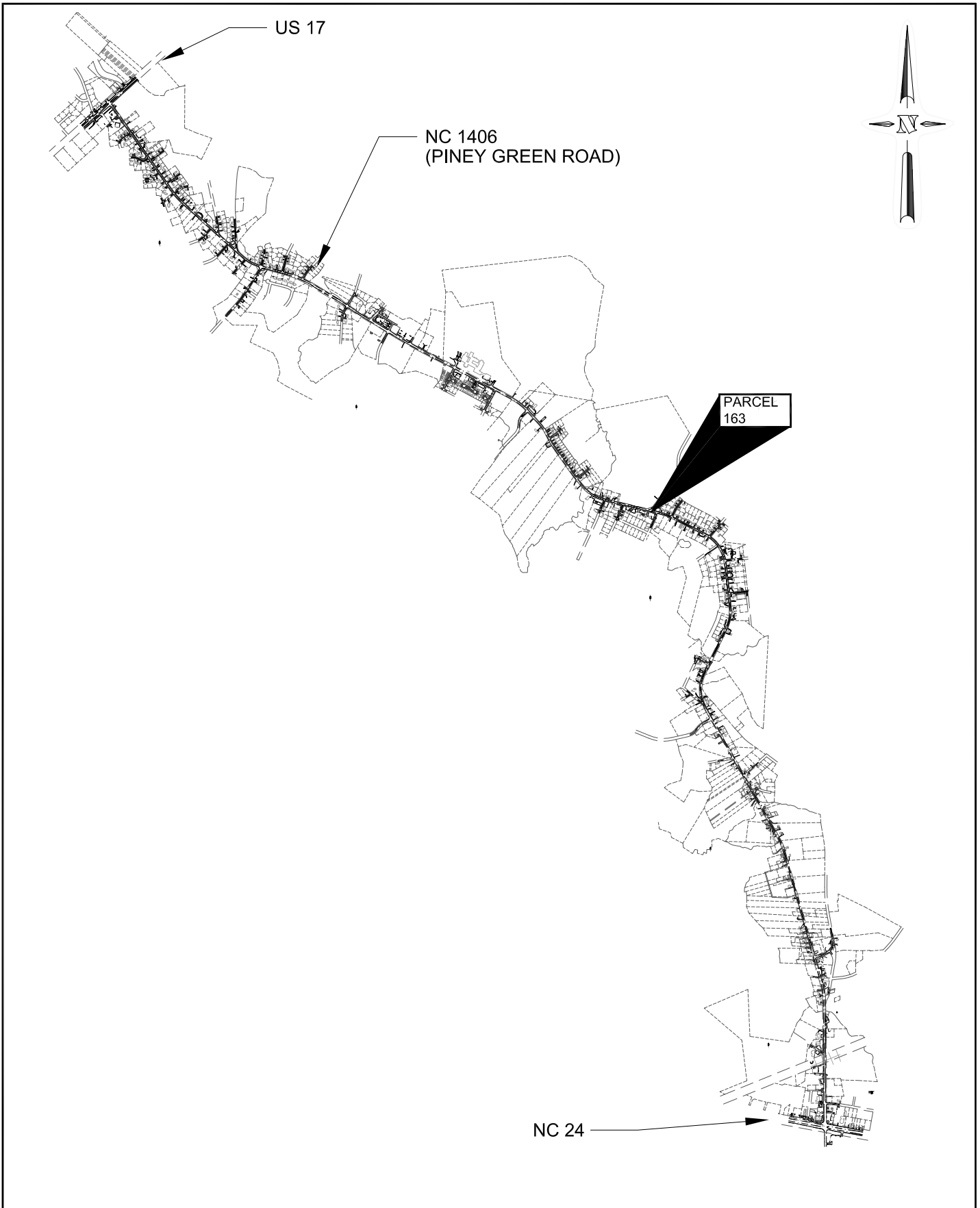
PROJECT: ncdt00110
PRELIMINARY SITE ASSESSMENT REPORT
PARCEL NO. 163, BADER OTHMAN
1500 PINEY GREEN ROAD
JACKSONVILLE, NORTH CAROLINA
STATE PROJECT U-3810, WBS #35801.1.1


DATE: May 3, 2010

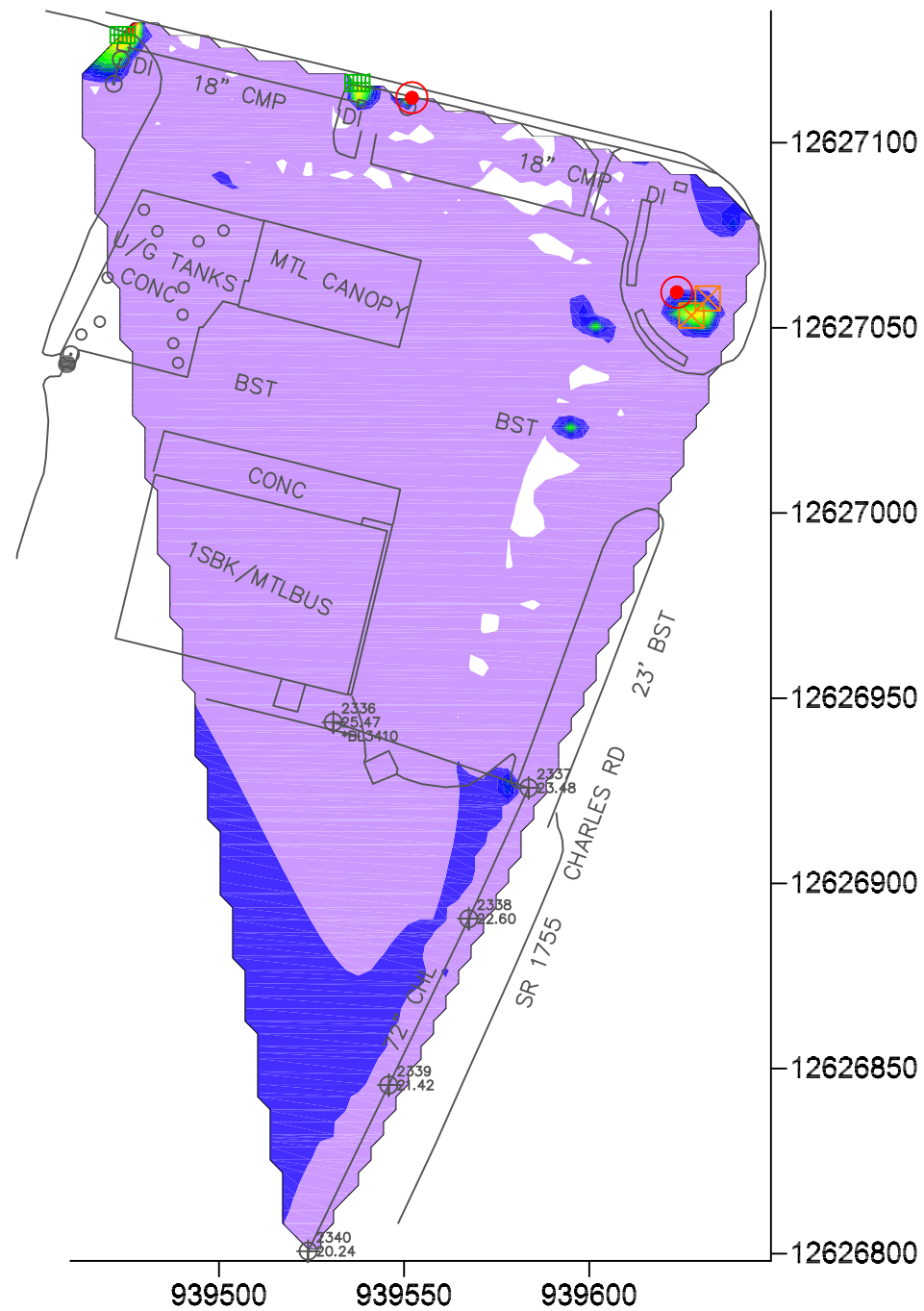
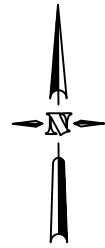
SITE SKETCH SHOWING
SOIL BORING LOCATIONS

DRAWN BY: TJP APPRV. BY: ADE

FIGURE
2

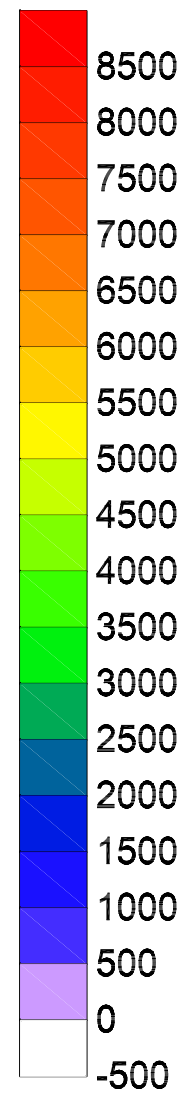


 Engineering of NC Inc. an Affiliate of THE GEL GROUP INC. problem solved	P.O. Box 14262 RTP, NC 27709 P: 919.544.1100 F: 919.406.1807 www.gel.com	PROJECT: ncd00110	KEY MAP SHOWING PARCEL LOCATION	FIGURE 3
		PRELIMINARY SITE ASSESSMENT REPORT PARCEL 163 JACKSONVILLE, NORTH CAROLINA STATE PROJECT U-3810, WBS# 35801.1.1		
		DATE: April 6, 2010	DRAWN BY: TJP	APPRV. BY: ADE



NORTHING

EM-61 Response, Ch 1 (mV)



NOTES

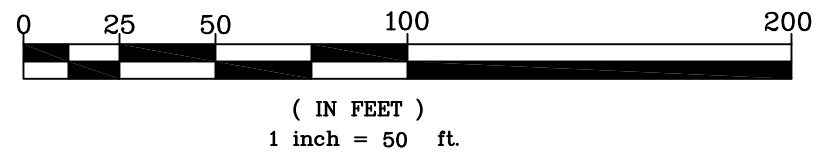
- 1) UNDERGROUND FEATURES WERE LOCATED USING VISUAL EVIDENCE, GROUND PENETRATING RADAR (GPR), AND TIME DOMAIN ELECTROMAGNETIC (TDEM) METHODS. OTHER BURIED UTILITIES AND STRUCTURES MAY EXIST BUT WERE NOT DETECTED DUE TO LIMITATIONS OF THE GEOPHYSICAL METHODS, SITE ACCESS, AND/OR HIGH TARGET CONGESTION. THEREFORE, DUE CAUTION SHOULD BE USED WHEN PERFORMING SUBSURFACE EXCAVATION ACTIVITIES WHERE POTENTIAL CONFLICTS EXIST. GEL ENGINEERING OF NC INC. IS NOT RESPONSIBLE FOR DAMAGES THAT MAY OCCUR. IDENTIFYING THE LOCATION OF SOME UTILITIES AND/OR STRUCTURES MAY ONLY BE POSSIBLE WITH VACUUM OR OTHER EXCAVATION METHODS.
- 2) DATA FROM GEONICS, LTD. EM-61 MKII AND MALA GEOSCIENCE GROUND PENETRATING RADAR.
- 3) COORDINATES IN US STATE PLANE NAD 1983 DATUM.
- 4) PROJECT MICROSTATION BASEMAPS PROVIDED BY NCDOT.
- 5) **NO UNKNOWN UNDERGROUND STORAGE TANKS FOUND UNLESS NOTED IN DRAWING**



LEGEND

- STORMWATER DRAINAGE GRATE
- UTILITY POLE
- COMMUNICATIONS HANDHOLE

GRAPHIC SCALE



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PROJECT: NCDT00110

Preliminary Site Assessment
 SR 1406 (Piney Green Rd) From NC 24 to US 17
 Onslow County, North Carolina
 State Project U-3810, WBS# 35801.1.1

March 11, 2010

Site Map Showing Results Of
 Geophysical Survey Investigation
 Parcel 163

DRAWN BY: DEA

APPRV. BY: CMS

FIGURE
 4

APPENDIX I

SOIL BORING LITHOLOGIC LOGS

SOIL BORING LOG

Boring/Well No.: SN-1
 Date Started: 3/11/10
 Date Completed: 3/11/10

09:15 *

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.4	DK Brn silty Sand, Organics, Damp Sandy Clay -> Lt Brn silty Fine Sand - Moist	
2	4-8	-	0.2	" Brn sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

340 45.521
 770 20.058

SOIL BORING LOG

Boring/Well No.: S11-2

Date Started: 3/11/10

Date Completed: 3/11/10

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.1	Asphalt 6" BGS, Organics ROC → Tan Fine Sand, Damp	
9:25 * 2	4-8	-	1.0	Tan Silty Sand, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 45.512 N

77° 20.043 W

SOIL BORING LOG

Boring/Well No.: S11-3

Date Started: 3/11/10

Date Completed: 3/11/10

0935 *

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	24 ^{RG}	1.0	Grass Mat, Organics (depth 6") ROC Damp Fine Sand, Ben Sandy Clay, Moist	
2	4-8	—	0.6	Tan Sandy Clay, Moist (Smudger @ depth)	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

340 45.509 N

770 20.032 W

SOIL BORING LOG

Boring/Well No.: 511-4
 Date Started: 3/11/10
 Date Completed: 3/11/10

9:45 *

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.6	DK Ben, Organics, Silty Sand - Damps Lt. Ben Med sand, moist-wet	
2	4-8	-	0.5	Silty Fine Sand, Tan, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 45.500

77° 20.025

SOIL BORING LOG

Boring/Well No.: 511-5
 Date Started: 3/11/10
 Date Completed: 3/11/10

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	1.0	Dk Brn, Organic Silty Sand, Asphalt (6") ROC Brn Sandy Clay, Moist	
2	4-8	-	1.2	" Tan Fine Sand, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34°45.490 N

77°20.031 W

SOIL BORING LOG

Boring/Well No.: 511-7

Date Started: 3/11/10

Date Completed: 3/11/10

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
* 1	0-4	-	1.1	DK Brn organic silty sand, Damp Orange Brown Sandy Clay, Moist	
2	4-8	-	1.0 0.5	" , Lt. Brn Clayey Sand, Moist Lt. Tan, Clean Fine sand, Moist-Wet	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34045.469 N

770 20.040 W

APPENDIX II

**CERTIFICATES OF ANALYSIS AND
CHAIN OF CUSTODY RECORD FOR SOIL SAMPLES**



Andrew Eyer
GEL Engineering of NC, Inc.
PO Box 14262
RTP, NC 27709

Report Number: G341-616

Client Project: U-3810/NCDOT 001100

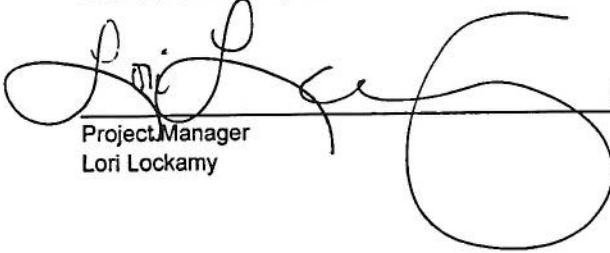
Dear Andrew Eyer,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. 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 services performed during this project, please call Lori Lockamy at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America, Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America, Inc.

A large, stylized handwritten signature in black ink, appearing to read 'Lori Lockamy', written over a horizontal line.

Project Manager
Lori Lockamy

23 March 2010

Date

Case Narrative

GEL

SGS Project: G341-616

Project Name: U-3810/NCDT001100


SGS North America Inc.

March 22nd, 2010

- Seventy four soil samples were accepted into the laboratory on March 11th, 2010 at 1515 for analyses as indicated on the chain of custody. The samples were received in good condition, with a temperature range of 2.0-2.1°C.
- All extractions and analyses were completed within holding time limits, with the following quality control exceptions.

8260 Analyses

- The ICAL dated 9032110 has a reported linear r^2 value for Acetone that is below 0.990. Only samples S8-2-8, S8-6-8, S8-8-4, S7-1-4, S7-2-4 and S7-3-4 were affected and these samples had no Acetone detected.
- Samples S8-4-4 and S8-7-8 have reported recoveries for 1,2-Dichloroethane-d4 that are above the QC limit. These recoveries were confirmed by duplicate analysis.

 _____ Date 3/23/10
Craig R Tronzo
Data Validation

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: S11-1-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-38A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2011 9:15
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 88.96

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.80	mg/Kg	1	03/18/10 23:01

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	86.1	86.1		70-130

Comments:


Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 5.81 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-1-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-38D
 Lab Project ID: G341-616

Date Collected: 3/11/2011 9:15
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 88.96
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.02	mg/Kg	1	03/17/10 16:49
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	38.4	96

Comments:

Batch Information

Analytical Batch: EP031710
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 32.01 G
 Prep Final Vol: 10 mL

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-2-8
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-39A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2011 9:25
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 86.53

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.47	mg/Kg	1	03/18/10 23:28

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	83.4	83.4		70-130

Comments:


Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 6.34 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-2-8
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-39D
 Lab Project ID: G341-616

Date Collected: 3/11/2011 9:25
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 86.53
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.83	mg/Kg	1	03/18/10 17:03
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	37.5	93.8

Comments:

Batch Information

Analytical Batch: EP031810
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 33.82 G
 Prep Final Vol: 10 mL

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-3-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-40A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2011 9:35
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 87.30

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.99	mg/Kg	1	03/18/10 23:55

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	83.9	83.9		70-130

Comments:

Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 6.89 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: BAO
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-3-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-40D
 Lab Project ID: G341-616

Date Collected: 3/11/2011 9:35
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 87.30
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.13	mg/Kg	1	03/17/10 18:41
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	41.6	104

Comments:

Batch Information

Analytical Batch: EP031710
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 32.13 G
 Prep Final Vol: 10 mL

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-4-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-21A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2010 9:45
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 86.75

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.91	mg/Kg	1	03/18/10 14:00

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	83.0	83.0		70-130

Comments:

Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 5.85 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-4-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-21D
 Lab Project ID: G341-616

Date Collected: 3/11/2010 9:45
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 86.75
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.18	mg/Kg	1	03/17/10 03:02
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	37.6	93.9

Comments:

Batch Information

Analytical Batch: EP031610
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 32.09 G
 Prep Final Vol: 10 mL

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-5-8
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-22A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2010 9:55
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 93.57

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.40	mg/Kg	1	03/18/10 14:27

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	83.9	83.9		70-130

Comments:


Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 5.01 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
 GRO.XLS

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

Client Sample ID: S11-5-8
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-22D
 Lab Project ID: G341-616

Date Collected: 3/11/2010 9:55
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 93.57
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.43	mg/Kg	1	03/17/10 03:29
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	41.3	103

Comments:

Batch Information

Analytical Batch: EP031610
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 33.24 G
 Prep Final Vol: 10 mL

Analyst: FA

NC Certification #481

Reviewed By: 
 DRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-6-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-23A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2010 10:05
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 82.71

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.84	mg/Kg	1	03/18/10 15:21

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	84.4	84.4		70-130

Comments:


Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 7.49 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-6-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-23D
 Lab Project ID: G341-616

Date Collected: 3/11/2010 10:05
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 82.71
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.32	mg/Kg	1	03/17/10 03:57
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	37.8	94.6

Comments:

Batch Information

Analytical Batch: EP031610
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 33.05 G
 Prep Final Vol: 10 mL

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-7-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-24A
 Lab Project ID: G341-616
 Report Basis: Dry Weight

Analyzed By: BAO
 Date Collected: 3/11/2010 10:15
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 84.89

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.74	mg/Kg	1	03/18/10 15:48

Surrogate Spike Results

	Added	Result	Recovery	Flag	Limits
BFB	100	83.6	83.6		70-130

Comments:

Batch Information

Analytical Batch: VP031810
 Analytical Method: 8015
 Instrument ID: GC4
 Analyst: BAO

Prep Method: 5035
 Initial Wt/Vol: 7.46 g
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: 
GRO.XLS

Results for Total Petroleum Hydrocarbons
by GC/FID 8015

Client Sample ID: S11-7-4
 Client Project ID: U-3810/NC DOT 001100
 Lab Sample ID: G341-616-24D
 Lab Project ID: G341-616

Date Collected: 3/11/2010 10:15
 Date Received: 3/11/2010
 Matrix: Soil
 Solids 84.89
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.01	mg/Kg	1	03/17/10 04:25
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	39.1	97.7

Comments:

Batch Information

Analytical Batch: EP031610
 Analytical Method: 8015
 Instrument: GC6
 Analyst: DTF

Prep batch: 16211
 Prep Method: 3541
 Prep Date: 03/15/10
 Initial Prep Wt/Vol: 33.62 G
 Prep Final Vol: 10 mL



SGS Environmental Services Inc.
CHAIN OF CUSTODY RECORD

- Locations Nationwide
- Alaska
 - Maryland
 - New Jersey
 - New York
 - North Carolina
 - Ohio
 - West Virginia
- www.us.sgs.com

1 CLIENT: GEL ENG. OF NC, TACC PHONE NO: 919-323-8828

CONTACT: ANDREW EYER SITE/PWSID#: ONSLOW Co.

PROJECT: U-3810/METICOLLO EMAIL: ade@gel.com

REPORTS TO: ANDREW EYER QUOTE #: WCDOT

INVOICE TO: WCDOT P.O. #: WBS # 35801.1.1

SGS Reference #: 6341-616 page of

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE	# CONTAINERS				SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	Preservatives Used	Analysis Required (3)	REMARKS/ LOC ID
					C	O	N	T				
31	58-9-4	3/10/10	13:10	50	3	0	0	0	0	0	0	GRD
32	58-10-4		13:25	50	3	0	0	0	0	0	0	Vols - 8260
33	58-11-4		13:40	50	3	0	0	0	0	0	0	Vols - 8270
34	59-1-8		14:10	50	3	0	0	0	0	0	0	
35	59-2-8		16:10	50	3	0	0	0	0	0	0	
36	59-3-8		16:20	50	3	0	0	0	0	0	0	
37	59-4-8		16:30	50	3	0	0	0	0	0	0	
38	511-1-4	3/11/10	09:15	50	3	0	0	0	0	0	0	
39	511-2-8		09:25	50	3	0	0	0	0	0	0	
40	511-3-4		09:35	50	3	0	0	0	0	0	0	

4 DOD Project? YES NO
Cooler ID: _____

Special Deliverable Requirements:

Requested Turnaround Time and/or Special Instructions:

Samples Received Cold? YES NO
Cooler TB TB

Temperature °C: 2.0, 2.1, 2.0

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



SGS Environmental Services Inc.
CHAIN OF CUSTODY RECORD

Locations Nationwide
 • Alaska
 • New Jersey
 • North Carolina
 • West Virginia
 • Maryland
 • New York
 • Ohio
 www.us.sgs.com

1 CLIENT: GEL Eng of NC, Inc. PHONE NO: 919-323-8828
 CONTACT: Andrew Eyer SITE/PWSID#: ONSLOW Co.
 PROJECT: U-3810/NC01010 EMAIL: ae@gel.com
 REPORTS TO: Andrew Eyer
 INVOICE TO: NC DOT QUOTE #: _____
 WBS# 35801.1.1 P.O. #: _____

SGS Reference #: G341-616 page _____ of _____

#	CONTAINERS	SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	PRESERVATIVES USED	ANALYSIS REQUIRED	REMARKS/LOC ID
21	3	G			
22	3	G			
23	3	G			
24	3	G			
25	3	G			
26	3	G			
27	3	G			
28	3	G			
29	3	G			
30	3	G			

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE
21	S11-4-4	3/11/10	09:45	50
22	S11-5-8		09:55	50
23	S11-6-4		10:05	50
24	S11-7-4		10:15	50
25	S10-1-4		10:40	50
26	S10-2-4		10:50	50
27	S10-3-8		11:00	50
28	S10-4-4		11:10	50
29	S10-5-4		11:20	50
30	S10-6-8		11:40	50

5 Collected/Relinquished By: (1) Andrew Eyer Received By: Andrew Eyer
 Relinquished By: (2) _____ Received By: _____
 Relinquished By: (3) _____ Received By: _____
 Relinquished By: (4) _____ Received For Laboratory By: _____

DOD Project? YES NO
 Cooler ID _____
 Special Deliverable Requirements: _____
 Requested Turnaround Time and/or Special Instructions: _____

Samples Received Cold? YES NO
 Cooler TB
 Temperature °C: 2-0, 2-1, 2-0
 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

APPENDIX III

PHOTOGRAPHS SHOWING SOIL BORING LOCATIONS



S11-1

S11-2

S11-3

S11-4

BELFAST QUICKMART
1500 PINEY GREEN RD.
PARCEL NO. 163

S11-5

S11-6

RACE TRACK ROAD

PINEY GREEN ROAD

CHARLES ROAD



