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March 23, 2021



North Carolina Department of Transportation  
Attention: Mr. John Pilipchuk, LG, PE  
GeoEnvironmental Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589

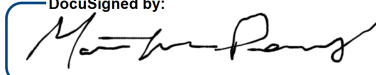
Re: Phase II Preliminary Site Assessment Report  
NC 55 from South of SR 1532 to North of NC 210  
Parcel 244 – Beryl Road Properties, LLC  
8305 NC 55, Willow Spring, Wake County, North Carolina  
TIP No. R-5705B  
WBS Element: 46377.1.3

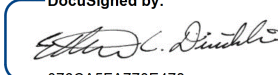
Dear Mr. Pilipchuk:

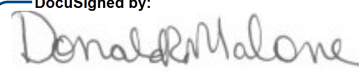
Terracon Consultants, Inc. (Terracon) is pleased to submit this Phase II Preliminary Site Assessment (PSA) Report for the above referenced site. This assessment was performed in accordance with our Revised Proposal for GeoEnvironmental Phase II Site Investigations (Terracon Proposal No. P70207241) dated December 8, 2020. This report includes the findings of the investigation and provides our conclusions and recommendations. Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation. If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

**Terracon Consultants, Inc.**

DocuSigned by:  
  
5ABC0739D7334DC...  
James M. Perry  
Field Scientist

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Ethan C. Dinwiddie, GIT  
Field Geologist

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Donald R. Malone, PE, RSM  
Senior Engineer

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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# Phase II Preliminary Site Assessment Report

NC 55 from South of SR 1532 to North of NC 210  
Parcel 244 – Beryl Road Properties, LLC  
8305 NC 55, Willow Spring, Wake County, North Carolina

TIP No. R-5705B

WBS Element: 46377.1.3

March 23, 2021

Terracon Project No. 70207241



**Prepared for:**

North Carolina Department of Transportation  
Raleigh, North Carolina

**Prepared by:**

Terracon Consultants, Inc.  
Raleigh, North Carolina

[terracon.com](http://terracon.com)

**Terracon**

Environmental



Facilities



Geotechnical



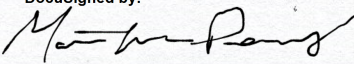
Materials



# Phase II Preliminary Site Assessment Report

NC 55 from South of SR 1532 to North of NC 210  
Parcel 244 – Beryl Road Properties, LLC  
8305 NC 55, Willow Spring, Wake County, North Carolina

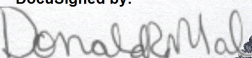
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## EXHIBITS

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Exhibit 2 – State of North Carolina, Division of Highways Conventional Plan Sheet Symbols

Exhibit 3 – Boring Locations and Summarized Soil and Groundwater Sample Results

## TABLES

Table 1 – Summary of PID Field Screening Values

Table 2 – Summary of Soil Analytical Results

Table 3 – Summary of Groundwater Analytical Results

## APPENDICES

Appendix A – Geophysical Survey Report

Appendix B – Photographs

Appendix C – Soil Boring Logs

Appendix D – Groundwater Sampling Log

Appendix E – Laboratory Analytical Reports and Chain-of-Custody Records

# PHASE II PRELIMINARY SITE ASSESSMENT REPORT

NC 55 FROM SOUTH OF SR 1532 TO NORTH OF NC 210

TIP NO. R-5705B

WBS ELEMENT: 46377.1.3

PARCEL 244 – BERYL ROAD PROPERTIES, LLC

8305 NC 55, WILLOW SPRING, WAKE COUNTY, NORTH CAROLINA

## 1.0 INTRODUCTION

### 1.1 Site Description

<b>Site Name</b>	Parcel # 244 – Beryl Road Properties, LLC
<b>Site Location/Address</b>	8305 NC 55, Willow Spring, Wake County, North Carolina
<b>General Site Description</b>	The site consists of an approximate 0.46-acre portion of a 1.82-acre parcel and is comprised of paved and grassed areas.

### 1.2 Site History

At the time of the Phase II Preliminary Site Assessment (PSA), the site was observed to be a vacant lot containing paved and grassed areas. Terracon obtained historical information about the site through a review of historical regulatory files available on the North Carolina Department of Environmental Quality (NCDEQ) online repository and files provided by the client. Based on the review of the available files, Terracon understands that a gasoline station, known as the former Marvin Johnson Property, formerly operated an underground storage tank (UST) system at the site and that a petroleum release was identified in 1989 during a septic tank inspection by the Wake County Health Department. The on-site gasoline station was not operational at the time the release was identified and the release was assigned UST Incident No. 5423 by NCDEQ. Information regarding the operation of the facility between 1989 and 2005 was not available for review. In 2005, the site was accepted into the NCDEQ State-Lead Cleanup Program and two 4,000-gallon gasoline USTs and approximately 660 tons of contaminated soil surrounding the USTs were removed from the site in April 2006. Analytical results from soil samples collected from the extents of the UST pit did not indicate residual petroleum contamination in the soil. At the time of the UST removal, the on-site structures had been demolished (Agra, 2006a).

Additional investigation of the site was recommended due to a shallow water table observed at the site during the UST removal, and a Phase I Limited Site Assessment (LSA) and Pre-Corrective Action Plan (CAP) were performed at the site in 2006 and 2007, respectively. The LSA and



Pre-CAP identified concentrations of petroleum compounds in soil and groundwater above regulatory standards surrounding the USTs that were removed in April 2006 (Agra, 2006b and 2007). From 2010 to 2015, groundwater at the site was monitored through periodic sampling of seven on-site monitoring wells, MW-2, 2R, 3, 4, 5, 6, and 7. The first monitoring well installed at the site, MW-1, was not located during the groundwater sampling events from 2010 to 2015 (S&ME, 2015). In July 2015, the release incident was closed with a land use restriction due to detected concentrations of several petroleum compounds in groundwater at the site above the Title 15A North Carolina Administrative Code 2L Groundwater Quality Standards (2L Standards). In August 2015, the on-site monitoring wells, MW-2 through MW-7, were abandoned by a North Carolina Certified Well Contractor.

### **1.3 Scope of Work**

Terracon conducted the following PSA scope of work in accordance with Terracon's Proposal No. P70207241 dated December 8, 2020. This PSA is being completed prior to a planned upgrade to NC 55 from South of SR 1532 (Oak Grove Church Road) to North of NC 210. The scope of work included a geophysical investigation, the collection of soil and groundwater samples, and preparation of a report documenting our investigation activities. The PSA is not intended to delineate potential impacts. The PSA was performed within the proposed rights-of-way (ROW) as indicated by North Carolina Department of Transportation (NCDOT) provided plan sheets.

### **1.4 Standard of Care**

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report. These services were performed in accordance with our Revised Proposal for GeoEnvironmental Phase II Site Investigations (Terracon Proposal No. P70207241) dated December 8, 2020 and were not necessarily conducted in strict accordance with ASTM E1903-11.

### **1.5 Additional Scope Limitations**

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or

other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

## **1.6 Reliance**

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

## **2.0 FIELD ACTIVITIES**

The following PSA activities are presented in the order that they were conducted in the field. **Exhibit 1** presents the topography of the site on a portion of the USGS topographic quadrangle maps of Angier and Fuquay-Varina, North Carolina, 1993. **Exhibit 2** depicts conventional plan sheet symbols used by the NCDOT, Division of Highways. **Exhibit 3** depicts the site layout and indicates the approximate locations of the site features, soil boring and temporary well locations, and analytical results.

### **2.1 Geophysical Survey**

On January 21 and 22, 2021, Terracon conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs, or other geophysical anomalies were present beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM31-SH metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-4000 unit. In addition to metal detection and GPR scans, NC One Call public utility locator was used to identify underground utility lines and to clear boring locations. A copy of the geophysical report is in **Appendix A**.

The geophysical investigation identified four probable metallic USTs located in the northwestern portion of the site along NC-55 and within the proposed ROW area. The probable USTs measured approximately 4.5 to 7 feet long and were located approximately 2 feet below land surface (bls). This area of the site was covered by grass and pavement and surface features such as vent pipes or fill ports were not observed in association with the probable USTs. Possible fuel lines on the site were not identified in the geophysical investigation.



Terracon verified the existence of the probable USTs further by advancing hand augers in the identified locations and observed a hollow sound when striking the USTs with the hand auger. Additionally, Terracon exposed the fill port for one of the USTs but was unable to remove the fill port to evaluate the presence of petroleum products.

One on-site abandoned monitoring well associated with the on-site UST petroleum release (Incident No. 5423) was identified during the geophysical investigation. Additional monitoring wells were not identified, and the on-site monitoring wells are reportedly abandoned. Photographs of the site and relevant site features are in **Appendix B**.

## **2.2 Soil Sampling**

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon oversaw the advancement of six soil borings (244-SB-01 through 244-SB-06) throughout the parcel and within the proposed NCDOT ROW. The borings were completed by a North Carolina Certified Well Contractor (Regional Probing Services, Inc. [Regional Probing]) using a truck-mount Geoprobe® 5410 direct-push drill rig.

Terracon collected soil samples in 5-foot long, disposable, Macro-Core® sampler tubes to document soil lithology, color, moisture content, and sensory evidence of impacts. Each soil sample was screened for organic vapors using an 11.7 electron volt photoionization detector (PID). The PID data were collected in order to help select the most appropriate sample intervals for laboratory analysis and to corroborate laboratory data. PID readings from the borings ranged from 0.1 parts per million (ppm) to 402.1 ppm. The highest PID readings were in 244-SB-05 and 244-SB-06. The PID screening values are summarized in **Table 1**.

Terracon directed Regional Probing to advance each soil borings to a depth of approximately 10 feet bls. Based on the results of the field screening, six soil samples, one from each boring, were collected from depths between approximately 4 feet and 8 feet bls. Soil samples were collected generally from the depth interval that exhibited the greatest PID reading. Samples were placed in laboratory provided sample containers, packed in an iced cooler, and shipped to REDLAB/QROS, LLC – Environmental Testing (REDLAB) for analysis by Ultraviolet Fluorescence (UVF).

Terracon directed the driller to advance three borings, surrounding the probable USTs, in order to further assess the probable USTs. Borings 244-SB-01, 244-SB-02, and 244-SB-04 were advanced surrounding the probable USTs. Field screening of the soils and soil samples collected beside the probable USTs indicated a release has occurred, although the impacted soil could be residual contamination from the USTs that were removed in 2006.

The drilling equipment used at the site was decontaminated prior to use and between the advancement of each boring. Non-dedicated sampling equipment was decontaminated using a

Liquinox<sup>®</sup>-water wash followed by a distilled water rinse. Each of the boreholes was backfilled with soil cuttings and bentonite pellets. Surface completion was achieved with either dirt or asphalt cold patch. Remaining investigation derived waste was spread on the site.

Soil generally consisted of clay with sand interlayered by sand with clay. Wet to saturated soils were not observed in the majority of the soil borings. The soil boring logs are included in **Appendix C**. Sample locations were measured using a sub-foot Trimble Geo7X GPS unit and are depicted on **Exhibits 3**.

### **2.3 Groundwater Sampling**

Based on the results of the field screening, boring 244-SB-04 was advanced to 15 feet bls on February 3, 2021 and converted to temporary monitoring well 244-TW-01, which was constructed as follows:

- Installation of a 10-foot section of 1-inch diameter, 0.010-inch machine slotted polyvinyl chloride (PVC) well screen;
- Installation of a 5-foot section of 1-inch diameter, threaded, flush-joint PVC riser pipe to the ground surface; and
- Placement of sand in the borehole annulus to approximately 2 feet above the screened interval, followed by a layer of hydrated bentonite.

After installation, depth to groundwater in the temporary well was measured at 4.85 feet bls. A groundwater sample was collected from 244-TW-01 using low flow sampling techniques (i.e., <200 milliliters per minute). Groundwater parameters (pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and temperature.) were monitored and the well was purged until the parameters stabilized (i.e., three consecutive readings were within approximately 5 percent of one another). After the purging was completed, Terracon collected the sample directly into laboratory supplied-containers and packed the sample in an iced cooler.

The groundwater sample collected from the temporary well was shipped to Pace Analytical, Inc. (Pace) in Columbia, North Carolina for analysis of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8260D and USEPA Method 8270E, respectively.

The groundwater sampling log is included in **Appendix D**. The temporary monitoring well location is depicted on **Exhibit 3**.



### 3.0 LABORATORY ANALYSES

Soil samples were submitted to REDLAB for analysis of the following:

- TPH-gasoline range organics (C<sub>5</sub>-C<sub>10</sub>) (TPH-GRO);
- TPH-diesel range organics (C<sub>10</sub>-C<sub>35</sub>) (TPH-DRO);
- Total petroleum hydrocarbons (C<sub>5</sub>-C<sub>35</sub>) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>);
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Groundwater samples were submitted to Pace for analysis of the following:

- EPA Method 8260D for VOCs; and
- EPA Method 8270E for SVOCs.

Please refer to **Appendix E** for the laboratory analytical reports.

### 4.0 DATA EVALUATION

#### 4.1 Soil Analytical Results

Laboratory analysis identified the following detections above the laboratory reporting limits in soil samples 244-SB-01 through 244-SB-06:

- TPH-GRO was reported within each sample at concentrations ranging from 6.5 to 122 milligrams per kilogram (mg/kg);
- TPH-DRO was reported within each sample at concentrations ranging from 1.8 to 274 mg/kg;
- TPH was reported within each sample at concentrations ranging from 12.4 to 396 mg/kg;
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>) was reported within each sample at concentrations ranging from 1.2 to 16.3 mg/kg; and
- 16 EPA PAHs was reported within 244-SB-02, 244-SB-05, and 244-SB-06 at concentrations ranging from 0.46 to 0.65 mg/kg.

BTEX and BaP were not reported above laboratory reporting limits in the soil samples.

The concentrations of TPH-GRO and/or TPH-DRO detected in 244-SB-02, 244-SB-05, and 244-SB-06 exceed NCDEQ Action Levels (50 mg/kg and 100 mg/kg, respectively). The concentrations of TPH-GRO or TPH-DRO detected in 244-SB-01, 244-SB-03, and 244-SB-04 do not exceed NCDEQ Action Levels.

**Table 2** summarizes the results of the analyses of the soil samples. **Exhibit 3** depicts the boring locations and detected compounds.

## 4.2 Groundwater Analytical Results

Laboratory analysis identified the following detections above the laboratory reporting limits in the groundwater sample collected from 244-TW-01:

- The following VOCs were detected within 244-TW-01: acetone, benzene, cyclohexane, ethylbenzene, isopropylbenzene, methylcyclohexane, and total xylenes. Benzene was the only constituent that exceeded the 2L Standards.
- The following SVOCs were detected within 244-TW-01: acenaphthene, anthracene, 1,1'-biphenyl, dibenzofuran, bis(2-ethylhexyl)phthalate, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. None of the SVOCs exceeded the 2L Standards.

**Table 3** summarizes the results of the analyses of the groundwater sample. **Exhibit 3** depicts the groundwater sample locations and detected compounds.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- The geophysical investigation identified four probable metallic USTs located in the northwestern portion of the site along NC-55 and within the proposed ROW area. The USTs measured approximately 4.5 to 7 feet long and were located approximately 2 feet bls.
- Terracon verified the existence of the probable USTs further by advancing hand augers in the identified locations. Surface features such as vent pipes or fill ports were not observed in association with the USTs and fuel lines on the site were not identified.
- Laboratory analyses reported concentrations of TPH-GRO, TPH-DRO, TPH, Total Aromatics, and/or 16 EPA PAHs within each soil sample collected at the site. The detected concentrations of TPH-GRO and/or TPH-DRO exceeded NCDEQ Action Levels in

244-SB-02, 244-SB-05, and 244-SB-06 in at least the 4 to 8 feet bls range. The detected concentrations of these compounds did not exceed NCDEQ Actions Levels in 244-SB-01, 244-SB-03, and 244-SB-05.

- The area of contamination appears within the vicinity of borings 244-SB-02, 244-SB-05, and 244-SB-06 and could be associated with releases from former on-site fuel dispensers or below ground fuel piping. Terracon estimated the volume of petroleum impacted soil located within the ROW at approximately 410 cubic yards. This is based on an approximate area of 3,700 square feet shown in Exhibit 3 and depths ranging from land surface to 3 feet bls. The actual amount of impacted soil can only be determined after excavation or by advancing additional borings at the site to further delineate the extents of contamination. This area would best be managed as a fill area, to avoid potentially impacted soil and groundwater.
- Laboratory analysis reported concentrations of multiple VOCs and SVOCs within groundwater at the site. The detected concentration of benzene exceeded the 2L Standard in the groundwater sample collected from 244-TW-01.
- Terracon recommends NCDOT provide a copy of the results to the owner and/or operator of the site and to NCDEQ.
- Terracon does not recommend further assessment of the ROW at this site. However, based on the probable USTs and the detections of petroleum compounds, USTs and impacted soil and groundwater encountered during the roadway construction project should be managed and/or disposed of in accordance with applicable NCDEQ Guidelines (NCDEQ, 2021). In addition, construction workers should be alert for potential soil and/or groundwater impacts at the site.

## **6.0 REFERENCES**

Agra Environmental, Inc. (Agra), 2006a. UST Closure Report, Marvin Johnson Property. January 13.

Agra, 2006b. Limited Site Assessment Report – Phase I, Marvin Johnson. September 20.

Agra, 2007. Monitoring Report (Pre-CAP), Marvin Johnson. February 1.

North Carolina Department of Environmental Quality, 2021. Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement, Petroleum and Hazardous Substance UST Releases and Petroleum Non-UST Releases, UST Section, January 19.

North Carolina Department of Transportation, 2018. GeoEnvironmental Planning Report. September 26.

**Phase II Preliminary Site Assessment Report**

Parcel 244 - Beryl Road Properties, LLC

8305 NC 55, Willow Spring, Harnett County, NC

March 23, 2021 ■ Terracon Project No. 70207241

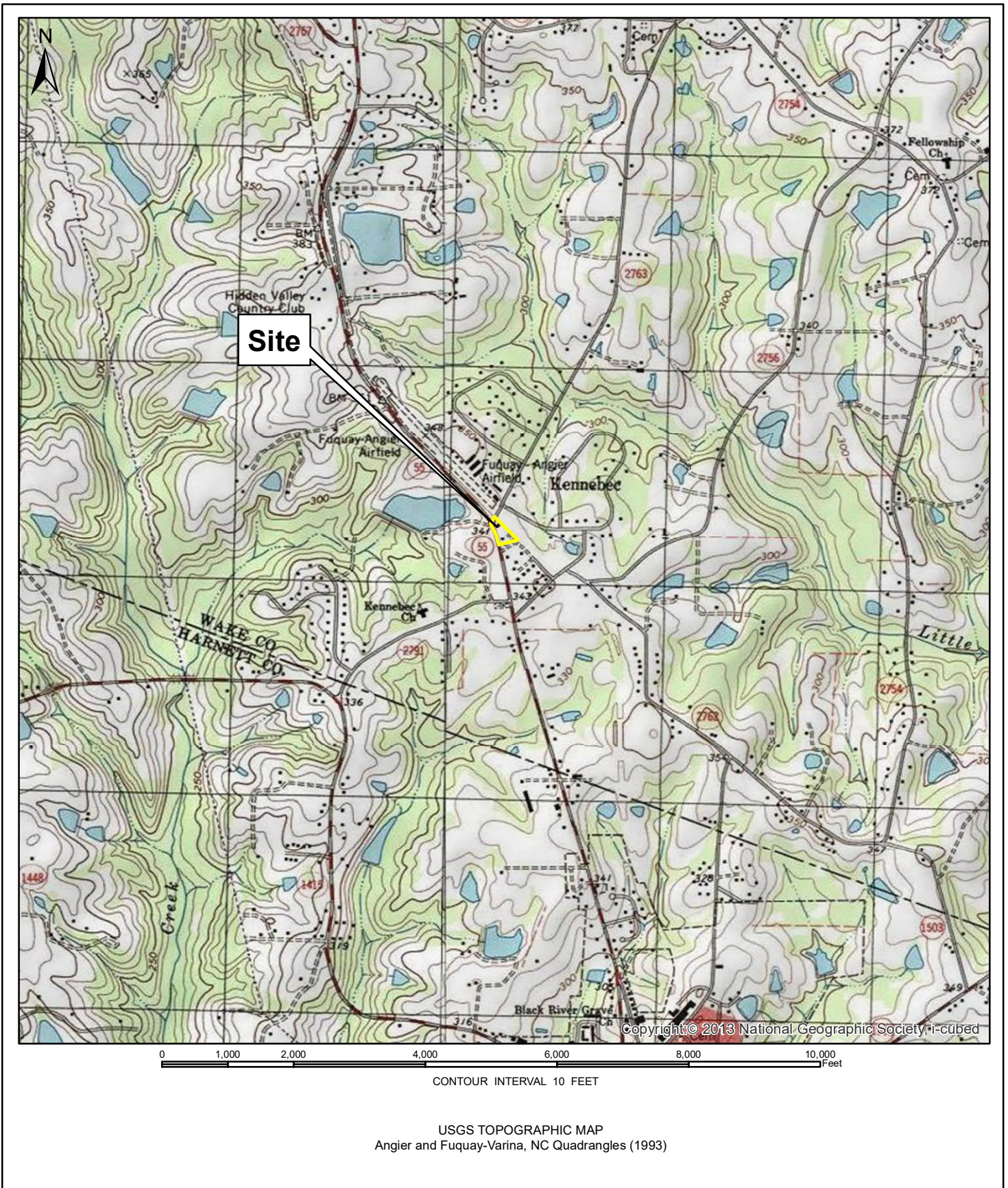


S&ME, Inc. (S&ME), 2015. Groundwater Monitoring Report, Marvin Johnson Property, Incident #5423. May 22.

Terracon Consultants, Inc., 2020. Revised Proposal for GeoEnvironmental Phase II Site Investigations, NC 55 from South of SR 1532 to North of NC 210. December 8.



## **EXHIBITS**



PM:	DRM
Drawn By:	ECD
Checked By:	DRM
Approved By:	DRM

Project No.	70207241
Scale:	1:24,000
File Path:	
Date:	March 2021

**Terracon**

2401 Brentwood Drive, Suite 107 Raleigh, NC 27604  
Phone: (919) 873-2211 Fax: (919) 873-9555

**Topographic Vicinity Map**

Preliminary Site Assessment  
Parcel 244 - Beryl Road Properties  
8305 NC 55  
Willow Springs, Wake County, North Carolina

EXHIBIT NO.	1
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# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

### BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

### HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

### RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

### RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easement Pin and Cap	
New Permanent Easement Pin and Cap	
Vertical Benchmark	
Existing Right of Way Marker	
Existing Right of Way Line	
New Right of Way Line	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite R/W Marker	
New Control of Access Line with Concrete CA Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage / Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

### VEGETATION:

Single Tree	
Single Shrub	

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

Hedge	
Woods Line	
Orchard	
Vineyard	

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

### UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

### TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

### WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

### TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

### GAS:

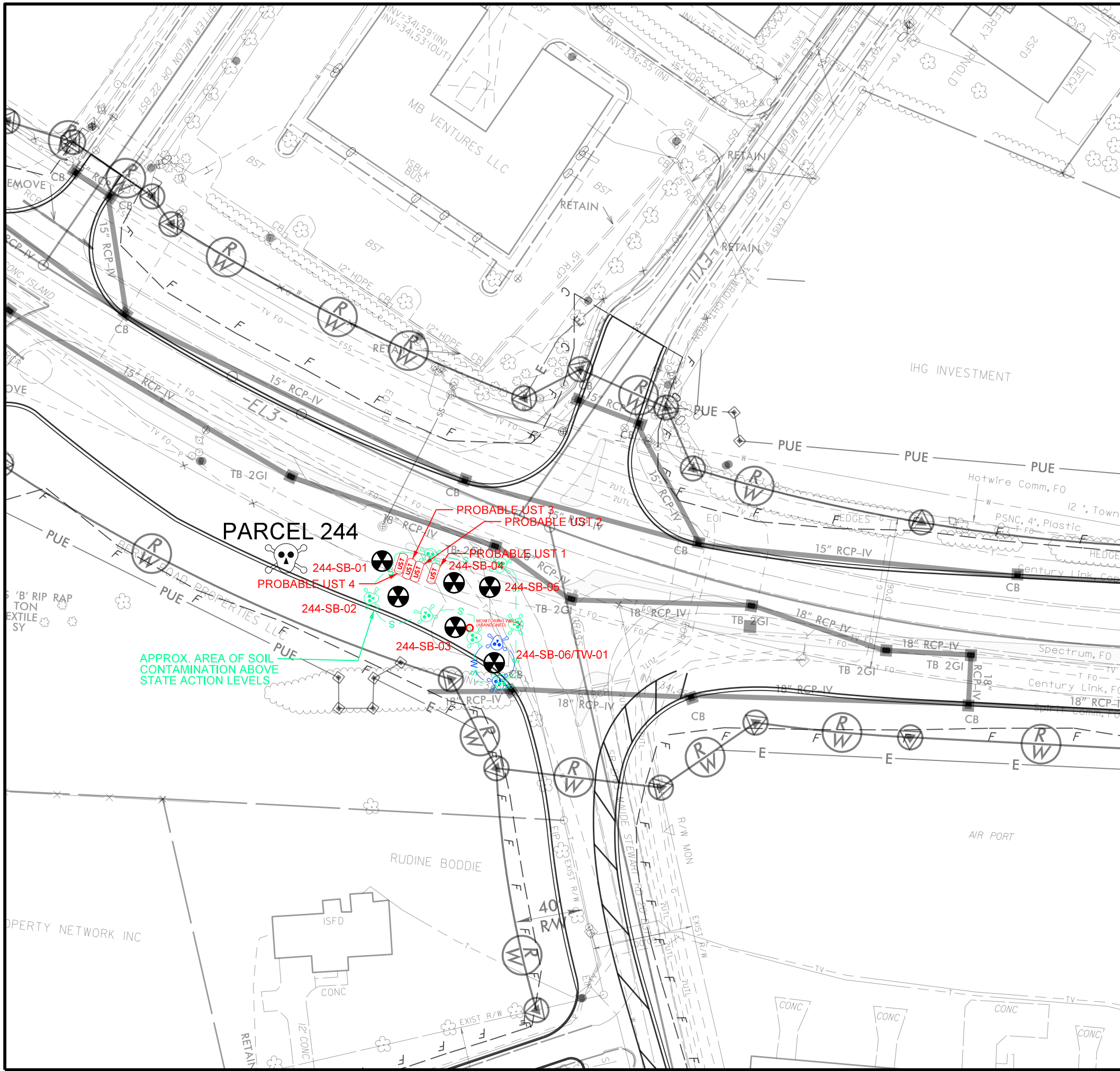
Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

### SANITARY SEWER:

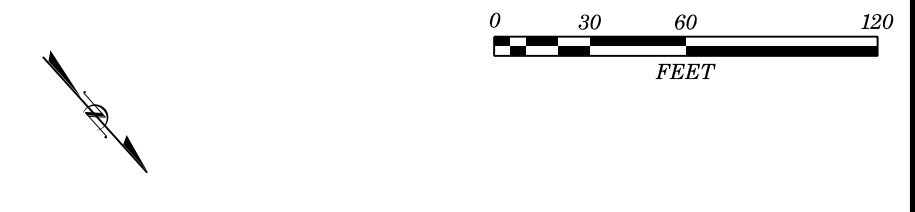
Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

### MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	



<b>PROJECT DESCRIPTION:</b> <b>PARCEL 244</b> <b>BERYL ROAD PROPERTIES</b> <b>8305 NC 55</b> <b>WILLOW SPRING, WAKE COUNTY</b>	<b>PROJECT REFERENCE NO.</b>	<b>EXHIBIT</b>
	46377.1.3 (R-5705B)	3
	<b>BORING LOCATIONS AND SUMMARIZED SOIL AND GROUNDWATER SAMPLE RESULTS</b>	



Sample ID	Date Collected	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs
244-SB-01 (4-6)	2/2/2021	10	8.8	18.8	1.5	<0.15
244-SB-02 (6-8)	2/2/2021	<b>122</b>	<b>274</b>	396	16.3	0.65
244-SB-03 (6-8)	2/2/2021	6.5	5.9	12.4	1.2	<0.15
244-SB-04 (4-6)	2/2/2021	10.6	1.8	12.4	1.4	<0.15
244-SB-05 (4-6)	2/2/2021	<b>86.8</b>	<b>253.7</b>	340.5	11.6	0.46
244-SB-06 (6-8)	2/2/2021	<b>73.2</b>	70.9	144.1	12.1	0.48
State Action Levels		50	100	NE	NE	NE

Sample depth is provided in parentheses as part of the sample ID.  
 All results are reported in milligrams per kilogram (mg/kg).  
 Bolded: Concentration exceeds applicable NCDEQ State Action Level.  
 <: Less than laboratory reporting limit.  
 NE - standard not established.  
 GRO - Gasoline Range Organics.  
 DRO - Diesel Range Organics.  
 TPH - Total Petroleum Hydrocarbons.  
 16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, ace naphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, inde no[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).

Sample ID	244-TW-01	GWQS (µg/L)	GCL (µg/L)
Date Collected	2/3/2021		

EPA Method 6200B			
Acetone	13	6,000	6,000,000
Benzene	1.1	1	5,000
Cyclohexane	24	NE	NE
Ethylbenzene	2.0	600	84,500
Isopropylbenzene (Cumene)	5.2	70	25,000
Methylcyclohexane	31	NE	NE
Xylenes (Total)	0.50 J	500	85,500
EPA Method 8270E			
Acenaphthene	0.39	80	2,120
Anthracene	0.082 J	2,000	2,000
1,1'-Biphenyl	0.60 J	NE	NE
Dibenzofuran	0.20 J	28	28,000
bis(2-Ethylhexyl)phthalate	0.57 B J	3	170
Fluoranthene	0.041 J	300	300
Fluorene	0.34	300	990
2-Methylnaphthalene	19	30	12,500
Naphthalene	4.5 B	6	6,000
Phenanthrene	0.32	200	410
Pyrene	0.046 J	200	200

244-TW-01 installed in 244-SB-06 at approximately 15 feet below land surface with 10 feet of screen.  
 Concentrations are reported in micrograms per liter (µg/L).  
 GWQS - North Carolina Groundwater Quality Standard (2L Standard, May, 2013).  
 GCL - Gross Contamination Levels for Groundwater (September, 2014).  
 NE - standard not established.  
 Bolded: Concentration exceeds applicable GWQS.  
 J: Indicates estimated concentration under laboratory reporting limit but above detection limit.



## TABLES

Table 1  
 Summary of PID Field Screening Values  
 Phase II Preliminary Site Assessment  
 Parcel 244 - Beryl Road Properties, LLC  
 8305 NC 55, Willow Spring, Harnett County, North Carolina  
 Terracon Project No. 70207241

Boring Depth (feet bls)	244-SB-01	244-SB-02	244-SB-03	244-SB-04	244-SB-05	244-SB-06
(0 - 2)	0.1	1.3	2.3	1.5	2.3	3.2
(2 - 4)	0.6	40.3	3.9	2.2	3.8	2.3
(4 - 6)	11.8	98.7	6.2	143.2	402	23.1
(6 - 8)	4.8	203.5	64.5	44.6	283.9	402.1
(8 - 10)	7.7	10.7	7.2	17.2	377.6	104.5

Notes:

Field screening was conducted on February 3, 2021

Values shown are given in parts per million (ppm)

PID - Photo-ionization detector

PID was calibrated using 100 ppm isobutylene gas

ft bls - feet below land surface.

Table 2  
 Summary of Soil Analytical Results  
 Phase II Preliminary Site Assessment  
 Parcel 244 - Beryl Road Properties, LLC  
 8305 NC 55, Willow Spring, Harnett County, North Carolina  
 Terracon Project No. 70207241

Sample ID: Sample Depth (ft bls):	244-SB-01 (4-6)	244-SB-02 (6-8)	244-SB-03 (6-8)	244-SB-04 (4-6)	244-SB-05 (4-6)	244-SB-06 (6-8)	NCDEQ Action Level	MSCC Industrial / Commercial
BTEX (C6 - C9)	<0.48	<0.50	<0.46	<0.95	<0.46	<0.45	NE	NE
GRO (C5 - C10)	10	122	6.5	10.6	86.8	73.2	50	NE
DRO (C10 - C35)	8.8	274	5.9	1.8	253.7	70.9	100	NE
TPH (C5 - C35)	18.8	396	12.4	12.4	340.5	144.1	NE	NE
Total Aromatics (C10-C35)	1.5	16.3	1.2	1.4	11.6	12.1	NE	NE
16 EPA PAHs	<0.15	0.65	<0.15	<0.15	0.46	0.48	NE	NE
BaP	<0.019	<0.020	<0.019	<0.019	<0.018	<0.018	NE	0.78

Notes:

Soil samples were collected on February 3, 2021.

Detected compounds are shown in the table.

Concentrations are reported in milligrams per kilogram (mg/kg).

ft bls - feet below land surface.

GRO - Gasoline Range Organics.

DRO - Diesel Range Organics.

TPH - Total Petroleum Hydrocarbons.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.

16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).

BaP - Benzo(a)pyrene

NE - Standard not established.

Detections shaded in gray exceed the North Carolina Department of Environmental Quality (NCDEQ) Action Level.

MSCC Industrial/Commercial - Maximum Soil Contaminant Concentration Levels Industrial/Commercial soil cleanup levels.

Bold: Constituent concentration reported above the method detection limit.

Table 3  
 Summary of Groundwater Analytical Results  
 Phase II Preliminary Site Assessment  
 Parcel 244 - Beryl Road Properties, LLC  
 8305 NC 55, Willow Spring, Harnett County, North Carolina  
 Terracon Project No. 70207241

Sample ID:	244-TW-01	GWQS	GCL
Dated Collected (mm/dd/yy)	2/3/2021		
<b>Volatile Organic Compounds (Method 8260D)</b>			
Acetone	13	6,000	6,000,000
Benzene	1.1	1	5,000
Cyclohexane	24	NE	NE
Ethylbenzene	2.0	600	84,500
Isopropylbenzene (Cumene)	5.2	70	25,000
Methylcyclohexane	31	NE	NE
Xylenes (Total)	0.50 J	500	85,500
<b>Semi-volatile Organic Compounds (Method 8270E)</b>			
Acenaphthene	0.39	80	2,120
Anthracene	0.082 J	2,000	2,000
1,1'-Biphenyl	0.60 J	NE	NE
Dibenzofuran	0.20 J	28	28,000
bis(2-Ethylhexyl)phthalate	0.57 B J	3	170
Fluoranthene	0.041 J	300	300
Fluorene	0.34	300	990
2-Methylnaphthalene	19	30	12,500
Naphthalene	4.5 B	6	6,000
Phenanthrene	0.32	200	410
Pyrene	0.046 J	200	200

Notes:

Detected compounds are shown in the table

Concentrations are reported in micrograms per liter (µg/L)

GWQS - North Carolina Groundwater Quality Standard (2L Standard, May, 2013)

\* - Interim Maximum Allowable Concentrations (IMACs) used due to unestablished standard in GWQS

GCL - Gross Contamination Levels for Groundwater (September, 2014)

NE - standard not established

Shading indicates concentration exceeds an applicable standard

Bold: Constituent concentration reported above the method detection limit

J: Indicates estimated concentration under laboratory reporting limit but above detection limit

Temporary well constructed at total depth of 15 feet below land surface (bls) with 0.010-inch slotted 1-inch PVC from 5 to 15 feet bls.

Depth to groundwater in temporary well was measured at 4.85 feet bls after installation.



**APPENDIX A**  
**GEOPHYSICAL SURVEY REPORT**



March 22, 2021

John Pilipchuk, L.G., P.E.  
North Carolina Department of Transportation  
GeoEnvironmental Engineering Unit  
1589 Mail Service Center  
Raleigh, NC 27699-1589

Re: Report for GeoEnvironmental Phase II Site Investigations  
Locate USTs and Utilities using Geophysical Methods  
Parcel #244 – Beryl Road Properties, LLC  
8305 NC-55, Willow Spring, Wake County, North Carolina  
TIP: R-5705B; WBS Element No. 46377.1.3  
Terracon Project No.: 70207241

Dear Mr. Pilipchuk:

On January 21 and 22, 2021, a representative of Terracon Consultants, Inc. (Terracon) performed geophysical exploration services at the above referenced site in general accordance with Terracon Proposal No. P70207241 dated December 8, 2020. This report is presented as a summary of those geophysical services.

## **1.0 PROJECT DESCRIPTION**

Based on the Request for Proposal (RFP) from the North Carolina Department of Transportation (NCDOT), a Phase II Preliminary Site Assessment (PSA) are requested for Parcel #244 – Beryl Road Properties, LLC, 8305 NC-55, Willow Spring, North Carolina. The project consisted of the exploration of an approximate 230-foot by 100-foot area along Highway 55 (entire area, not just along the roadways). The purpose of the geophysical exploration was to aid in identifying anomalies consistent with Underground Storage Tanks (USTs) utilizing non-intrusive geophysical methods.



Terracon attempted to define the findings from this survey according to the following NCDOT standard terms:

## Geophysical Surveys for Underground Storage Tanks on NCDOT Projects

High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	<b>Possible UST</b> Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist’s discretion.

## 2.0 EXPLORATION METHODS

Terracon used a frequency domain electromagnetic profiler (EM) consisting of a Geonics EM-31-SH system with data logger to collect EM data. In general, field data collection followed the procedures referenced in ASTM D6639-18. More information on both the general method and collection procedures can be found in the referenced standard. EM collects soil conductivity in millisiemens per meter (mS/m) and magnetic susceptibility in parts per trillion (ppt).

Data was collected on a bi-directional grid at approximately 5-foot spacings in both directions. However, the EM-31 uses a sub-meter GPS system to accurately plot data points of collection, therefore the grid was approximate. Data was post-processed utilizing Trackmaker 31 software engineered by Geomar and Surfer software developed by Golden Software.

Additionally, a Ground Penetrating System (GPR) consisting of a 350 MHz antenna and SIR-4000 system made by Geophysical Survey Systems Inc. (GSSI), was utilized to collect GPR data. Data was collected on a bi-directional grid with spacings of approximately 5 feet in both directions. Following the completion of field data collection, data was post-processed utilizing RADAN software engineered by GSSI.

## 3.0 FINDINGS

Terracon reviewed the EM and GPR data collected. Based on the EM data, an anomaly consistent with one or more probable USTs was identified on the west side of the site. Additionally, interference likely occurred from site utilities, a metal sign, and small amounts of miscellaneous debris which likely caused a “false” anomaly. In general, soil conductivity measurements between 0 to 30 mS/m and magnetic susceptibility measurements between -1 to 3 ppt were considered

“background”. Measurements outside of these ranges were interpreted to be caused by above or below ground anomalies. The depth of EM signal penetration is approximately 9 feet below the existing grade; however, the actual depth is not produced from the data collected.

Upon review of the GPR data, four anomalies consistent with four probable USTs were identified at the following locations:

UST I.D.	Coordinates <sup>1</sup>	Approximate Depth to Top of UST (ft)	Approximate UST Length (ft) <sup>2</sup>
1	35.540079°, -78.747373°	2	4.5
2	35.540058°, -78.747356°	2	7
3	35.540044°, -78.747346°	2.2	7
4	35.540031°, -78.747337°	2	7

1. Coordinates are accurate to within  $\pm 1.5$  feet to the center of the UST.
2. The length is approximate, and a width cannot be determined utilizing geophysical methods.

The depth of GPR signal penetration across the site was approximately 8 feet below the existing grade. Complete results of our findings can be found in the attached Exhibits.

## 4.0 LIMITATIONS

It should be noted that, as with any geophysical testing method, the processes rely on instrument signals to indicate physical conditions in the field. Signal information can be affected by on-site conditions beyond the control of the operator, such as, but not limited to, ground surface cover, concrete/soil types, concrete/soil moisture, groundwater table depth, and/or reinforcing steel spacing. The depth of penetration and quality of the GPR data cannot be determined until our arrival on site. Interpretation of those signals is based on a combination of known factors combined with the experience of the operator and geophysicist evaluating the results. Additionally, GPR may not be able to identify the diameter of an object such as a pipe or UST. Utilizing conventional observation, sampling, and testing (“truthing”) of select areas is recommended to confirm the results from the geophysical surveys. As with all geophysical methods, the geophysical results provide a level of confidence, but should not be considered absolute. We cannot be responsible for the interpretation of geophysical results by others.

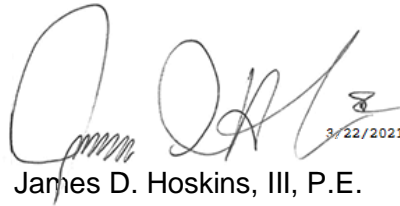
## 5.0 CLOSURE

We appreciate the opportunity to work with you on this project. Please do not hesitate to contact the undersigned if you have any questions regarding this information or if we can be of further service to you.

Sincerely,  
**Terracon Consultants, Inc.**



For: Joshua A. Lopez  
Geophysicist



James D. Hoskins, III, P.E.  
Principal / Greensboro Office Manager

Attachments: Exhibits – Geophysical Exploration Results (6 pages)



**SITE LOCATION**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC  
March 22, 2021 ■ Terracon Project No. 70207241

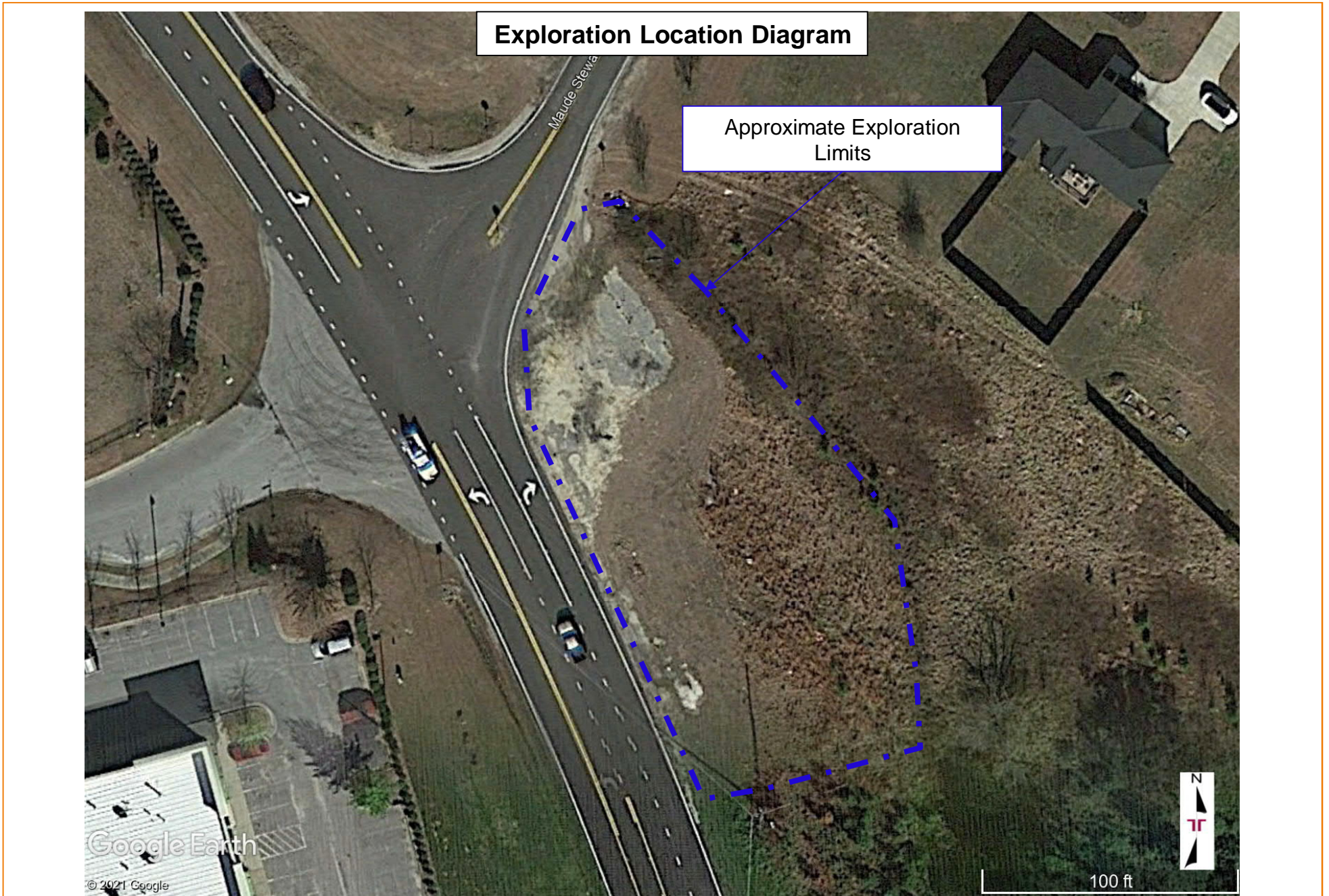




**EXPLORATION LOCATION**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241

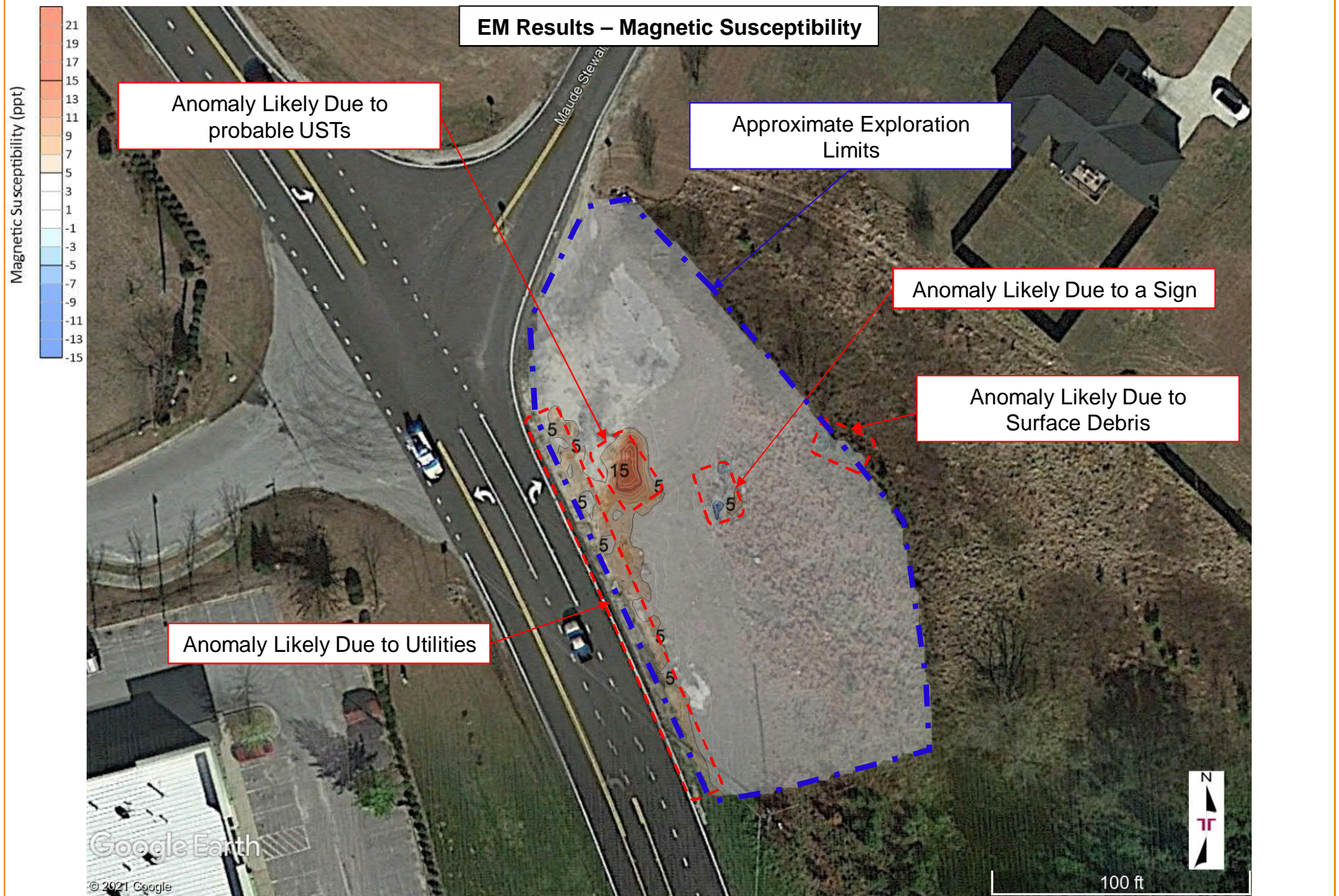




**EXPLORATION RESULTS**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241

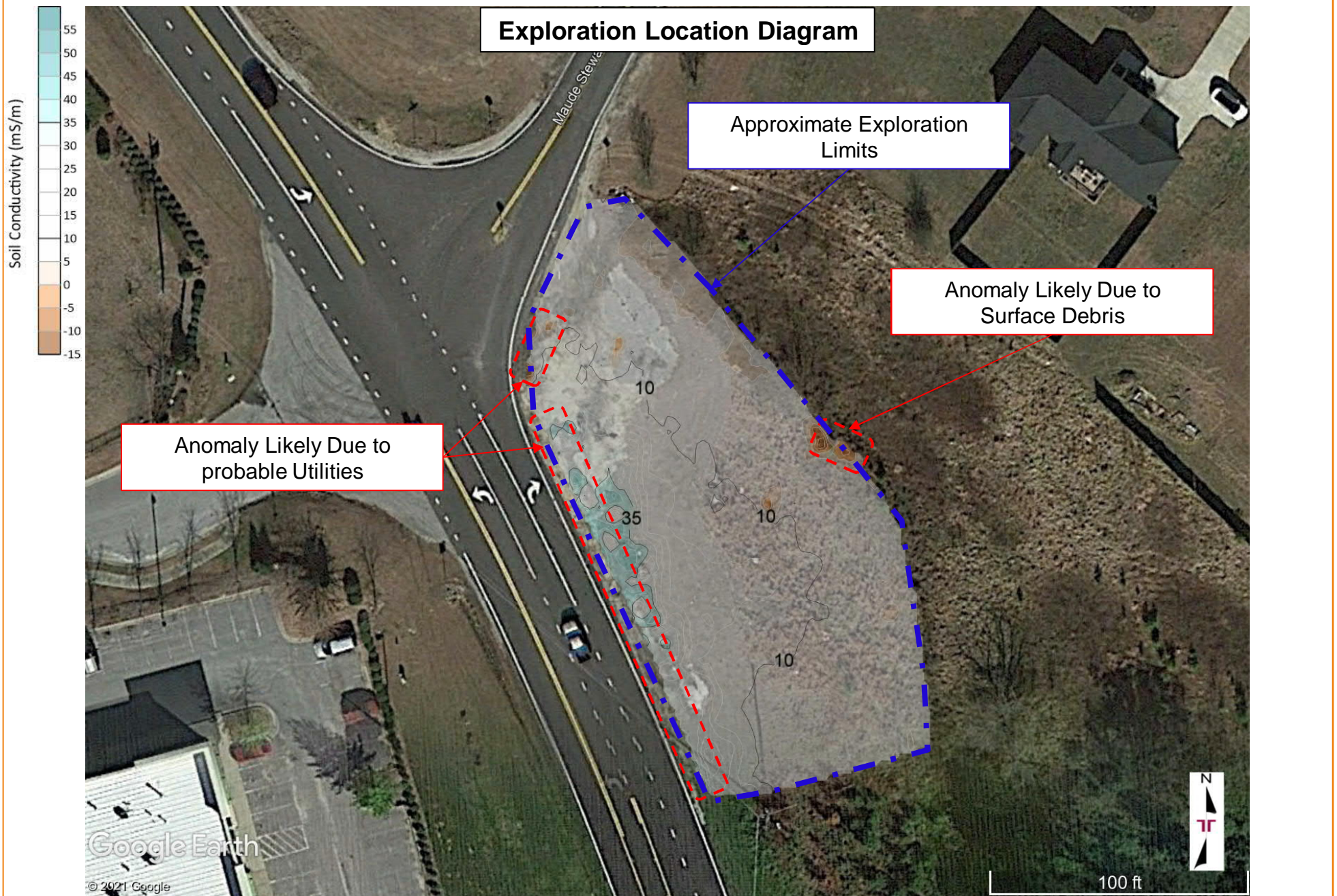




**EXPLORATION RESULTS**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC

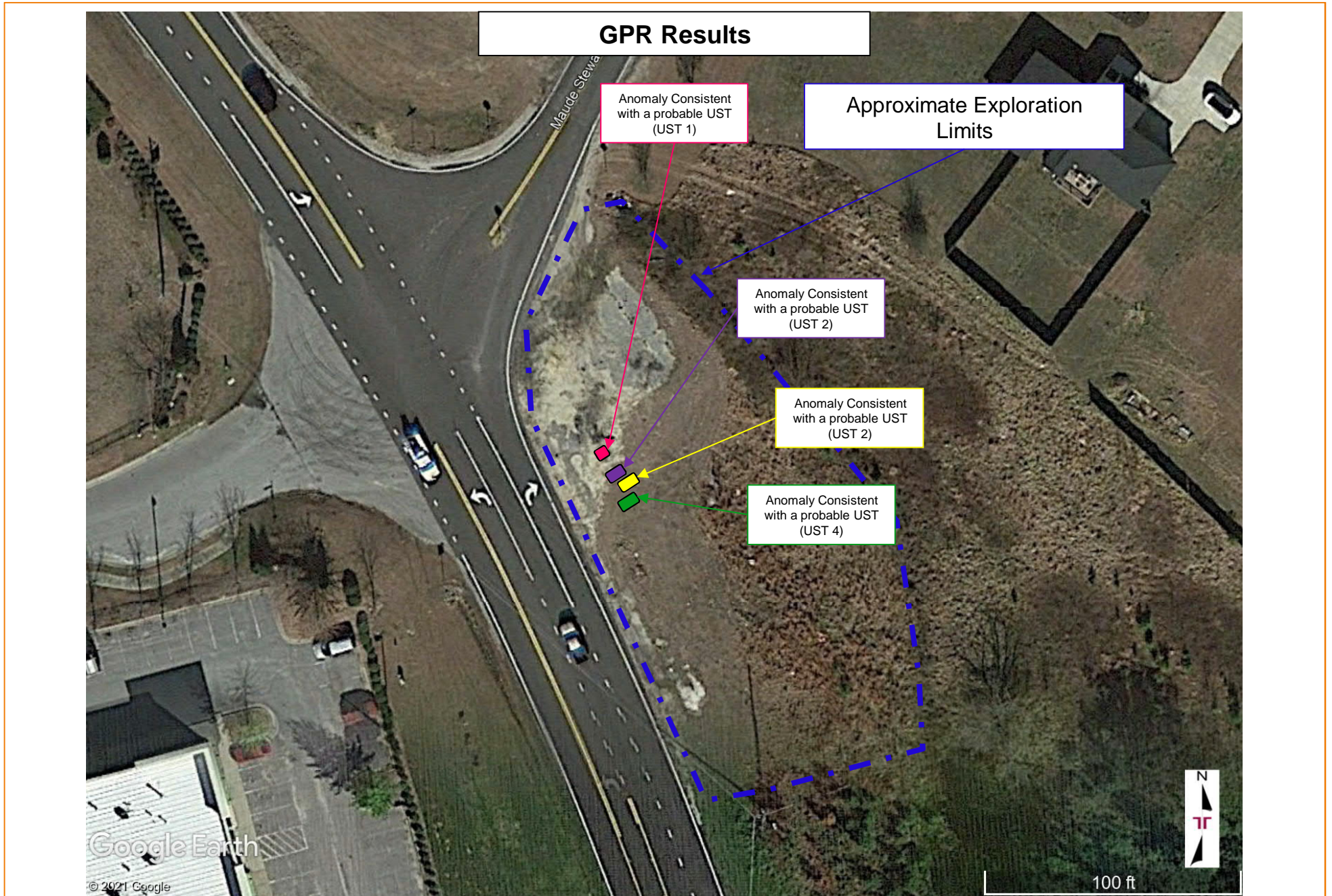
March 22, 2021 ■ Terracon Project No. 70207241





**EXPLORATION RESULTS**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC  
March 22, 2021 ■ Terracon Project No. 70207241

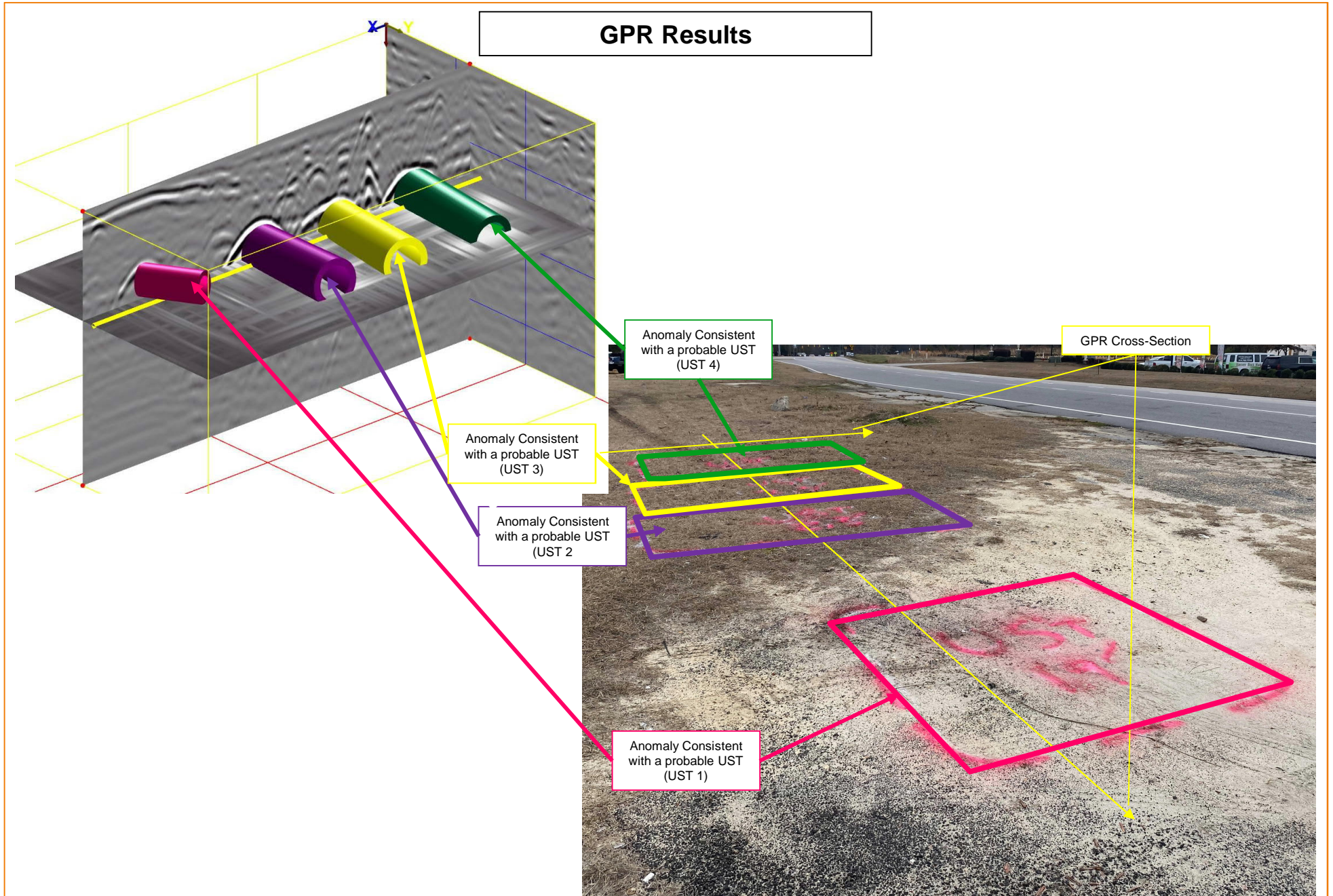




**EXPLORATION RESULTS**

Parcel #244 – Beryl Road Properties, LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241



**APPENDIX B  
PHOTOGRAPHS**



## Phase II Preliminary Site Assessment

Parcel 244 – Beryl Road Properties ■ Willow Spring, North Carolina

Photos Taken: February 3, 2021 ■ Terracon Project No. 70207241



**Photo #1** View of the northern portion of the site; facing northwest.



**Photo #2** View of the southern portion of the site; facing south.



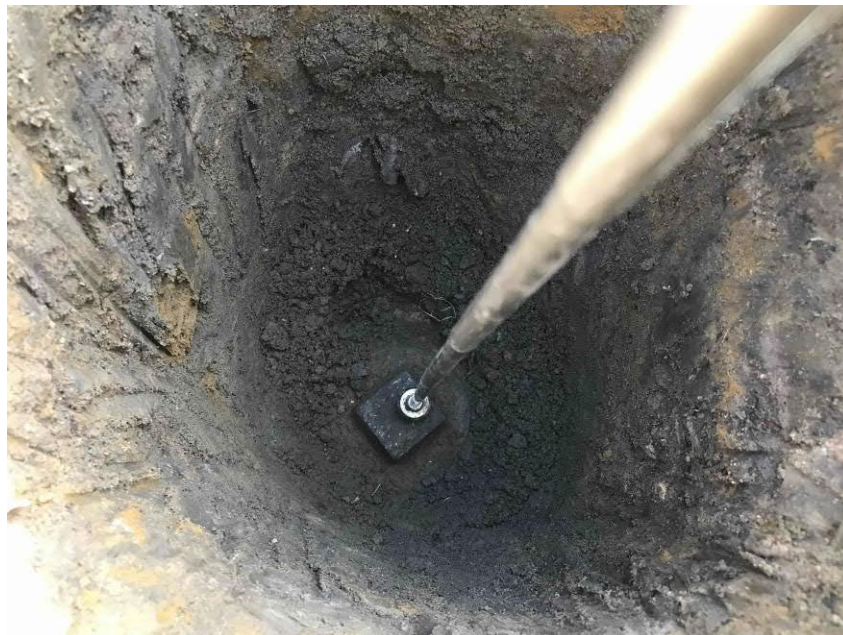
## Phase II Preliminary Site Assessment

Parcel 244 – Beryl Road Properties ■ Willow Spring, North Carolina

Photos Taken: February 3, 2021 ■ Terracon Project No. 70207241



**Photo #3** View of the four probable USTs identified in the geophysical investigation; facing northwest.



**Photo #4** View of an unearthed fill port of one of the probable USTs with a magnetic rod attached to confirm it as metal; facing south.

## Phase II Preliminary Site Assessment

Parcel 244 – Beryl Road Properties ■ Willow Spring, North Carolina

Photos Taken: February 3, 2021 ■ Terracon Project No. 70207241



**Photo #5** View of the on-site abandoned monitoring well identified during the geophysical investigation; facing south.

**APPENDIX C**  
**SOIL BORING LOGS**

# BORING LOG NO. 244-SB-01

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
	<p><u>CLAY (CL)</u>, with sand, dark brown and dark gray, slight petroleum odor and staining observed, moist</p>	0.1				0.1	244-SB-01 TPH via QED UVF
		36				0.6	
	<p><u>CLAY (CL)</u>, with sand, light gray, slight petroleum odor and staining observed, moist</p>	5	Grab	36	11.8		
		4.8				36	
	<p><b>Boring Terminated at 10 Feet</b></p>	10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-03-2021	Boring Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

# BORING LOG NO. 244-SB-02

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
4.0	<b>CLAY (CL)</b> , with sand, dark brown and dark gray, slight petroleum odor and staining observed, moist	1.3			36		244-SB-02 TPH via QED UVF
6.0	<b>CLAY (CL)</b> , with sand, light gray and dark gray, slight petroleum odor and staining observed, moist	40.3			36	98.7	
10.0	<b>CLAY (CL)</b> , with sand, light gray with orange mottling, petroleum odor and staining observed, moist	203.5	Grab		36	10.7	
<b>Boring Terminated at 10 Feet</b>		10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-03-2021	Boring Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B



# BORING LOG NO. 244-SB-03

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.3	<b>ASPHALT</b>						
4.0	<b>CLAY (CL)</b> , with sand, dark brown and orange, slight petroleum odor and staining observed, moist					2.3	
10.0	<b>CLAY (CL)</b> , with sand, light gray and orange, slight petroleum odor and staining observed, moist	5		Grab	36	3.9	
					36	6.2	
					36	64.5	244-SB-03 TPH via QED UVF
					36	7.2	
	<b>Boring Terminated at 10 Feet</b>	10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-03-2021	Boring Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

# BORING LOG NO. 244-SB-04

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.3	<b>ASPHALT</b>						
4.0	<b>CLAY (CL)</b> , with sand, dark brown and orange, odor and staining not observed, moist				48	1.5	244-SB-04 TPH via QED UVF
6.0	<b>SAND (SP)</b> , with clay, reddish brown and orange, slight petroleum odor and staining observed, moist	5	Grab	36	143.2		
10.0	<b>CLAY (CL)</b> , with sand, light gray and orange, slight petroleum odor and staining observed, moist				44.6		
				36	17.2		
	<b>Boring Terminated at 10 Feet</b>	10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-03-2021	Boring Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

# BORING LOG NO. 244-SB-05

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.3	<b>ASPHALT</b>						
4.0	<b>CLAY (CL)</b> , with sand, dark brown and orange, odor and staining not observed, moist					2.3	
6.0	<b>SAND (SP)</b> , with clay, light brown and orange, petroleum odor and staining observed, moist	5		Grab	48	3.8	
8.0	<b>CLAY (CL)</b> , with sand, light gray and orange, slight petroleum odor and staining observed, moist				36		244-SB-05 TPH via QED UVF
10.0	<b>SAND (SP)</b> , with clay, light gray and orange, slight petroleum odor and staining observed, moist					283.9	
10.0	<b>Boring Terminated at 10 Feet</b>	10			36	377.6	

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-03-2021	Boring Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B



# WELL LOG NO. 244-SB-06/244-TW-01

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 244

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Beryl Road Properties - 8305 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	INSTALLATION DETAILS	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
DEPTH	MATERIAL DESCRIPTION	Well Completion: Temporary Well						
0.3	<b>ASPHALT</b>							
	<b>CLAY (CL)</b> , with sand, light brown and orange, slight petroleum odor and staining observed, moist						3.2	
						36		
							2.3	
			5	▽				
						36	23.1	
7.0	<b>SAND (SP)</b> , with clay, light gray and orange, slight petroleum odor and staining observed, moist				Grab			244-SB-06 TPH via QED UVF
							402.1	
								244-TW-01 VOCs via 8260, SVOCs via 8270
9.0	<b>CLAY (CL)</b> , with sand, light gray with red mottling, slight petroleum odor and staining observed, moist to wet at 10 feet bls							
						36	104.5	
			10					
						36	NA	
15.0	<b>Boring Terminated at 15 Feet</b>		15					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

**WATER LEVEL OBSERVATIONS**  
▽ Depth to groundwater measured in ft bls after temporary well installation.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence  
NA: Not analyzed



Well Started: 02-03-2021	Well Completed: 02-03-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

**APPENDIX D**  
**GROUNDWATER SAMPLING LOG**

# Groundwater Sampling Log



Site Name: Parcel 244  
 Project Number: 70207241  
 Site Location: Angier, NC  
 Weather: Sunny, 40°F

Well ID: 244-TW-01  
 Sample Date: 2/3/21  
 Sampler Initials: EW  
 Sample Time: 1555

## GAUGING DATA

Gauging Date: 2/3/21  
 Screen Interval (ft bls): 5-15  
 Total Depth (ft bTOC): 15  
 Depth to water (ft bTOC): 5.35  
 Stick-up length (ft ags): .5  
 Water column length (ft): 4.85 <sup>2.5</sup> 9.65  
 Well Volume: 0.4 gal

Well Diameter	Gal/ft	L/ft
6"	1.47	5.56
4"	0.653	2.47
2"	0.163	0.618
<u>1"</u>	<u>0.041</u>	0.154
3/4"	0.023	0.087

### Sample Method

- Peristaltic
- Bladder
- Bailer
- Grundfos
- Monsoon
- PDB

### Purge Device

- Dedicated
- Disposable
- Decontaminated

### QA/QC Samples

- Duplicate
- MS/MSD
- Equipment Blank

### QA/QC Sample ID

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## FIELD PARAMETERS

Time	Purge Vol. (gal)	Temp (°C)	pH (SU)	DO (mg/L)	Cond. (µmhos/cm)	Turbidity (NTU)	ORP (mV)	Flow (ml/min)	Water Depth (ft bTOC)
15:00	-	-	-	-	-	-	-	-	-
15:35	3.50	11.17	6.33	1.13	353	-	-53.9	190	-
15:40	3.75	11.15	6.43	1.03	353	-	-63.3	190	-
15:45	4.00	11.19	6.50	1.33	352	-	-69.5	190	-
15:50	4.25	11.14	6.54	1.26	353	-	-74.6	190	-
15:55	4.50	11.13	6.59	1.50	353	-	-78.5	190	-

## LABORATORY ANALYSIS

Analytical Parameter	Method	Bottle Size/Type	No. Bottles	Preservative	Hold Time
VOCs	6200	40ml / VOA	3	HCL	14 days

Notes: YSI # 018462; ~5 gallons purged during well development/sampling.

Signature:

Date: 2/3/21



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



### Hydrocarbon Analysis Results

**Client:** TERRACON  
**Address:** 2401 BRENTWOODRD SUITE 107  
 RALEIGH, NC 27604

**Samples taken** Wednesday, February 3, 2021  
**Samples extracted** Wednesday, February 3, 2021  
**Samples analysed** Thursday, February 4, 2021

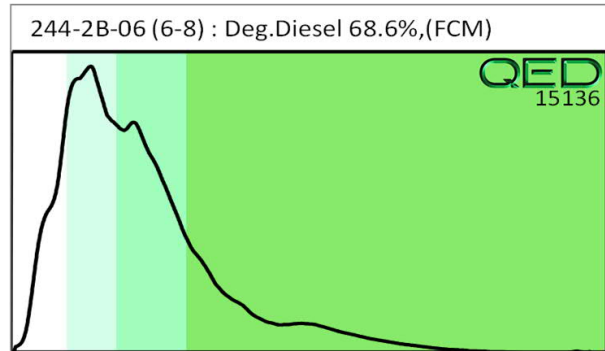
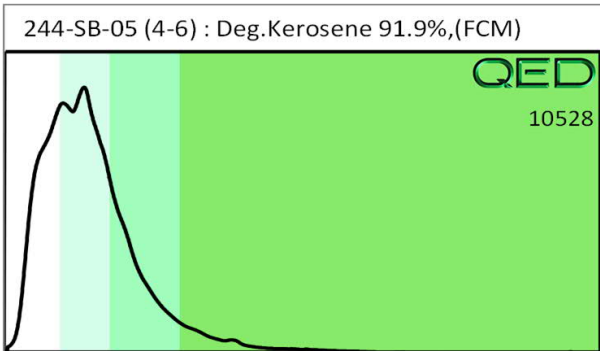
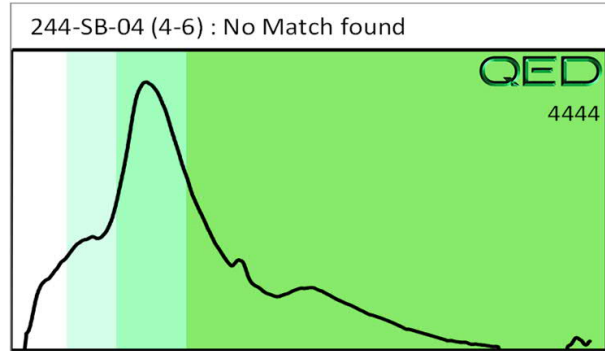
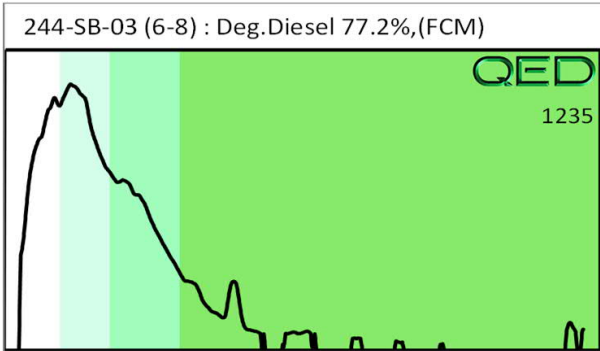
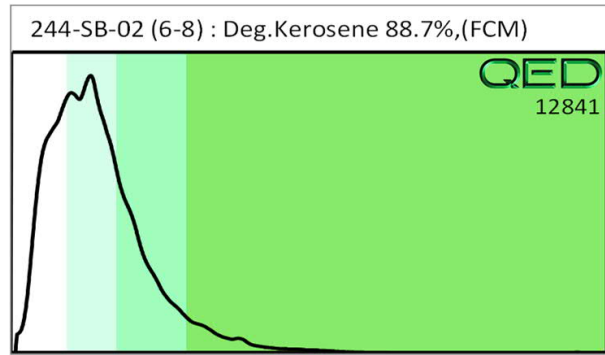
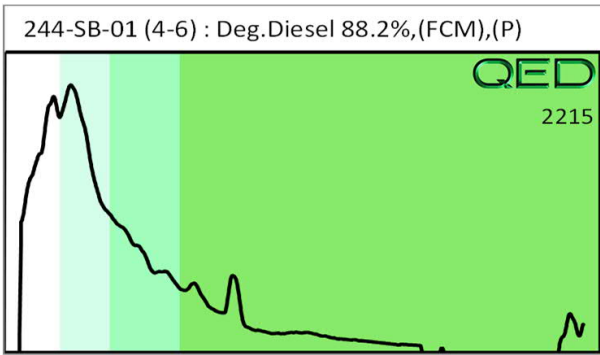
**Contact:** ETHAN DIWIDDIE

**Operator** TORI KELLY

**Project:** #70207241

											F03640						
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match				
										% light	% mid	% heavy					
s	244-SB-01 (4-6)	19.1	<0.48	10	8.8	18.8	1.5	<0.15	<0.019	98.4	1.3	0.3	Deg.Diesel 88.2%,(FCM),(P)				
s	244-SB-02 (6-8)	20.0	<0.5	122	274	396	16.3	0.65	<0.02	99.5	0.4	0	Deg.Kerosene 88.7%,(FCM)				
s	244-SB-03 (6-8)	18.6	<0.46	6.5	5.9	12.4	1.2	<0.15	<0.019	98.3	1.7	0	Deg.Diesel 77.2%,(FCM)				
s	244-SB-04 (4-6)	19.0	<0.95	10.6	1.8	12.4	1.4	<0.15	<0.019	92.7	6.2	1.1	No Match found				
s	244-SB-05 (4-6)	18.4	<0.46	86.8	253.7	340.5	11.6	0.46	<0.018	99.6	0.4	0	Deg.Kerosene 91.9%,(FCM)				
s	244-2B-06 (6-8)	17.9	<0.45	73.2	70.9	144.1	12.1	0.48	<0.018	97.4	2.4	0.3	Deg.Diesel 68.6%,(FCM)				
Initial Calibrator QC check											OK		Final FCM QC Check		OK		99.3 %

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content  
 Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library  
 (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present





Client Name: Terracon  
 Address: 2401 Brentwood Rd, Suite 107  
 Raleigh, NC 27604  
 Contact: Ethan Dinwiddie  
 Project Ref.: 70207241  
 Email: Ethan.Dinwiddie@Terracon.com  
 Phone #: 828-550-5502  
 Collected by: Ethan Dinwiddie



RAPID ENVIRONMENTAL DIAGNOSTICS

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409

Each UVF sample will be analyzed for total BTEX, GRO, DRO, TPH, PAH total aromatics and BaP. Standard GC Analyses are for BTEX and Chlorinated Solvents: VC, 1,1 DCE, 1,2 cis DCE, 1,2 trans DCE, TCE, and PCE. Specify target analytes in the space provided below.

CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM

Sample Collection Date/Time	TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour	UVF	GC					
2/3/21 / 945		X	X		ED	23-SB-04 (6-8)	53.1	40.0	13.1
2/3 / 1015		X	X		ED	23-SB-05 (2-4)	53.9	40.3	13.6
2/3 / 1020		X	X		ED	23-SB-06 (2-4)	53.3	40.2	13.1
2/3 / 1045		X	X		ED	23-SB-07 (6-8)	52.9	40.3	12.6
2/3 / 1100		X	X		ES	23-SB-08 (6-8)	53.6	46.3	13.3
2/3 / 1240		X	X		ED	244-SB-01 (4-6)	53.9	46.3	13.6
2/3 / 1315		X	X		ED	244-SB-02 (6-8)	53.2	40.2	13
2/3 / 1320		X	X		ES	244-SB-03 (6-8)	54.2	40.2	14
2/3 / 1330		X	X		ES	244-SB-04 (4-6)	54.0	46.3	13.7
2/3 / 1350		X	X		ED	244-SB-05 (4-6)	54.5	40.4	14.1
2/3 / 1420		X	X		ES	244-SB-06 (6-8)	54.0	39.9	14.5
2/3 / -		X	ON HOLD			TB-02			

COMMENTS/REQUESTS:

TARGET GC/UVF ANALYTES:

Relinquished by	Date/Time	Accepted by	Date/Time
<i>[Signature]</i>	2/3/1800	WIK	11am
Relinquished by		Accepted by	

RED Lab USE ONLY  
 (11)  
 Ref. No 2-2021-1



---

## Report of Analysis

**Terracon Consultants, Inc.**  
2401 Brentwood Road  
Suite 107 I  
Raleigh, NC 27604  
Attention: Don Malone

Project Name: NC 55 PSA

Project Number: 70207241

Lot Number: **WC05001**

Date Completed: 03/08/2021

03/09/2021 5:12 PM

Approved and released by:  
Project Manager II: **Cathy S. Dover**



The electronic signature above is the equivalent of a handwritten signature.  
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Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)  
106 Vantage Point Drive West Columbia, SC 29172  
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

# PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

## **Case Narrative Terracon Consultants, Inc. Lot Number: WC05001**

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved The NELAC Institute (TNI) standards, the Pace Analytical Services, LLC ("Pace") Laboratory Quality Manual, standard operating procedures (SOPs), and Pace policies. Any exceptions to the TNI standards, the Laboratory Quality Manual, SOPs or policies are qualified on the results page or discussed below.

The lot (WC05001) was created in order to separate out sample 244-TW-01 and associated on-hold trip blank, per client request.

If you have any questions regarding this report please contact the Pace Project Manager listed on the cover page.



# PACE ANALYTICAL SERVICES, LLC

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**Sample Summary**  
**Terracon Consultants, Inc.**  
**Lot Number: WC05001**  
**Project Name: NC 55 PSA**  
**Project Number: 70207241**

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<b>Sample Number</b>	<b>Sample ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
001	244-TW-01	Aqueous	02/03/2021 1600	02/04/2021
002	TB-02	Aqueous	02/03/2021	02/04/2021

---

(2 samples)

# PACE ANALYTICAL SERVICES, LLC

**Detection Summary**  
**Terracon Consultants, Inc.**  
**Lot Number: WC05001**  
**Project Name: NC 55 PSA**  
**Project Number: 70207241**

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	244-TW-01	Aqueous	Acetone	8260D	13		ug/L	5
001	244-TW-01	Aqueous	Benzene	8260D	1.1		ug/L	5
001	244-TW-01	Aqueous	Cyclohexane	8260D	24		ug/L	5
001	244-TW-01	Aqueous	Ethylbenzene	8260D	2.0		ug/L	5
001	244-TW-01	Aqueous	Isopropylbenzene	8260D	5.2		ug/L	5
001	244-TW-01	Aqueous	Methylcyclohexane	8260D	31		ug/L	5
001	244-TW-01	Aqueous	Xylenes (total)	8260D	0.50	J	ug/L	6
001	244-TW-01	Aqueous	Acenaphthene	8270E	0.39		ug/L	7
001	244-TW-01	Aqueous	Anthracene	8270E	0.082	J	ug/L	7
001	244-TW-01	Aqueous	1,1'-Biphenyl	8270E	0.60	J	ug/L	7
001	244-TW-01	Aqueous	Dibenzofuran	8270E	0.20	J	ug/L	7
001	244-TW-01	Aqueous	bis(2-Ethylhexyl)phthalate	8270E	0.57	BJ	ug/L	7
001	244-TW-01	Aqueous	Fluoranthene	8270E	0.041	J	ug/L	7
001	244-TW-01	Aqueous	Fluorene	8270E	0.34		ug/L	7
001	244-TW-01	Aqueous	2-Methylnaphthalene	8270E	19		ug/L	8
001	244-TW-01	Aqueous	Naphthalene	8270E	4.5	B	ug/L	8
001	244-TW-01	Aqueous	Phenanthrene	8270E	0.32		ug/L	8
001	244-TW-01	Aqueous	Pyrene	8270E	0.046	J	ug/L	8

(18 detections)

# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>WC05001-001</b>
Description: <b>244-TW-01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>02/03/2021 1600</b>	Project Name: <b>NC 55 PSA</b>
Date Received: <b>02/04/2021</b>	Project Number: <b>70207241</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260D	1	02/08/2021 1729	BWS		82167

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
<b>Acetone</b>	<b>67-64-1</b>	<b>8260D</b>	<b>13</b>		<b>10</b>	<b>4.0</b>	<b>ug/L</b>	<b>1</b>
<b>Benzene</b>	<b>71-43-2</b>	<b>8260D</b>	<b>1.1</b>		<b>0.50</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Bromodichloromethane	75-27-4	8260D	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260D	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260D	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260D	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260D	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260D	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260D	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260D	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260D	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260D	ND		0.50	0.40	ug/L	1
<b>Cyclohexane</b>	<b>110-82-7</b>	<b>8260D</b>	<b>24</b>		<b>0.50</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260D	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260D	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260D	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260D	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260D	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260D	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260D	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260D	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260D	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260D	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260D	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260D	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260D	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260D	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260D	ND		0.50	0.40	ug/L	1
<b>Ethylbenzene</b>	<b>100-41-4</b>	<b>8260D</b>	<b>2.0</b>		<b>0.50</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
2-Hexanone	591-78-6	8260D	ND		10	2.0	ug/L	1
<b>Isopropylbenzene</b>	<b>98-82-8</b>	<b>8260D</b>	<b>5.2</b>		<b>0.50</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methyl acetate	79-20-9	8260D	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260D	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260D	ND		10	2.0	ug/L	1
<b>Methylcyclohexane</b>	<b>108-87-2</b>	<b>8260D</b>	<b>31</b>		<b>5.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methylene chloride	75-09-2	8260D	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260D	ND		0.50	0.41	ug/L	1
1,1,1,2-Tetrachloroethane	79-34-5	8260D	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260D	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260D	ND		0.50	0.40	ug/L	1
1,1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260D	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260D	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260D	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260D	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis

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# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>WC05001-001</b>
Description: <b>244-TW-01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>02/03/2021 1600</b>	Project Name: <b>NC 55 PSA</b>
Date Received: <b>02/04/2021</b>	Project Number: <b>70207241</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260D	1	02/08/2021 1729	BWS		82167

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260D	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260D	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260D	ND		1.0	0.25	ug/L	1
<b>Xylenes (total)</b>	<b>1330-20-7</b>	<b>8260D</b>	<b>0.50</b>	<b>J</b>	<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
Bromofluorobenzene		103	70-130
1,2-Dichloroethane-d4		96	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis

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# Semivolatile Organic Compounds by GC/MS

Client: Terracon Consultants, Inc.

Laboratory ID: WC05001-001

Description: 244-TW-01

Matrix: Aqueous

Date Sampled: 02/03/2021 1600

Project Name: NC 55 PSA

Date Received: 02/04/2021

Project Number: 70207241

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270E	1	02/09/2021 1534	SCD	02/04/2021 1407	81859

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
<b>Acenaphthene</b>	<b>83-32-9</b>	<b>8270E</b>	<b>0.39</b>		<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
Acenaphthylene	208-96-8	8270E	ND		0.16	0.040	ug/L	1
Acetophenone	98-86-2	8270E	ND		0.80	0.23	ug/L	1
<b>Anthracene</b>	<b>120-12-7</b>	<b>8270E</b>	<b>0.082</b>	<b>J</b>	<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
Atrazine	1912-24-9	8270E	ND		0.80	0.20	ug/L	1
Benzaldehyde	100-52-7	8270E	ND		4.0	0.27	ug/L	1
Benzo(a)anthracene	56-55-3	8270E	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270E	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270E	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270E	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270E	ND		0.16	0.040	ug/L	1
<b>1,1'-Biphenyl</b>	<b>92-52-4</b>	<b>8270E</b>	<b>0.60</b>	<b>J</b>	<b>0.80</b>	<b>0.21</b>	<b>ug/L</b>	<b>1</b>
4-Bromophenyl phenyl ether	101-55-3	8270E	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270E	ND		4.0	0.21	ug/L	1
Caprolactam	105-60-2	8270E	ND		4.0	0.71	ug/L	1
Carbazole	86-74-8	8270E	ND		0.80	0.040	ug/L	1
bis(2-Chloro-1-methylethyl) ether	108-60-1	8270E	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270E	ND		0.80	0.26	ug/L	1
4-Chloroaniline	106-47-8	8270E	ND		0.80	0.13	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270E	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270E	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270E	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270E	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270E	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270E	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270E	ND		0.16	0.040	ug/L	1
<b>Dibenzofuran</b>	<b>132-64-9</b>	<b>8270E</b>	<b>0.20</b>	<b>J</b>	<b>0.80</b>	<b>0.16</b>	<b>ug/L</b>	<b>1</b>
3,3'-Dichlorobenzidine	91-94-1	8270E	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270E	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270E	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270E	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270E	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270E	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270E	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270E	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270E	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270E	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270E	ND		4.0	0.48	ug/L	1
<b>bis(2-Ethylhexyl)phthalate</b>	<b>117-81-7</b>	<b>8270E</b>	<b>0.57</b>	<b>BJ</b>	<b>4.0</b>	<b>0.38</b>	<b>ug/L</b>	<b>1</b>
<b>Fluoranthene</b>	<b>206-44-0</b>	<b>8270E</b>	<b>0.041</b>	<b>J</b>	<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
<b>Fluorene</b>	<b>86-73-7</b>	<b>8270E</b>	<b>0.34</b>		<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
Hexachlorobenzene	118-74-1	8270E	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270E	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270E	ND		4.0	1.1	ug/L	1

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# Semivolatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>WC05001-001</b>
Description: <b>244-TW-01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>02/03/2021 1600</b>	Project Name: <b>NC 55 PSA</b>
Date Received: <b>02/04/2021</b>	Project Number: <b>70207241</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270E	1	02/09/2021 1534	SCD	02/04/2021 1407	81859

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Hexachloroethane	67-72-1	8270E	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270E	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270E	ND		0.80	0.22	ug/L	1
<b>2-Methylnaphthalene</b>	<b>91-57-6</b>	<b>8270E</b>	<b>19</b>		<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
2-Methylphenol	95-48-7	8270E	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270E	ND		1.6	0.46	ug/L	1
<b>Naphthalene</b>	<b>91-20-3</b>	<b>8270E</b>	<b>4.5</b>	<b>B</b>	<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
2-Nitroaniline	88-74-4	8270E	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270E	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270E	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270E	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270E	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270E	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270E	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270E	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270E	ND		4.0	1.3	ug/L	1
<b>Phenanthrene</b>	<b>85-01-8</b>	<b>8270E</b>	<b>0.32</b>		<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
Phenol	108-95-2	8270E	ND		0.80	0.19	ug/L	1
<b>Pyrene</b>	<b>129-00-0</b>	<b>8270E</b>	<b>0.046</b>	<b>J</b>	<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>1</b>
2,4,5-Trichlorophenol	95-95-4	8270E	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270E	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		63	37-129
2-Fluorophenol		46	24-127
Nitrobenzene-d5		58	38-127
Phenol-d5		53	28-128
Terphenyl-d14		67	10-148
2,4,6-Tribromophenol		82	35-144

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## QC Summary



# Volatile Organic Compounds by GC/MS - MB

Sample ID: WQ82167-001

Matrix: Aqueous

Batch: 82167

Prep Method: 5030B

Analytical Method: 8260D

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	4.0	ug/L	02/08/2021 0928
Benzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Bromodichloromethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Bromoform	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	02/08/2021 0928
2-Butanone (MEK)	ND		1	10	2.0	ug/L	02/08/2021 0928
Carbon disulfide	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Chlorobenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Chloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Chloroform	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Cyclohexane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Dibromochloromethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
trans-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Ethylbenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
2-Hexanone	ND		1	10	2.0	ug/L	02/08/2021 0928
Isopropylbenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Methyl acetate	ND		1	1.0	0.40	ug/L	02/08/2021 0928
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	02/08/2021 0928
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	02/08/2021 0928
Methylcyclohexane	ND		1	5.0	0.40	ug/L	02/08/2021 0928
Methylene chloride	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Styrene	ND		1	0.50	0.41	ug/L	02/08/2021 0928
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Tetrachloroethene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Toluene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	02/08/2021 0928
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Volatile Organic Compounds by GC/MS - MB

Sample ID: WQ82167-001

Matrix: Aqueous

Batch: 82167

Prep Method: 5030B

Analytical Method: 8260D

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Trichloroethene	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	02/08/2021 0928
Vinyl chloride	ND		1	1.0	0.25	ug/L	02/08/2021 0928
Xylenes (total)	ND		1	1.0	0.40	ug/L	02/08/2021 0928
Surrogate	Q	% Rec	Acceptance Limit				
Bromofluorobenzene		102	70-130				
1,2-Dichloroethane-d4		97	70-130				
Toluene-d8		103	70-130				

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Volatile Organic Compounds by GC/MS - LCS

Sample ID: WQ82167-002

Matrix: Aqueous

Batch: 82167

Prep Method: 5030B

Analytical Method: 8260D

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	98		1	98	60-140	02/08/2021 0825
Benzene	50	48		1	97	70-130	02/08/2021 0825
Bromodichloromethane	50	51		1	103	70-130	02/08/2021 0825
Bromoform	50	57		1	114	70-130	02/08/2021 0825
Bromomethane (Methyl bromide)	50	42		1	83	70-130	02/08/2021 0825
2-Butanone (MEK)	100	100		1	100	70-130	02/08/2021 0825
Carbon disulfide	50	50		1	100	70-130	02/08/2021 0825
Carbon tetrachloride	50	50		1	100	70-130	02/08/2021 0825
Chlorobenzene	50	49		1	97	70-130	02/08/2021 0825
Chloroethane	50	42		1	84	70-130	02/08/2021 0825
Chloroform	50	46		1	92	70-130	02/08/2021 0825
Chloromethane (Methyl chloride)	50	35		1	70	60-140	02/08/2021 0825
Cyclohexane	50	46		1	91	70-130	02/08/2021 0825
1,2-Dibromo-3-chloropropane (DBCP)	50	54		1	107	70-130	02/08/2021 0825
Dibromochloromethane	50	52		1	105	70-130	02/08/2021 0825
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	02/08/2021 0825
1,2-Dichlorobenzene	50	48		1	96	70-130	02/08/2021 0825
1,3-Dichlorobenzene	50	49		1	98	70-130	02/08/2021 0825
1,4-Dichlorobenzene	50	48		1	96	70-130	02/08/2021 0825
Dichlorodifluoromethane	50	40		1	79	60-140	02/08/2021 0825
1,1-Dichloroethane	50	47		1	93	70-130	02/08/2021 0825
1,2-Dichloroethane	50	46		1	92	70-130	02/08/2021 0825
1,1-Dichloroethene	50	48		1	96	70-130	02/08/2021 0825
cis-1,2-Dichloroethene	50	47		1	94	70-130	02/08/2021 0825
trans-1,2-Dichloroethene	50	47		1	94	70-130	02/08/2021 0825
1,2-Dichloropropane	50	48		1	97	70-130	02/08/2021 0825
cis-1,3-Dichloropropene	50	53		1	107	70-130	02/08/2021 0825
trans-1,3-Dichloropropene	50	53		1	106	70-130	02/08/2021 0825
Ethylbenzene	50	50		1	99	70-130	02/08/2021 0825
2-Hexanone	100	110		1	109	70-130	02/08/2021 0825
Isopropylbenzene	50	51		1	102	70-130	02/08/2021 0825
Methyl acetate	50	51		1	102	70-130	02/08/2021 0825
Methyl tertiary butyl ether (MTBE)	50	46		1	92	70-130	02/08/2021 0825
4-Methyl-2-pentanone	100	110		1	109	70-130	02/08/2021 0825
Methylcyclohexane	50	48		1	96	70-130	02/08/2021 0825
Methylene chloride	50	47		1	95	70-130	02/08/2021 0825
Styrene	50	53		1	106	70-130	02/08/2021 0825
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	02/08/2021 0825
Tetrachloroethene	50	48		1	97	70-130	02/08/2021 0825
Toluene	50	48		1	97	70-130	02/08/2021 0825
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	92	70-130	02/08/2021 0825
1,2,4-Trichlorobenzene	50	50		1	101	70-130	02/08/2021 0825
1,1,1-Trichloroethane	50	48		1	95	70-130	02/08/2021 0825
1,1,2-Trichloroethane	50	48		1	97	70-130	02/08/2021 0825

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Volatile Organic Compounds by GC/MS - LCS

Sample ID: WQ82167-002

Matrix: Aqueous

Batch: 82167

Prep Method: 5030B

Analytical Method: 8260D

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	50	49		1	98	70-130	02/08/2021 0825
Trichlorofluoromethane	50	46		1	93	70-130	02/08/2021 0825
Vinyl chloride	50	40		1	80	70-130	02/08/2021 0825
Xylenes (total)	100	100		1	100	70-130	02/08/2021 0825
Surrogate	Q	% Rec	Acceptance Limit				
Bromofluorobenzene		98	70-130				
1,2-Dichloroethane-d4		92	70-130				
Toluene-d8		98	70-130				

LOQ = Limit of Quantitation

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**



# Semivolatile Organic Compounds by GC/MS - MB

Sample ID: WQ81859-001

Matrix: Aqueous

Batch: 81859

Prep Method: 3520C

Analytical Method: 8270E

Prep Date: 02/04/2021 1407

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Acenaphthylene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Acetophenone	ND		1	0.80	0.23	ug/L	02/09/2021 1307
Anthracene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Atrazine	ND		1	0.80	0.20	ug/L	02/09/2021 1307
Benzaldehyde	ND		1	4.0	0.27	ug/L	02/09/2021 1307
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
1,1'-Biphenyl	ND		1	0.80	0.21	ug/L	02/09/2021 1307
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	02/09/2021 1307
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	02/09/2021 1307
Caprolactam	ND		1	4.0	0.71	ug/L	02/09/2021 1307
Carbazole	ND		1	0.80	0.040	ug/L	02/09/2021 1307
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	02/09/2021 1307
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	02/09/2021 1307
4-Chloroaniline	ND		1	0.80	0.13	ug/L	02/09/2021 1307
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	02/09/2021 1307
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	02/09/2021 1307
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	02/09/2021 1307
2-Chlorophenol	ND		1	0.80	0.15	ug/L	02/09/2021 1307
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	02/09/2021 1307
Chrysene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Dibenzofuran	ND		1	0.80	0.16	ug/L	02/09/2021 1307
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	02/09/2021 1307
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	02/09/2021 1307
Diethylphthalate	ND		1	4.0	0.19	ug/L	02/09/2021 1307
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	02/09/2021 1307
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	02/09/2021 1307
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	02/09/2021 1307
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	02/09/2021 1307
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	02/09/2021 1307
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	02/09/2021 1307
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	02/09/2021 1307
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	02/09/2021 1307
<b>bis(2-Ethylhexyl)phthalate</b>	<b>0.49</b>	<b>J</b>	<b>1</b>	<b>4.0</b>	<b>0.38</b>	<b>ug/L</b>	<b>02/09/2021 1307</b>
Fluoranthene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Fluorene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	02/09/2021 1307
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	02/09/2021 1307
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	02/09/2021 1307

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ND = Not detected at or above the DL

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - MB

Sample ID: WQ81859-001

Matrix: Aqueous

Batch: 81859

Prep Method: 3520C

Analytical Method: 8270E

Prep Date: 02/04/2021 1407

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Hexachloroethane	ND		1	0.80	0.17	ug/L	02/09/2021 1307
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Isophorone	ND		1	0.80	0.22	ug/L	02/09/2021 1307
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
2-Methylphenol	ND		1	0.80	0.21	ug/L	02/09/2021 1307
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	02/09/2021 1307
<b>Naphthalene</b>	<b>0.15</b>	<b>J</b>	<b>1</b>	<b>0.16</b>	<b>0.040</b>	<b>ug/L</b>	<b>02/09/2021 1307</b>
2-Nitroaniline	ND		1	1.6	0.66	ug/L	02/09/2021 1307
3-Nitroaniline	ND		1	1.6	0.15	ug/L	02/09/2021 1307
4-Nitroaniline	ND		1	1.6	1.3	ug/L	02/09/2021 1307
Nitrobenzene	ND		1	0.80	0.17	ug/L	02/09/2021 1307
2-Nitrophenol	ND		1	1.6	0.44	ug/L	02/09/2021 1307
4-Nitrophenol	ND		1	4.0	2.1	ug/L	02/09/2021 1307
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	02/09/2021 1307
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	02/09/2021 1307
Pentachlorophenol	ND		1	4.0	1.3	ug/L	02/09/2021 1307
Phenanthrene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
Phenol	ND		1	0.80	0.19	ug/L	02/09/2021 1307
Pyrene	ND		1	0.16	0.040	ug/L	02/09/2021 1307
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	02/09/2021 1307
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	02/09/2021 1307

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		61	37-129
2-Fluorophenol		43	24-127
Nitrobenzene-d5		57	38-127
Phenol-d5		50	28-128
Terphenyl-d14		72	10-148
2,4,6-Tribromophenol		77	35-144

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P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: WQ81859-002

Matrix: Aqueous

Batch: 81859

Prep Method: 3520C

Analytical Method: 8270E

Prep Date: 02/04/2021 1407

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	6.3		1	78	30-122	02/09/2021 1332
Acenaphthylene	8.0	6.3		1	79	30-130	02/09/2021 1332
Acetophenone	8.0	7.6		1	95	52-125	02/09/2021 1332
Anthracene	8.0	6.8		1	86	30-123	02/09/2021 1332
Atrazine	8.0	7.1		1	88	25-121	02/09/2021 1332
Benzaldehyde	8.0	4.1		1	52	20-115	02/09/2021 1332
Benzo(a)anthracene	8.0	6.9		1	86	40-125	02/09/2021 1332
Benzo(a)pyrene	8.0	8.2		1	102	40-128	02/09/2021 1332
Benzo(b)fluoranthene	8.0	7.8		1	98	30-130	02/09/2021 1332
Benzo(g,h,i)perylene	8.0	8.0		1	100	30-130	02/09/2021 1332
Benzo(k)fluoranthene	8.0	7.3		1	92	30-130	02/09/2021 1332
1,1'-Biphenyl	8.0	6.1		1	76	42-120	02/09/2021 1332
4-Bromophenyl phenyl ether	8.0	7.2		1	90	30-124	02/09/2021 1332
Butyl benzyl phthalate	8.0	7.3		1	91	54-135	02/09/2021 1332
Caprolactam	8.0	7.1		1	89	44-152	02/09/2021 1332
Carbazole	8.0	6.8		1	85	45-101	02/09/2021 1332
bis (2-Chloro-1-methylethyl) ether	8.0	5.7		1	71	42-124	02/09/2021 1332
4-Chloro-3-methyl phenol	8.0	5.7		1	71	30-123	02/09/2021 1332
4-Chloroaniline	8.0	3.3		1	42	12-157	02/09/2021 1332
bis(2-Chloroethoxy)methane	8.0	5.7		1	71	44-127	02/09/2021 1332
bis(2-Chloroethyl)ether	8.0	6.3		1	79	46-120	02/09/2021 1332
2-Chloronaphthalene	8.0	5.8		1	73	46-100	02/09/2021 1332
2-Chlorophenol	8.0	6.6		1	82	50-117	02/09/2021 1332
4-Chlorophenyl phenyl ether	8.0	6.4		1	80	30-121	02/09/2021 1332
Chrysene	8.0	7.0		1	87	30-130	02/09/2021 1332
Dibenzo(a,h)anthracene	8.0	7.9		1	99	30-130	02/09/2021 1332
Dibenzofuran	8.0	6.6		1	82	30-118	02/09/2021 1332
3,3'-Dichlorobenzidine	8.0	3.8		1	47	10-126	02/09/2021 1332
2,4-Dichlorophenol	8.0	5.6		1	69	30-121	02/09/2021 1332
Diethylphthalate	8.0	6.6		1	82	40-125	02/09/2021 1332
Dimethyl phthalate	8.0	6.6		1	82	40-127	02/09/2021 1332
2,4-Dimethylphenol	8.0	4.7		1	58	20-125	02/09/2021 1332
Di-n-butyl phthalate	8.0	7.1		1	88	40-127	02/09/2021 1332
4,6-Dinitro-2-methylphenol	8.0	6.3		1	79	56-128	02/09/2021 1332
2,4-Dinitrophenol	16	9.0		1	56	11-126	02/09/2021 1332
2,4-Dinitrotoluene	8.0	7.4		1	92	59-127	02/09/2021 1332
2,6-Dinitrotoluene	8.0	7.2		1	90	59-126	02/09/2021 1332
Di-n-octylphthalate	8.0	7.1		1	88	50-136	02/09/2021 1332
bis(2-Ethylhexyl)phthalate	8.0	6.8		1	85	56-128	02/09/2021 1332
Fluoranthene	8.0	7.0		1	88	40-128	02/09/2021 1332
Fluorene	8.0	6.1		1	76	30-124	02/09/2021 1332
Hexachlorobenzene	8.0	6.7		1	83	30-125	02/09/2021 1332
Hexachlorobutadiene	8.0	4.4		1	55	24-110	02/09/2021 1332
Hexachlorocyclopentadiene	40	16		1	40	16-96	02/09/2021 1332

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\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: WQ81859-002

Matrix: Aqueous

Batch: 81859

Prep Method: 3520C

Analytical Method: 8270E

Prep Date: 02/04/2021 1407

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Hexachloroethane	8.0	6.0		1	75	31-110	02/09/2021 1332
Indeno(1,2,3-c,d)pyrene	8.0	7.5		1	94	30-130	02/09/2021 1332
Isophorone	8.0	6.5		1	81	57-123	02/09/2021 1332
2-Methylnaphthalene	8.0	5.5		1	69	40-132	02/09/2021 1332
2-Methylphenol	8.0	6.9		1	86	56-119	02/09/2021 1332
3+4-Methylphenol	8.0	6.2		1	78	53-119	02/09/2021 1332
Naphthalene	8.0	6.4		1	80	30-130	02/09/2021 1332
2-Nitroaniline	8.0	6.7		1	83	60-124	02/09/2021 1332
3-Nitroaniline	8.0	4.5		1	56	43-123	02/09/2021 1332
4-Nitroaniline	8.0	5.3		1	67	30-135	02/09/2021 1332
Nitrobenzene	8.0	5.6		1	70	51-122	02/09/2021 1332
2-Nitrophenol	8.0	5.9		1	73	51-118	02/09/2021 1332
4-Nitrophenol	16	11		1	71	53-130	02/09/2021 1332
N-Nitrosodi-n-propylamine	8.0	7.1		1	89	54-127	02/09/2021 1332
N-Nitrosodiphenylamine (Diphenylamine)	8.0	6.6		1	83	30-123	02/09/2021 1332
Pentachlorophenol	16	12		1	76	42-131	02/09/2021 1332
Phenanthrene	8.0	6.9		1	86	40-123	02/09/2021 1332
Phenol	8.0	6.4		1	79	49-117	02/09/2021 1332
Pyrene	8.0	7.1		1	89	40-126	02/09/2021 1332
2,4,5-Trichlorophenol	8.0	6.0		1	75	30-123	02/09/2021 1332
2,4,6-Trichlorophenol	8.0	6.0		1	75	30-125	02/09/2021 1332

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		71	37-129
2-Fluorophenol		71	24-127
Nitrobenzene-d5		61	38-127
Phenol-d5		76	28-128
Terphenyl-d14		82	10-148
2,4,6-Tribromophenol		89	35-144

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ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

\* = RSD is out of criteria

+ = RPD is out of criteria

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**



**Chain of Custody  
and  
Miscellaneous Documents**



**PACE ANALYTICAL SERVICES, LLC**  
 106 Vantage Point Drive • West Columbia, SC 29172  
 Telephone: No. 803-791-9700 Fax No. 803-791-9111  
 www.pacelabs.com

Number 108462

Client <b>Terraco Consultants, Inc.</b> Address 2401 Brentwood Rd. Suite 107 Raleigh, NC 27604 Project Name NC-55 PSA-5	Report to Contact <b>Ethian D. Dwyer</b> Signature [Signature]	Telephone No. (FAX) (803) 591-5302 Analysis (Attach list if more space is needed)	Quote No. 23598 Pages 1 of 1 Barcode WB03036 GSD Remarks / Coalar I.D. new "split" lot # WC05001 Barcode WC05001 GSD
Project No. 10207241 Sample ID / Description (Containers for each sample may be combined on one line) 244-TW-01 TB-02	Matrix [Blank]	No. of Containers by Preservation Type [Blank]	Revised Name <b>Ethian Dwyer</b>
P.O. No. [Blank]	Collection Date(s) 2/3/21 2/3/21	Collection Time (Military) 1600 -	Date 2/3/21 2/3/21
Turn Around Time Required (Prior lab approval required for expedited (ATL) Standard) <input checked="" type="checkbox"/> Retain (Specify) 1. Requisitioned by [Signature] 2. Requisitioned by [Signature] 3. Requisitioned by Felcy 4. Requisitioned by [Signature]	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Destroyed by Lab Date 2/3/21 1600 Time 16:30	Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown 1. Received by [Signature] 2. Received by [Signature] 3. Received by [Signature] 4. Laboratory received by [Signature]	CC Requirements (Specify) Date 2/4/21 1030 Time 10:30 Temp Blank <input checked="" type="checkbox"/> N

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

# PACE ANALYTICAL SERVICES, LLC



Samples Receipt Checklist (SRC) (ME0018C-15)  
Issuing Authority: Pace ENV - WCOL

Revised: 9/29/2020  
Page 1 of 1

## Sample Receipt Checklist (SRC)

Client: Tetracon Cooler Inspected by/date: MEH / 02/04/2021 Lot #: WB03036

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: <u>NA</u> Chlorine Strip ID: <u>NA</u> Tested by: <u>NA</u>	
Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: <u>NA</u> <u>1.8 / 1.8</u> °C <u>NA / NA</u> °C <u>NA / NA</u> °C <u>NA / NA</u> °C	
Method: <input checked="" type="checkbox"/> Temperature Blank <input type="checkbox"/> Against Bottles IR Gun ID: <u>5</u> IR Gun Correction Factor: <u>0</u> °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Were sample IDs listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Was collection date & time listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Was collection date & time listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Was adequate sample volume available?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (½" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	19. Were all applicable NH <sub>3</sub> /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Was the quote number listed on the container label? If yes, Quote #
<b>Sample Preservation</b> (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) <u>NA</u> were received incorrectly preserved and were adjusted accordingly in sample receiving with <u>NA</u> mL of circle one: H <sub>2</sub> SO <sub>4</sub> , HNO <sub>3</sub> , HCl, NaOH using SR # <u>NA</u>	
Time of preservation <u>NA</u> . If more than one preservative is needed, please note in the comments below.	
Sample(s) <u>NA</u> were received with bubbles >6 mm in diameter.	
Sample(s) <u>NA</u> were received with TRC > 0.5 mg/L (If #19 is <i>no</i> ) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> ) with Shualy ID: <u>NA</u>	
SR barcode labels applied by: <u>MEH</u> Date: <u>02/04/2021</u>	

Comments:

---



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---



---



March 23, 2021



North Carolina Department of Transportation  
Attention: Mr. John Pilipchuk, LG, PE  
GeoEnvironmental Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589


Re: Phase II Preliminary Site Assessment Report  
NC 55 from South of SR 1532 to North of NC 210  
Parcel 282 – Harteland LLC Property  
7709 NC 55, Willow Spring, Wake County, North Carolina  
TIP No. R-5705B  
WBS Element: 46377.1.3

Dear Mr. Pilipchuk:


Terracon Consultants, Inc. (Terracon) is pleased to submit this Phase II Preliminary Site Assessment (PSA) Report for the above referenced site. This assessment was performed in accordance with our *Revised Proposal for GeoEnvironmental Phase II Site Investigations* (Terracon Proposal No. P70207241) dated December 8, 2020. This report includes the findings of the investigation and provides our conclusions and recommendations. Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation. If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

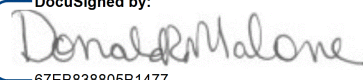
Sincerely,

**Terracon Consultants, Inc.**

DocuSigned by:  
  
5ABC0739D7334DC...

James M. Perry  
Field Scientist

DocuSigned by:  
  
076CA5FA770E478...  
Ethan C. Dinwiddie, GIT  
Field Geologist

DocuSigned by:  
  
67EB838805B1477...

Donald R. Malone, PE, RSM  
Senior Engineer

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

Terracon Consultants, Inc. 2401 Brentwood Road, Suite 107 Raleigh, NC 27604  
P [919] 873 2211 F [919] 873 9555 terracon.com

# Phase II Preliminary Site Assessment Report

NC 55 from South of SR 1532 to North of NC 210  
Parcel 282 – Harteland LLC Property  
7709 NC 55, Willow Spring, Wake County, North Carolina

TIP No. R-5705B

WBS Element: 46377.1.3

March 23, 2021

Terracon Project No. 70207241



**Prepared for:**

North Carolina Department of Transportation  
Raleigh, North Carolina

**Prepared by:**

Terracon Consultants, Inc.  
Raleigh, North Carolina

[terracon.com](http://terracon.com)

**Terracon**

Environmental



Facilities



Geotechnical



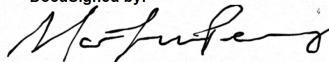
Materials



# Phase II Preliminary Site Assessment Report

NC 55 from South of SR 1532 to North of NC 210  
Parcel 282 – Harteland LLC Property  
7709 NC 55, Willow Spring, Wake County, North Carolina

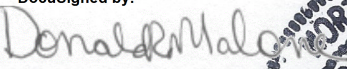
TIP No. R-5705B  
WBS Element: 46377.1.3  
March 23, 2021  
Terracon Project No. 70207241

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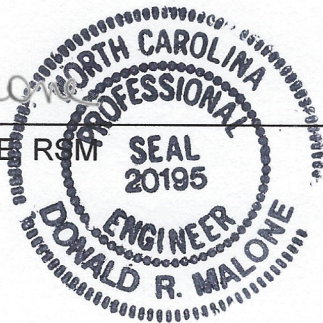
James M. Perry  
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076CA5FA770E478...

Ethan C. Dinwiddie, GIT  
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Environmental

Facilities

Geotechnical

Materials

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## EXHIBITS

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Exhibit 2 – State of North Carolina, Division of Highways Conventional Plan Sheet Symbols

Exhibit 3 – Boring Locations and Summarized Soil Sample Results

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Table 1 – Summary of PID Field Screening Values

Table 2 – Summary of Soil Analytical Results

## APPENDICES

Appendix A – Geophysical Survey Report

Appendix B – Photographs

Appendix C – Soil Boring Logs

Appendix D – Laboratory Analytical Reports and Chain-of-Custody Records

# PHASE II PRELIMINARY SITE ASSESSMENT REPORT

NC 55 FROM SOUTH OF SR 1532 TO NORTH OF NC 210

TIP NO. R-5705B

WBS ELEMENT: 46377.1.3

PARCEL 282 – HARTELAND LLC PROPERTY

7709 NC 55, WILLOW SPRING, WAKE COUNTY, NORTH CAROLINA

## 1.0 INTRODUCTION

### 1.1 Site Description

<b>Site Name</b>	Parcel 282 – Harteland LLC Property
<b>Site Location/Address</b>	7709 NC 55, Willow Spring, Wake County, North Carolina
<b>General Site Description</b>	The site consists of an approximate 0.7-acre portion of a 2.12-acre parcel and is developed with an approximate 2,000 square foot building. The remainder of the site is improved with several ancillary structures, gravel parking areas, and landscaped areas.

### 1.2 Site History

At the time of the Phase II Preliminary Site Assessment (PSA), the site was observed to contain an approximate 2,000 square foot building that operated as a country store and landscaping supply store. The remainder of the site is improved with several ancillary structures, gravel parking areas, and landscaped areas. According to a GeoEnvironmental Planning Report dated September 26, 2018, the design of the building suggested it may have also sold gasoline or other petroleum fuel at one time (Terracon Consultants, Inc. [Terracon], 2020). The address is not listed in the North Carolina Department of Environmental Quality (NCDEQ), Division of Waste Management, Underground Storage Tank (UST) section registry. Additional historical records regarding the site were not available for review.

### 1.3 Scope of Work

Terracon conducted the following PSA scope of work in accordance with Terracon’s Proposal No. P70207241 dated December 8, 2020. This PSA is being completed prior to a planned upgrade to NC 55 from South of SR 1532 (Oak Grove Church Road) to North of NC 210. The scope of work included a geophysical investigation, the collection of soil samples, and preparation of a report documenting our investigation activities. The PSA is not intended to delineate potential

impacts. The PSA was performed within the proposed rights-of-way (ROW) as indicated by North Carolina Department of Transportation (NCDOT) provided plan sheets.

#### **1.4 Standard of Care**

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions, or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. These services were performed in accordance with our *Revised Proposal for GeoEnvironmental Phase II Site Investigations* (Terracon Proposal No. P70207241) dated December 8, 2020 and were not necessarily conducted in strict accordance with ASTM E1903-11.

#### **1.5 Additional Scope Limitations**

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

#### **1.6 Reliance**

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

## **2.0 FIELD ACTIVITIES**

The following PSA activities are presented in the order that they were conducted in the field. **Exhibit 1** presents the topography of the site on a portion of the USGS topographic quadrangle maps of Angier and Fuquay-Varina, North Carolina, 1993. **Exhibit 2** depicts conventional plan



sheet symbols used by the NCDOT, Division of Highways. **Exhibit 3** depicts the site layout and indicates the approximate locations of the site features, soil boring locations, and analytical results.

## **2.1 Geophysical Survey**

On January 21 and 22, 2021, Terracon conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs or other geophysical anomalies were present beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM31-SH metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-4000 unit. In addition to metal detection and GPR scans, NC One Call public utility locator was used to identify several underground utility lines and to clear boring locations. A copy of the geophysical report is in **Appendix A**.

The geophysical investigation did not identify possible USTs or other geophysical anomalies within the proposed ROW area. However, we did locate one septic tank within the ROW area and directly north and adjacent to the on-site building. Photographs of the site and relevant site features are in **Appendix B**.

## **2.2 Soil Sampling**

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon oversaw the advancement of seven soil borings (282-SB-01 through 282-SB-07) throughout the parcel and within the proposed NCDOT ROW. The borings were completed by a North Carolina Certified Well Contractor (Regional Probing Services, Inc. [Regional Probing]) using a truck-mount Geoprobe® 5410 direct-push drill rig.

Terracon collected soil samples in 5-foot long, disposable, Macro-Core® sampler tubes to document soil lithology, color, moisture content, and sensory evidence of impacts. Each soil sample was screened for organic vapors using an 11.7 electron volt photoionization detector (PID). The PID data were collected to help select the most appropriate sample intervals for laboratory analysis and to corroborate laboratory data. PID readings from soil collected from the borings ranged from 0.3 to 3.2 parts per million (ppm). The PID screening values are summarized in **Table 1**.

Terracon directed Regional Probing to advance each soil boring to a depth of approximately 10 feet below land surface (bls). Based on the results of the field screening, seven soil samples, one from each boring, were collected from depths between approximately 2 feet and 8 feet bls. Soil samples were collected generally from the depth interval with the greatest PID reading.



Samples were placed in laboratory provided sample containers, packed in an iced cooler, and shipped to REDLAB/QROS, LLC – Environmental Testing (REDLAB) for analysis by Ultraviolet Fluorescence (UVF).

The drilling equipment used at the site was decontaminated prior to use and between the advancement of each boring. Non-dedicated sampling equipment was decontaminated using a Liquinox®-water wash followed by a distilled water rinse. Each of the boreholes was backfilled with soil cuttings and bentonite pellets. Surface completion was achieved with either dirt or asphalt cold patch. Remaining investigation derived waste was spread on the site.

Soil generally consisted of silty fine- to coarse-grained sand interlayered with clayey sand. Wet to saturated soils were observed at approximately 5 feet bls in the majority of the soil borings. The soil boring logs are included in **Appendix C**. Sample locations were measured using a sub-foot Trimble Geo7X GPS unit and are depicted on **Exhibit 3**.

### **3.0 LABORATORY ANALYSES**

Soil samples were submitted to REDLAB for analysis of the following:

- TPH-gasoline range organics (C<sub>5</sub>-C<sub>10</sub>) (TPH-GRO);
- TPH-diesel range organics (C<sub>10</sub>-C<sub>35</sub>) (TPH-DRO);
- Total petroleum hydrocarbons (C<sub>5</sub>-C<sub>35</sub>) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>);
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Please refer to **Appendix D** for the laboratory analytical reports.

### **4.0 DATA EVALUATION**

#### **4.1 Soil Analytical Results**

**Table 2** summarizes the results of the analyses of the soil samples. **Exhibit 3** depicts the boring locations and detected compounds. Laboratory analysis identified the following detections above the laboratory reporting limits in soil samples 282-SB-02 through 282-SB-04:

- TPH-DRO was reported within each sample at concentrations ranging from 1.5 to 3.8 milligrams per kilogram (mg/kg);

- TPH was reported within each sample at concentrations ranging from 1.5 to 3.8 mg/kg; and
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>) was reported within each sample at concentrations ranging from 0.81 and 2.2 mg/kg.

TPH-DRO, TPH, and Total aromatics (C<sub>10</sub>-C<sub>35</sub>) were not reported above laboratory reporting limits in soil samples 282-SB-01 and 282-SB-05 through 282-SB-07. Additionally, BTEX, TPH-GRO, 16 EPA PAHs, and BaP were not reported above laboratory reporting limits in the collected soil samples. The concentrations of TPH-GRO and TPH-DRO detected did not exceed NCDEQ Action Levels (50 mg/kg and 100 mg/kg, respectively).

## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

The findings of this investigation are discussed below.

- The geophysical investigation did not identify USTs within the proposed NCDOT ROW.
- One septic tank within the ROW area was identified during the PSA, located directly north and adjacent to the on-site building.
- Laboratory analysis reported concentrations of TPH-DRO, TPH, and Total Aromatics in multiple soil borings at the site; however, the concentrations of TPH-DRO detected did not exceed NCDEQ Action Levels.
- Concentrations of BTEX, TPH-GRO, 16 EPA PAHs, and BaP were not detected above laboratory reporting limits in the soil borings.
- Terracon does not recommend further assessment of the ROW at this site. Based on minor detections of petroleum compounds in the samples, soil and groundwater encountered during NCDOT's roadway construction project should not need to be managed and/or disposed using special provisions.

## **6.0 REFERENCES**

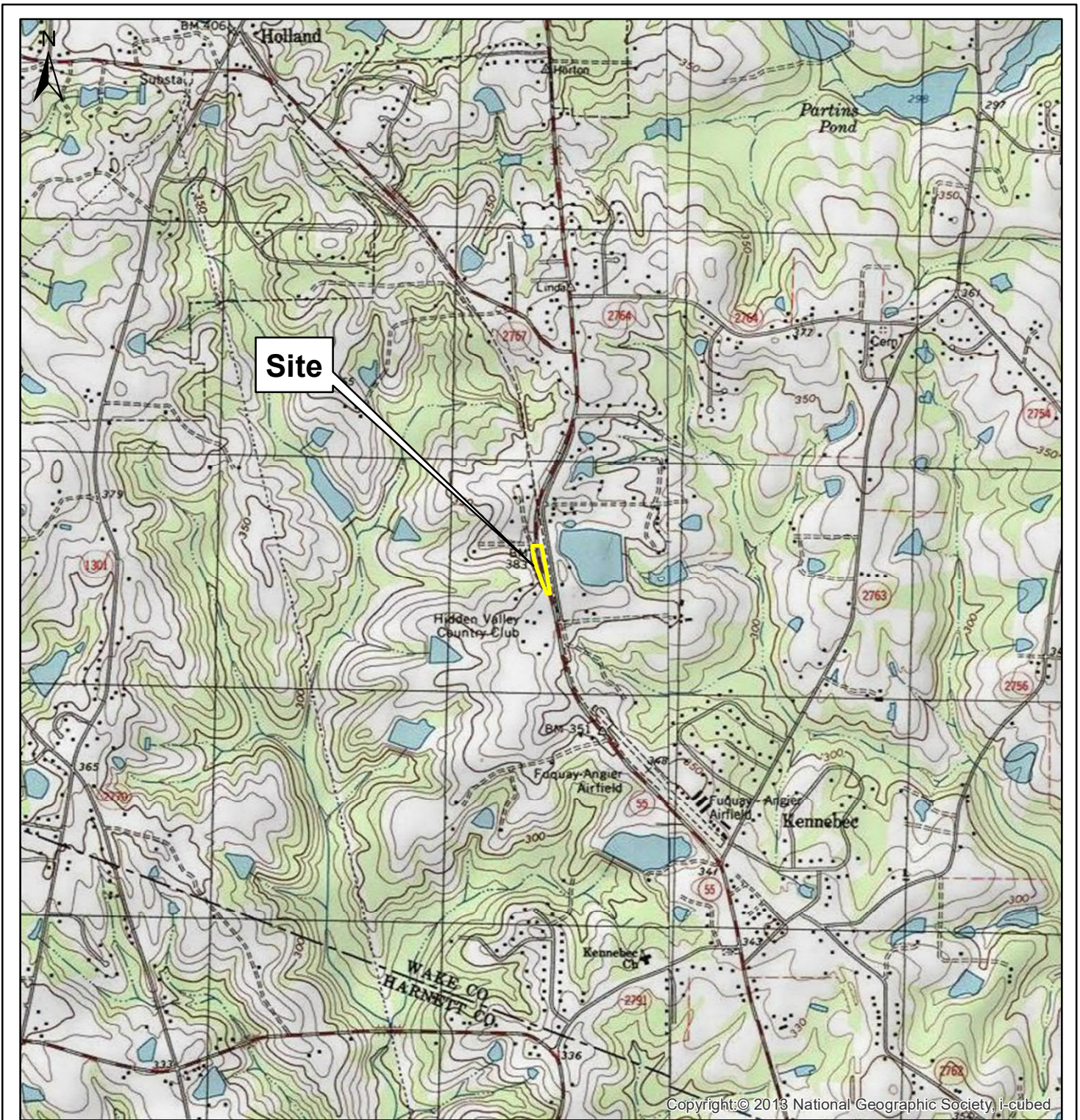
North Carolina Department of Environmental Quality, 2021. Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement, January 19.

North Carolina Department of Transportation, 2018. GeoEnvironmental Planning Report. September 26.

Terracon Consultants, Inc., 2020. Revised Proposal for GeoEnvironmental Phase II Site Investigations, NC 55 from South of SR 1532 to North of NC 210. December 8.

## **EXHIBITS**





0 1,000 2,000 4,000 6,000 8,000 10,000 Feet

CONTOUR INTERVAL 10 FEET

USGS TOPOGRAPHIC MAP  
Angier and Fuquay-Varina, NC Quadrangles (1993)

PM: DRM  
 Drawn By: ECD  
 Checked By: DRM  
 Approved By: DRM

Project No. 70207241  
 Scale: 1:24,000  
 File Path:  
 Date: March 2021

**Terracon**

2401 Brentwood Drive, Suite 107 Raleigh, NC 27604  
 Phone: (919) 873-2211 Fax: (919) 873-9555

**Topographic Vicinity Map**

Phase II Preliminary Site Assessment  
 Parcel 282 - Harteland LLC Property  
 7709 NC 55  
 Willow Spring, Wake County, North Carolina

EXHIBIT NO. 1



# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

### BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

### HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

### RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

### RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easement Pin and Cap	
New Permanent Easement Pin and Cap	
Vertical Benchmark	
Existing Right of Way Marker	
Existing Right of Way Line	
New Right of Way Line	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite R/W Marker	
New Control of Access Line with Concrete CA Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage / Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

### VEGETATION:

Single Tree	
Single Shrub	

*Note: Not to Scale* \*S.U.E. = *Subsurface Utility Engineering*

Hedge	
Woods Line	
Orchard	
Vineyard	

### EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

### UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

### TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

### WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

### TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

### GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

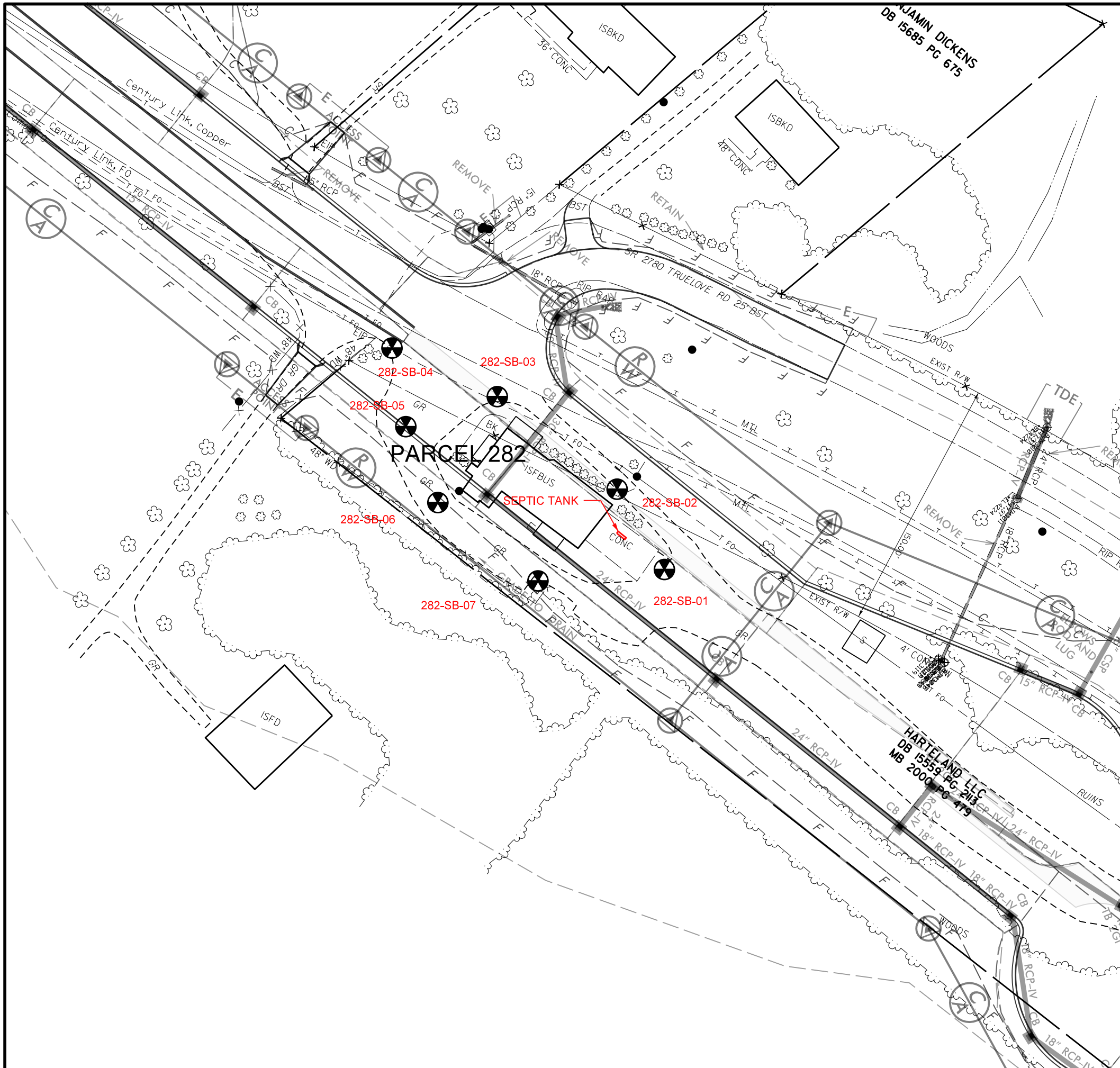
### SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

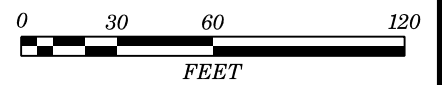
### MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	





<b>PROJECT DESCRIPTION:</b>  PARCEL 282 HARTELAND LLC 7709 NC 55 WILLOW SPRING, WAKE COUNTY	<b>PROJECT REFERENCE NO.</b> 46377.1.3 (R-5705B)	<b>EXHIBIT</b> 3
	<b>BORING LOCATIONS AND SUMMARIZED SOIL SAMPLE RESULTS</b>	



Sample ID	Date Collected	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)
282-SB-01 (2-4)	2/4/2021	<0.47	<0.47	<0.47	<0.090
282-SB-02 (4-6)	2/4/2021	<0.49	3.8	3.8	2.2
282-SB-03 (2-4)	2/4/2021	<0.51	1.5	1.5	0.81
282-SB-04 (6-8)	2/4/2021	<0.48	1.9	1.9	0.93
282-SB-05 (4-6)	2/4/2021	<0.51	<0.51	<0.51	<0.10
282-SB-06 (4-6)	2/4/2021	<0.53	<0.53	<0.53	<0.11
282-SB-07 (2-4)	2/4/2021	<0.50	<0.50	<0.50	<0.10
State Action Levels		50	100	NE	NE

Sample depth is provided in parentheses as part of the sample ID.  
 All results are reported in milligrams per kilogram (mg/kg).  
 <: Less than laboratory reporting limit.  
 GRO - Gasoline Range Organics.  
 DRO: Diesel Range Organics.  
 TPH: Total Petroleum Hydrocarbons.  
 NE: Standard Not Established

## TABLES

Table 1  
 Summary of PID Field Screening Values  
 Phase II Preliminary Site Assessment  
 Parcel 282 - Harteland LLC Property  
 7709 NC 55, Willow Spring, Wake County, North Carolina  
 Terracon Project No. 70207241

Boring Depth (feet bls)	282-SB-01	282-SB-02	282-SB-03	282-SB-04	282-SB-05	282-SB-06	282-SB-07
(0 - 2)	0.9	0.6	0.5	2.1	2.2	1.5	1.7
(2 - 4)	1.6	0.4	1.1	2.4	2.5	1.2	2.4
(4 - 6)	1.8	0.7	1.3	2.9	3.2	1.4	1.8
(6 - 8)	1.7	0.4	1.3	3.0	3.0	1.8	1.5
(8 - 10)	1.7	0.3	1.2	2.8	2.4	1.4	2.1

Notes:

Field screening was conducted on February 4, 2021.

Values shown are given in parts per million (ppm)

PID - Photo-ionization detector

PID was calibrated using 100 ppm isobutylene gas

ft bls - feet below land surface.

Table 2  
 Summary of Soil Analytical Results  
 Phase II Preliminary Site Assessment  
 Parcel 282 - Harteland LLC Property  
 7709 NC 55, Willow Spring, Wake County, North Carolina  
 Terracon Project No. 70207241

Sample ID: Sample Depth (ft bls):	282-SB-01 (2-4)	282-SB-02 (4-6)	282-SB-03 (2-4)	282-SB-04 (6-8)	282-SB-05 (4-6)	282-SB-06 (4-6)	282-SB-07 (2-4)	NCDEQ Action Level	MSCC Industrial / Commercial
BTEX (C6 - C9)	<0.47	<0.49	<0.51	<0.48	<0.51	<0.53	<0.50	NE	NE
GRO (C5 - C10)	<0.47	<0.49	<0.51	<0.48	<0.51	<0.53	<0.50	50	NE
DRO (C10 - C35)	<0.47	3.8	1.5	1.9	<0.51	<0.53	<0.50	100	NE
TPH (C5 - C35)	<0.47	3.8	1.5	1.9	<0.51	<0.53	<0.50	NE	NE
Total Aromatics (C10-C35)	<0.090	2.2	0.81	0.93	<0.10	<0.11	<0.10	NE	NE
16 EPA PAHs	<0.15	<0.16	<0.16	<0.15	<0.16	<0.17	<0.16	NE	NE
BaP	<0.019	<0.020	<0.020	<0.019	<0.020	<0.021	<0.020	NE	0.78

Notes:

Soil samples were collected on February 4, 2021.

Detected compounds are shown in the table.

Concentrations are reported in milligrams per kilogram (mg/kg).

ft bls - feet below land surface.

GRO - Gasoline Range Organics.

DRO - Diesel Range Organics.

TPH - Total Petroleum Hydrocarbons.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.

16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, anthracene,

benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene,

chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).

BaP - Benzo(a)pyrene

NE - Standard not established.

Detections shaded in gray exceed the North Carolina Department of Environmental Quality (NCDEQ) Action Level.

MSCC Industrial/Commercial - Maximum Soil Contaminant Concentration Levels Industrial/Commercial soil cleanup levels.

Bold: Constituent concentration reported above the method detection limit.



**APPENDIX A**  
**GEOPHYSICAL SURVEY REPORT**



March 22, 2021

John Pilipchuk, L.G., P.E.  
North Carolina Department of Transportation  
GeoEnvironmental Engineering Unit  
1589 Mail Service Center  
Raleigh, NC 27699-1589

Re: Report for GeoEnvironmental Phase II Site Investigations  
Locate USTs and Utilities using Geophysical Methods  
Parcel #282 – Harteland LLC  
7709 NC-55, Willow Spring, North Carolina  
TIP: R-5705B; WBS Element No. 46377.1.3  
Terracon Project No.: 70207241

Dear Mr. Pilipchuk:

On January 21 and 22, 2021, a representative of Terracon Consultants, Inc. (Terracon) performed geophysical exploration services at the above referenced site in general accordance with Terracon Proposal No. P70207241 dated December 8, 2020. This report is presented as a summary of those geophysical services.

## 1.0 PROJECT DESCRIPTION

Based on the Request for Proposal (RFP) from the North Carolina Department of Transportation (NCDOT), a Phase II Preliminary Site Assessment (PSA) are requested for Parcel #282 – Harteland LLC, 7709 NC-55, Willow Spring, North Carolina. The project consisted of the exploration of an approximate 300-foot by 100-foot area along Highway 55 (entire area, not just along the roadways). The purpose of the geophysical exploration was to aid in identifying anomalies consistent with Underground Storage Tanks (USTs) utilizing non-intrusive geophysical methods.



Terracon attempted to define the findings from this survey according to the following NCDOT standard terms:

## Geophysical Surveys for Underground Storage Tanks on NCDOT Projects

High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	<b>Possible UST</b> Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist’s discretion.

## 2.0 EXPLORATION METHODS

Terracon used a frequency domain electromagnetic profiler (EM) consisting of a Geonics EM-31-SH system with data logger to collect EM data. In general, field data collection followed the procedures referenced in ASTM D6639-18. More information on both the general method and collection procedures can be found in the referenced standard. EM collects soil conductivity in millisiemens per meter (mS/m) and magnetic susceptibility in parts per trillion (ppt).

Data was collected on a bi-directional grid at approximately 5-foot spacings in both directions. However, the EM-31 uses a sub-meter GPS system to accurately plot data points of collection, therefore the grid was approximate. Data was post-processed utilizing Trackmaker 31 software engineered by Geomar and Surfer software developed by Golden Software.

Additionally, a Ground Penetrating System (GPR) consisting of a 350 MHz antenna and SIR-4000 system made by Geophysical Survey Systems Inc. (GSSI), was utilized to collect GPR data. Data was collected on a bi-directional grid with spacings of approximately 5 feet in both directions. Following the completion of field data collection, data was post-processed utilizing RADAN software engineered by GSSI.

## 3.0 FINDINGS

Terracon reviewed the EM and GPR data collected. Anomalies identified were likely due to interference from multiple buried utilities and above-ground structures. Anomalies consistent with possible USTs were not identified in the EM data. In general, soil conductivity measurements between 4 to 12 mS/m and magnetic susceptibility measurements between -1 to 2 ppt were considered “background”. Measurements outside of these ranges were interpreted to be caused

**Report for GeoEnvironmental Phase II Site Investigations**

Parcel #282 – Harteland LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241



by above or below ground anomalies. The depth of EM signal penetration is approximately 9 feet below the existing grade; however, the actual depth is not produced from the data collected.

Upon review of the GPR data, anomalies consistent with possible USTs were not identified on the site. The depth of GPR signal penetration across the site was approximately 6 feet below the existing grade. Some areas of the site were inaccessible due to above ground obstructions used for storage. Complete results of our findings can be found in the attached Exhibits.

**4.0 LIMITATIONS**

It should be noted that, as with any geophysical testing method, the processes rely on instrument signals to indicate physical conditions in the field. Signal information can be affected by on-site conditions beyond the control of the operator, such as, but not limited to, ground surface cover, concrete/soil types, concrete/soil moisture, groundwater table depth, and/or reinforcing steel spacing. The depth of penetration and quality of the GPR data cannot be determined until our arrival on site. Interpretation of those signals is based on a combination of known factors combined with the experience of the operator and geophysicist evaluating the results. Additionally, GPR may not be able to identify the diameter of an object such as a pipe or UST. Utilizing conventional observation, sampling, and testing (“truthing”) of select areas is recommended to confirm the results from the geophysical surveys. As with all geophysical methods, the geophysical results provide a level of confidence, but should not be considered absolute. We cannot be responsible for the interpretation of geophysical results by others.

**5.0 CLOSURE**

We appreciate the opportunity to work with you on this project. Please do not hesitate to contact the undersigned if you have any questions regarding this information or if we can be of further service to you.

Sincerely,  
**Terracon Consultants, Inc.**

For: Joshua A. Lopez  
Geophysicist

James D. Hoskins, III, P.E.  
Principal / Greensboro Office Manager

Attachments: Exhibits – Geophysical Exploration Results (4 pages)



**SITE LOCATION**

Parcel #282 – Harteland LLC ■ Willow Spring, NC  
March 22, 2021 ■ Terracon Project No. 70207241

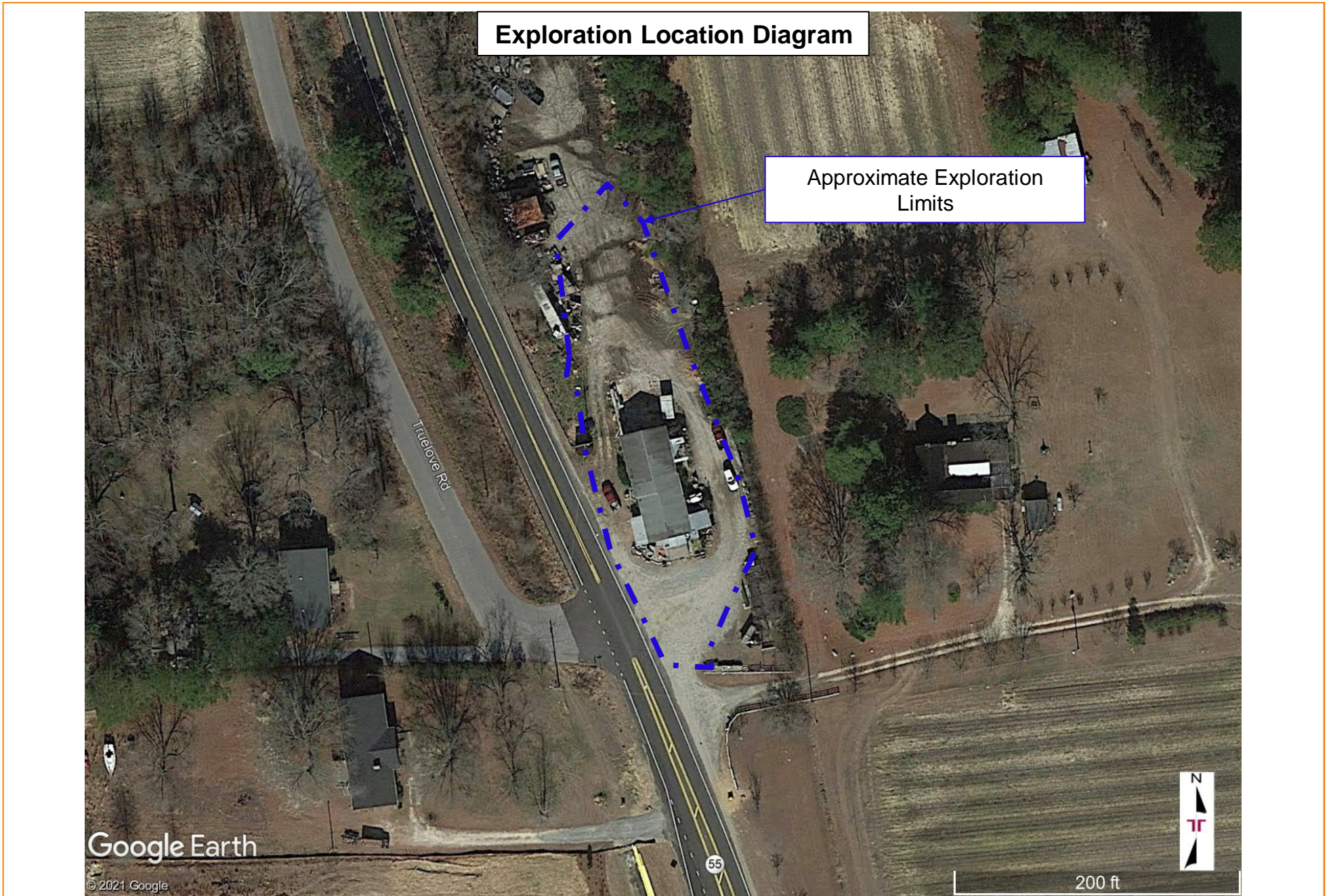




**EXPLORATION LOCATION**

Parcel #282 – Harteland LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241

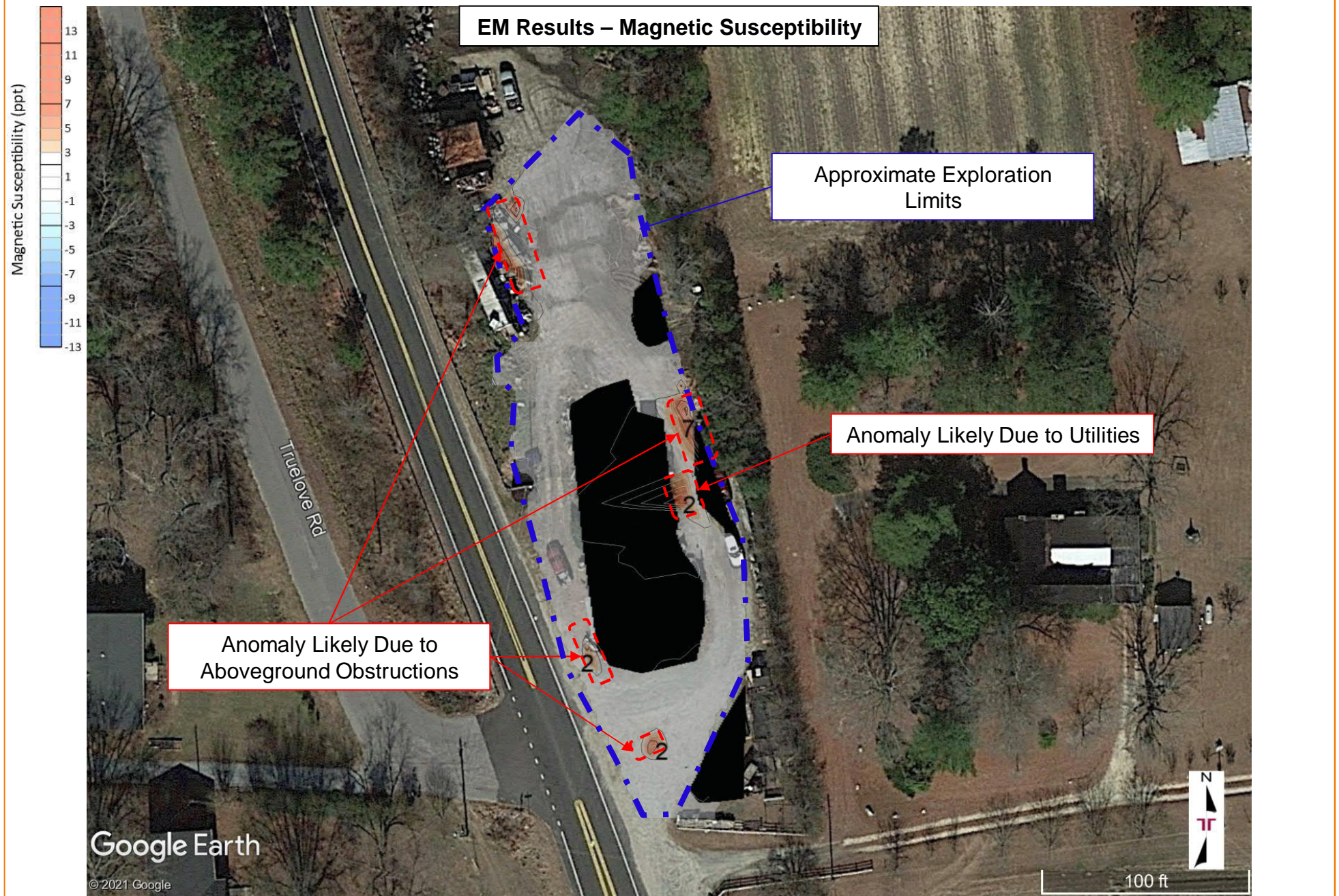




**EXPLORATION RESULTS**

Parcel #282 – Harteland LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241

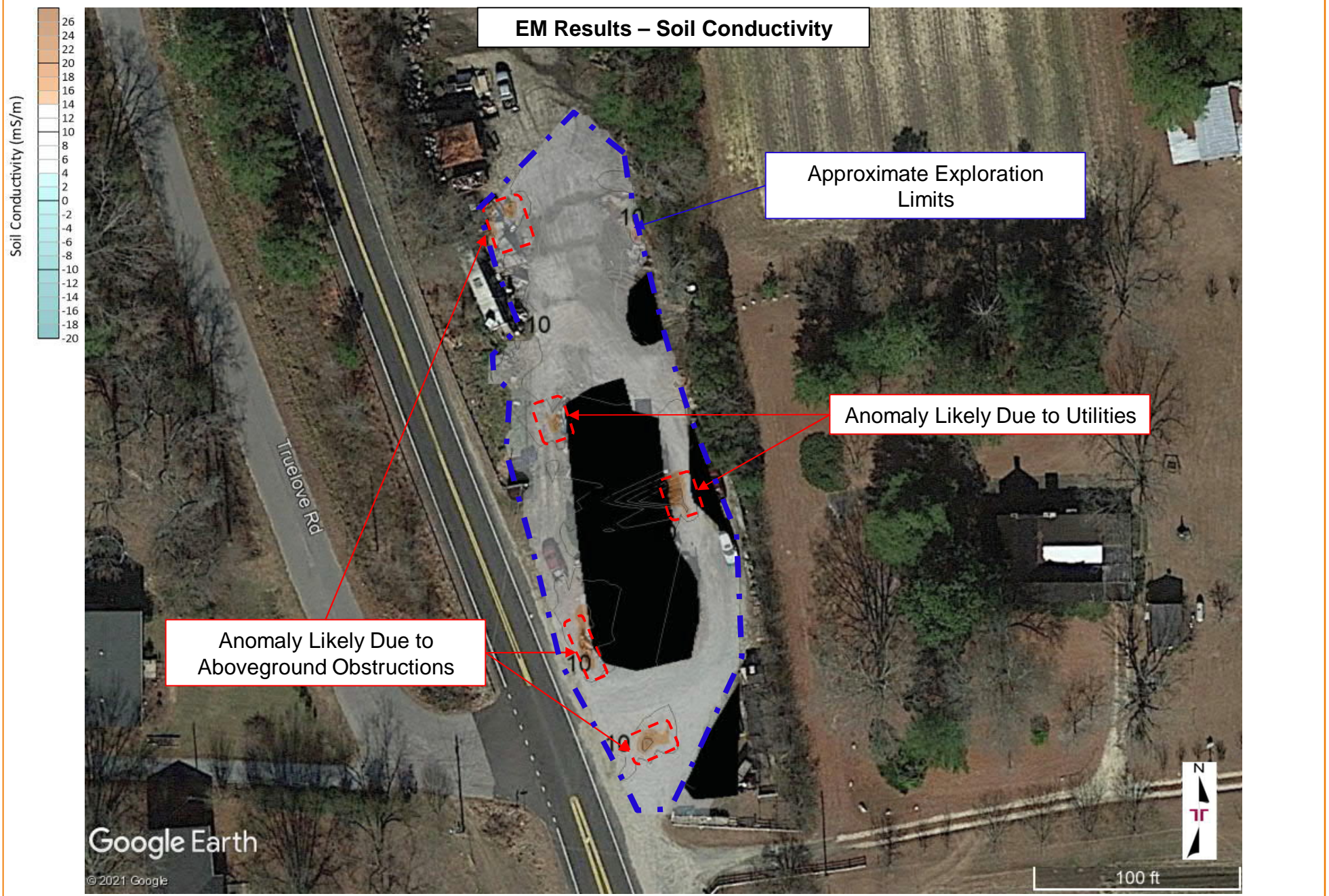




**EXPLORATION RESULTS**

Parcel #282 – Harteland LLC ■ Willow Spring, NC

March 22, 2021 ■ Terracon Project No. 70207241



**APPENDIX B  
PHOTOGRAPHS**



## Phase II Preliminary Site Assessment

Parcel 282 – Harteland, LLC ■ Willow Spring, North Carolina

Photos Taken: February 4, 2021 ■ Terracon Project No. 70207241



**Photo #1** View of the site; facing north.



**Photo #2** View of the western portion of the site; facing north.

## Phase II Preliminary Site Assessment

Parcel 282 – Harteland, LLC ■ Willow Spring, North Carolina

Photos Taken: February 4, 2021 ■ Terracon Project No. 70207241



**Photo #3** View of the eastern portion of the site; facing north.



**Photo #4** View of the northern portion of the site; facing north.



## Phase II Preliminary Site Assessment

Parcel 282 – Harteland, LLC ■ Willow Spring, North Carolina

Photos Taken: February 4, 2021 ■ Terracon Project No. 70207241



**Photo #5** View of the on-site septic tank located north of the on-site building; facing northwest.

**APPENDIX C**  
**SOIL BORING LOGS**



# BORING LOG NO. 282-SB-01

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>SILTY SAND (SM)</b> , trace gravel, light brown, odor and staining not observed, moist						282-SB-01 TPH via QED UVF
0.5	<b>CLAYEY SAND (SC)</b> , trace organics, coarse grained, orangish brown, odor and staining not observed, moist					0.9	
2.5	<b>SANDY CLAY (CL)</b> , orangish brown and reddish brown, odor and staining not observed, moist to wet at 6 feet bls			Grab	36	1.6	
5		5			36	1.8	
10						1.7	
10	<b>Boring Terminated at 10 Feet</b>	10				36	1.7

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

# BORING LOG NO. 282-SB-02

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
4.0	<b>SILTY SAND (SM)</b> , trace clay, trace gravel, light brown, odor and staining not observed, moist	4.0				0.6	282-SB-02 TPH via QED UVF
5.0	<b>SILTY SAND (SM)</b> , brown and orangish brown, odor and staining not observed, wet	5.0		Grab	36	0.4	
9.0	<b>SILTY SAND (SM)</b> , some clay, orangish brown, odor and staining not observed, wet	9.0			36	0.3	
10.0	<b>Boring Terminated at 10 Feet</b>	10.0					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

# BORING LOG NO. 282-SB-03

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
5.0	<b>SILTY SAND (SM)</b> , fine to coarse grained, dark brown and light brown, odor and staining not observed, moist	5		36	1.1	0.5	282-SB-03 TPH via QED UVF
6.0	<b>CLAY (CL)</b> , trace sand, light gray and reddish brown, odor and staining not observed, wet			36	1.3		
9.0	<b>SILTY SAND (SM)</b> , trace clay, coarse grained, orangish brown, odor and staining not observed, wet				1.3		
10.0	<b>CLAYEY SAND (SC)</b> , orangish brown, odor and staining not observed, wet			36	1.2		
	<b>Boring Terminated at 10 Feet</b>	10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

# BORING LOG NO. 282-SB-04

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>SILTY SAND (SM)</b> , trace gravel, fine to coarse grained, light brown, odor and staining not observed, moist						
7.0	<b>SILTY SAND (SM)</b> , trace clay, fine to coarse grained, light gray and orangish brown, odor and staining not observed, moist to wet at 6 feet bls					2.1	
10.0	<b>CLAYEY SAND (SC)</b> , coarse grained, orangish brown and reddish brown, odor and staining not observed, wet			Grab	36	2.4	
10.0	<b>Boring Terminated at 10 Feet</b>	5			36	2.9	
10.0		10			36	3.0	282-SB-04 TPH via QED UVF
10.0					36	2.8	

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B



# BORING LOG NO. 282-SB-05

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
3.0	<b>SILTY SAND (SM)</b> , trace gravel, fine to coarse grained, light brown, odor and staining not observed, dry to moist	2.2			36		282-SB-05 TPH via QED UVF
3.0	<b>SILTY SAND (SM)</b> , some clay, fine to coarse grained, orangish brown and reddish brown, odor and staining not observed, moist to wet at 5 feet bls	2.5		Grab			
8.0	<b>CLAYEY SAND (SC)</b> , coarse grained, orangish brown and light gray, odor and staining not observed, wet	3.0		36			
10.0	<b>CLAYEY SAND (SC)</b> , coarse grained, orangish brown and light gray, odor and staining not observed, wet	2.4		36			
	<b>Boring Terminated at 10 Feet</b>	10					

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

WATER LEVEL OBSERVATIONS



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

# BORING LOG NO. 282-SB-06

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

GRAPHIC LOG	LOCATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)	
	See Exhibit 3							
	DEPTH	MATERIAL DESCRIPTION						
3/2/21	4.0	<b>SILTY SAND (SM)</b> , trace gravel from 0 to 0.5 feet bls, fine to coarse grained, light brown and orangish brown, odor and staining not observed, dry to moist						282-SB-06 TPH via QED UVF
4.0	<b>SILTY SAND (SM)</b> , trace clay, fine to coarse grained, orangish brown, odor and staining not observed, moist to wet at 5 feet bls							
5.0								
10.0	<b>Boring Terminated at 10 Feet</b>							

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021  
Drill Rig: Geoprobe 5410  
Project No.: 70207241

Boring Completed: 02-04-2021  
Driller: Regional Probing Services  
Appendix B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241\_BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

# BORING LOG NO. 282-SB-07

**PROJECT:** Phase II Preliminary Site Assessment - Parcel 282

**CLIENT:** NCDOT  
Raleigh, North Carolina

**SITE:** Harteland LLC - 7709 NC 55  
Willow Spring, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG 70207241 BORING LOGS.GPJ TERRACON DATATEMPLATE.GDT 3/2/21

GRAPHIC LOG	LOCATION See Exhibit 3	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>SILTY SAND (SM)</b> , with gravel, light brown, odor and staining not observed, dry						282-SB-07 TPH via QED UVF
2.0	<b>CLAYEY SAND (SC)</b> , coarse grained, reddish brown, odor and staining not observed, moist						
4.0	<b>SILTY SAND (SM)</b> , fine to coarse grained, light brown, odor and staining not observed, moist			36			
7.0	<b>CLAYEY SAND (SC)</b> , coarse grained, orangish brown and reddish brown, odor and staining not observed, moist	5		Grab			
10.0	<b>SANDY CLAY (CL)</b> , reddish brown and light gray, odor and staining not observed, moist				36		
10.0	<b>Boring Terminated at 10 Feet</b>	10				36	

The stratification lines represent the approximate transition between differing soil types and/or rock types; in-situ these transitions may be gradual or may occur at different depths than shown.

Advancement Method:  
2.25-inch DPT

Abandonment Method:  
Boring backfilled with bentonite chips upon completion.

Notes:  
ft bls: feet below land surface  
PID: Photoionization detector  
TPH: Total petroleum hydrocarbons  
UVF: Ultraviolet fluorescence

**WATER LEVEL OBSERVATIONS**



Boring Started: 02-04-2021	Boring Completed: 02-04-2021
Drill Rig: Geoprobe 5410	Driller: Regional Probing Services
Project No.: 70207241	Appendix B

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





### Hydrocarbon Analysis Results

**Client:** Terracon Consultants  
**Address:** 2401 Brentwood Road Suite 107  
 Raleigh, NC

**Samples taken**  
**Samples extracted**  
**Samples analysed**

Thursday, February 4, 2021  
 Thursday, February 4, 2021  
 Friday, February 5, 2021

**Contact:** Ethan Dinwiddie

**Operator**

Caroline Stevens

**Project:** #70207241

										F03640				
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match	
										% light	% mid	% heavy		
s	282-SB-01 (2-4)	19.0	<0.47	<0.47	<0.47	<0.47	<0.09	<0.15	<0.019	0	0	0	PHC not detected	
s	282-SB-02 (4-6)	19.7	<0.49	<0.49	3.8	3.8	2.2	<0.16	<0.02	0	69.3	30.7	V.Deg.PHC 92.1%,(FCM),(P)	
s	282-SB-03 (2-4)	20.3	<0.51	<0.51	1.5	1.5	0.81	<0.16	<0.02	0	70.9	29.1	V.Deg.PHC 91.7%,(FCM),(P)	
s	282-SB-04 (6-8)	19.3	<0.48	<0.48	1.9	1.9	0.93	<0.15	<0.019	0	72.7	27.3	V.Deg.PHC 95%,(FCM)	
s	282-SB-05 (4-6)	20.5	<0.51	<0.51	<0.51	<0.51	<0.1	<0.16	<0.02	0	0	0	PHC not detected,(P)	
s	282-SB-06 (4-6)	21.1	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	PHC not detected,(BO)	
s	282-SB-07 (2-4)	20.0	<0.5	<0.5	<0.5	<0.5	<0.1	<0.16	<0.02	0	0	0	PHC not detected,(BO)	
Initial Calibrator QC check			OK							Final FCM QC Check			OK 99.8 %	

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

