GEL Engineering of NC INC

an affiliate of **The GEL Group** INC

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT
PARCEL #10, 20671 CATAWBA AVENUE, CORNELIUS, NC

September 5, 2019

WBS Number: 50146.1.F1

TIP Number: C-5621

County: Mecklenburg

Description: Intersection of US 21 and SR 2697 (Catawba Avenue), Cornelius, Mecklenburg County, NC

Parcel No (PIN): Parcel #10; Fast Express 504
PIN #00319201

Address: 20671 Catawba Avenue, Cornelius, NC 28031

Submitted to:

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

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This document, entitled *GeoEnvironmental Phase II Investigation Report, Parcel #10, 20671 Catawba Avenue, Cornelius, NC*, has been prepared by GEL Engineering of NC, Inc., for the parcel identified above in accordance with the Notice to Proceed issued by the North Carolina Department of Transportation – Geotechnical Engineering Unit on July 23, 2019. It has been prepared in accordance with accepted quality control practices for the exclusive use of the North Carolina Department of Transportation and has been reviewed by the undersigned.

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

E. Jorgen Bergstrom
Senior Geophysicist

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

September 5, 2019.
Date

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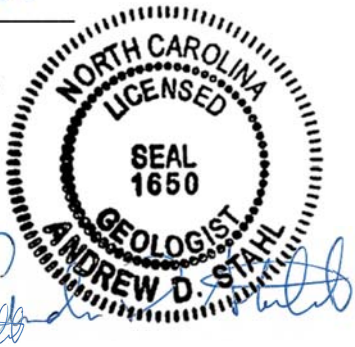

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Intersection of US 21 and SR 2697 (Catawba Avenue), Cornelius, Mecklenburg County, NC
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Mecklenburg County

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1.0 INTRODUCTION

NCDOT authorized GEL Engineering of NC, Inc. (GEL), to perform a Phase II geoenvironmental investigation at the subject parcel in Mecklenburg County. The objective of the investigation was to evaluate the presence of potential environmental hazards within the existing and proposed rights-of-way (ROWs) and/or easements, including objects such as underground storage tanks (USTs) and petroleum contaminated soil. The subject parcel location is shown on Figure 1 and listed below.

Parcel #	Owner	Business Name	Address	Mecklenburg County PIN #
10	QuickTrip Corporation	Fast Express 504	20671 Catawba Avenue, Cornelius, NC 28031	00319201

A portion of the parcel was designated as the investigation area from information included in NCDOT's C-5621 CAD files provided to GEL. This area is shown on Figure 2 and extends from the edge-of-pavement to the innermost existing or proposed ROW or easement. Geophysical surveys were conducted across the investigation area using ground penetrating radar (GPR) and time-domain electromagnetic (TDEM) technologies. Nine geoenvironmental soil borings were installed within the investigation are at the locations shown on Figure 3. The methodologies and results of these investigations are discussed in the following sections.

In addition to the electronic DocuSign copy of this report, GEL is submitting to NCDOT (a) an electronic Microstation C-5621_env_geo.dgn file that provides the geoenvironmental soil boring locations and the estimated extent of contaminated soil, and (b) a Microsoft Excel file of the soil sample ultra-violet fluorescence (UVF) spectrometry analytical results prepared by RED Lab, LLC, of Wilmington, North Carolina (RED Lab).

2.0 HISTORY

In addition to reviewing site environmental records posted on the Connect NCDOT server, GEL searched North Carolina Department of Environmental Quality (NCDEQ) electronic records and contacted the NCDEQ Mooresville Regional Office and NCDEQ Headquarters in Raleigh to obtain pertinent environmental records and regulatory history. A summary of the records review is as follows:

- The facility was constructed in 1982. Marr, Inc., leased the property from DMC Properties, Inc., and operated it as a gasoline station and convenience store until closing the business in early June 2017.
- Four 10-000-gallon gasoline USTs were located in a single tank basin in the northwestern property area with product piping extending east and south in the direction of the dispenser islands located in the central portion of the property. In addition, one 2,000-gallon kerosene UST was located immediately south-southwest of the convenience store on the southeastern portion of the product property with the piping and dispenser located immediately above the kerosene UST.
- The results of a site assessment conducted by Mid Atlantic Engineering & Environmental Solutions were presented in a report dated March 21, 2016. The results revealed petroleum-related impacts near the gasoline USTs, and the release was reported to NCDEQ in April 2016, who in turn issued a Notice of Regulatory Requirement on September 13, 2016, requiring completion of a Limited Site Assessment (LSA).
- An LSA Report dated November 16, 2016, was prepared by Geological Resources, Inc. Dissolved petroleum-related constituents in groundwater exceeded the North Carolina 2L Groundwater Standards (15A NCAC 2L .0202) but were below the NCDEQ Gross Contaminant Levels for Groundwater (GCLs). Soil contamination exceeded residential Maximum Soil Contaminant Concentration Levels (MSCCs) but were below industrial/ commercial MSCCs.
- NCDEQ issued a conditional Notice of No Further Action (NFA) on December 12, 2016, requiring that a Notice of Residual Petroleum (NORP) be filed with the Mecklenburg County Register of Deeds.
- The NORP was filed in March 2017, and NCDEQ issued an NFA on April 3, 2017.

- Genesis Project, Inc. (Genesis Project), conducted a Phase II Environmental Site Assessment (ESA) as part of due diligence activities for QuikTrip Corporation to acquire the property from DMC Properties. It was concluded that identified soil and groundwater impacts were consistent with the LSA findings. The depth to groundwater was reported at approximately 28 to 32 feet below ground surface (bgs).
- The UST system was removed in June 2017, and a UST Closure Report dated August 22, 2017, was prepared by Genesis Project.
- An Initial Abatement Action Report dated October 20, 2017, was prepared by Genesis Project. It was concluded that site petroleum soil impacts were below industrial/ commercial MSCCs and groundwater impacts were below NCDEQ GCLs. The report documented the identification and removal of impacted soil in the vicinity of the kerosene UST and included the following related statements: "The extent of the excavation was based on field screening results as well as visual and olfactory observations. Based on laboratory analytical results of post-excavation soil samples (KEX-1 through KEX-5), abatement actions were successful in the removal of the identified petroleum impacted soil… All petroleum impacts above the Residential MSCC in the vicinity of the kerosene tank basin were successfully removed… Soil impacts above the Soil-to-Groundwater MSCC were vertically delineated in the vicinity of the kerosene tank basin."
- NCDEQ issued an NFA for the site on November 17, 2017.

3.0 SITE OBSERVATIONS

In advance of the field investigation, the GEL Project Manager notified the landowner of the planned investigation activities. The GEL Project Manager also conducted a site reconnaissance on July 24, 2019, during the beginning of the investigation. Representative photographs taken during the site reconnaissance are provided in Appendix A.

The site is currently vacant. The prior site building, fueling station canopy, and other surface features have been removed, with only the building' concrete slab and other concrete and asphalt pavement areas remaining. No active USTs, active hydraulic lifts with in-ground components, or other features of potential environmental concern were observed within or adjacent to the investigation area. The only obstructions to the geophysical survey across the investigation area were surface utility structures, site fencing, and concrete traffic barriers (for example, see Appendix A, photographs 6 through 8). One abandoned monitoring well was observed outside of the investigation area near the former location of the UST basin (Appendix A, photograph 1).

4.0 METHODS

This section describes the field methods followed to complete the geophysical surveys and the geoenvironmental soil boring and sampling program.

4.1 Geophysical Survey Methods

The geophysical evaluation included the deployment of GPR and TDEM technologies to the site. These technologies were used in concert with one another in order to identify the presence of potential USTs or other subsurface features of concern such as buried drums. A brief description of these technologies is presented in the following paragraphs.

The GPR and TDEM surveys were conducted by towing the geophysical equipment along a system of transect lines on an approximately 2.5-foot spaced grid established within the investigation area. In spatially restricted and surface obstructed areas, a modified pattern of transect lines was implemented to maximize data acquisition. Positioning for the investigation was provided using a Trimble real-time kinematic (RTK) global positioning system (GPS).

4.1.1 Ground Penetrating Radar Methodology

An ImpulseRadar Crossover dual-channel digital radar control system configured with a 400- and 800-Megahertz (MHz) antenna array was used in this investigation. GPR is an electromagnetic geophysical method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of an antenna which houses the transmitter and receiver, a digital control unit which both generates and digitally records the GPR data, and a color video monitor to view data as it is collected in the field.

The transmitter radiates repetitive short duration electromagnetic waves (at radar frequencies) into the earth from an antenna moving across the ground surface. These radar waves are reflected back to the receiver from the interface of materials with different dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant between the materials, the conductivity of the material through which the wave is traveling, and the frequency of the signal.

Subsurface features that commonly cause such reflections are: 1) natural geologic conditions, such as changes in sediment composition, bedding, and cementation horizons and voids; or 2) unnatural changes to the subsurface such as disturbed soils, soil backfill, buried debris, tanks,

pipelines, and utilities. The digital control unit processes the signal from the receiver and produces a continuous cross-section of the subsurface interface reflection events.

GPR data profiles were collected along transects covering the entire investigation area. Depth of investigation of the GPR signal is highly site specific and is limited by signal attenuation (absorption) in the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities such as clays, brackish groundwater, or groundwater with a high dissolved solid content from natural or manmade sources. Signal attenuation is lowest in relatively low conductivity materials such as dry sand or rock. Depth of investigation is also dependent on the antenna's transmitting frequency. Depth of investigation generally increases as transmitting frequency decreases; however, the ability to resolve smaller subsurface features is diminished as frequency is decreased. The average depth of penetration at this site was approximately 3 to 4 feet below the surface.

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

4.1.2 Time Domain Electromagnetic Methodology

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

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

4.2 GeoEnvironmental Soil Borings and Soil Sampling

A direct push technology (DPT) drilling rig provided by our subcontracted driller, Regional Probing Services, Inc., was used to advance soil borings across the investigation area at the locations shown on Figure 3. A utility clearance was performed by North Carolina One-Call across the investigation area prior to the soil boring program. In addition to the GPR and TDEM geophysical investigations described in Section 4.1, GEL specifically cleared each planned drilling location for underground utilities utilizing radio frequency electromagnetics instrumentation. Underground utilities were identified across much of the investigation area and, as shown on Figure 3, the position of soil borings SB-3 through SB-9 were all adjusted to the northern edge of the investigation area (i.e., the innermost existing or proposed ROW/easement lines). Downhole DPT equipment was decontaminated before and after each boring was constructed. Following sample collection, the borings were backfilled with bentonite chips, and the location of each boring (Figure 3) was measured using the Trimble RTK/GPS.

GEL installed each of the nine soil borings to 8 feet bgs. DPT soil sampling consists of pushing/hammering a stainless-steel, 4-foot long, Macro-Core soil sampler and PVC liner to the desired sampling depth. The liner is removed from the soil sampler and cut to expose a continuous soil core for characterization and sampling. Lithologic descriptions of soil samples were recorded on soil boring logs along with other field observations. The soil boring logs are provided as Appendix B.

Subsurface soil was screened for organic vapors using a field photoionization detector (PID), and these measurements were recorded on the soil boring logs (Appendix B). The PID measures the concentration of organic compounds in the vapor space above a soil sample resulting from volatilization of organic compounds contained in the soil. To screen the soils, each sample was placed in a clean, resealable polyethylene bag. The bag was sealed, the sample was allowed to equilibrate, the probe of the PID was then inserted into the bag, and the airspace above the soil was screened for organic vapors.

Soil samples were submitted for laboratory analysis by RED Lab. After the soil core extracted from each boring was logged, the horizon with the highest field PID reading was selected for laboratory analysis. In the absence of discernable PID reading differences, the sample collected from 1 to 2 feet bgs was selected for laboratory analysis, because the NCDOT C-5621 plans and

cross sections indicated this to be the most representative soil horizon to be cut or otherwise handled by NCDOT at this parcel during the planned construction project.

To collect the sample, approximately 10 grams of soil from the selected horizon were extracted using a laboratory-provided Terra-Core sampler and transferred into a laboratory-provided VOA vial containing 20 milliliters of methanol preservative and handled according to RED Lab field sampling protocol. Laboratory-quality nitrile gloves were worn by sampling personnel throughout the sampling process and changed between each sample. Upon collection, sample bottles were placed on ice in a cooler and transported to the analytical laboratory under proper chain-of-custody procedures. The samples were analyzed by RED Lab using UVF Spectrometry for the following indicator parameters to evaluate the investigation area for the presence petroleum of contaminated soil:

- Total benzene, toluene, ethylbenzene, and xylenes (BTEX) (C6-C9 fraction)
- DRO (C10-C35 fraction)
- GRO (C5-C10 fraction)
- Total Petroleum Hydrocarbons (TPH) (C5-C35 fraction)
- Total Aromatics (C10-C35 fraction)
- 16 EPA Polyaromatic Hydrocarbons (PAHs) (total PAH value)
- Benzo(a)Pyrene.

5.0 RESULTS

The results of the geophysical surveys and geoenvironmental soil boring and soil sampling program are presented below.

5.1 Geophysical Survey Results

The geophysical field investigation was successfully performed at the subject parcel. Interpretation of the GPR data was conducted in the field, with subsequent data processing including band pass filtering, background removal, horizontal smoothing, and gain adjustments. TDEM was also used to scan the project site. Based on the field data review, no electromagnetic or GPR anomalies were detected that were indicative of buried metallic objects, and so no potential anomalies were marked in the field.

The TDEM survey results are displayed on Figure 4. All the high TDEM responses shown on Figure 4 are correlated to surface metallic debris and/or above-ground metal structures as labeled on the figure and are not considered to be representative of "Potential USTs."

5.2 Soil Sample Analytical Results

The field PID screening measurements listed in Appendix B indicate the presence of organic vapors only in one boring, SB-5, which is the boring closest to the kerosene UST excavation and corrective action area (see Section 2.0). The horizon with the highest PID measurement, 186 parts per million (ppm), was 2 to 3 feet bgs. Therefore, a sample of the soil collected from 2 to 3 feet bgs was submitted to RED Lab for indicator-parameter UVF Spectrometry analysis to evaluate for the presence petroleum contaminated soil. None of the other soil borings showed significant PID readings or discernable differences between soil horizons, and so the sample collected from all other borings from 1 to 2 feet bgs was selected for laboratory analysis, as discussed in Section 4.2. A summary of the soil sampling details is tabulated below, along with a listing of the northing and easting coordinates for the boring locations.

Summary of Soil Sample Location Data and PID Measurements

Soil Boring	Depth Interval of Soil Sample Collected for Laboratory Analysis (feet bgs)	PID Reading (ppm)	Northing	Easting
SB-1	1-2	0.3	636429.731	1442959.570
SB-2	1-2	0.0	636392.522	1442946.184
SB-3	1-2	0.0	636358.565	1442910.325
SB-4	1-2	0.1	636345.001	1442896.620
SB-5	2-3	186	636335.265	1442881.602
SB-6	1-2	0.2	636333.565	1442864.260
SB-7	1-2	0.0	636331.650	1442846.016
SB-8	1-2	0.0	636327.889	1442807.264
SB-9	1-2	0.0	636323.013	1442772.403

Notes:
1) Northings and Eastings are based on the NC State Plane Coordinate System (feet)
2) bgs = below ground surface
3) PID = photoionization detector
4) ppm = parts per million

The UVF Spectrometry analytical results are presented in Table 1. These results are also presented in Appendix B along with hydrocarbon fingerprint graphs prepared by RED Lab and the chain-of-custody form completed for the project. Consistent with the field PID measurement results, the sample collected from soil boring SB-5 was the only sample that had notable concentrations of petroleum hydrocarbons, with a reported TPH concentration (carbon range C5 through C35) of 166.2 mg/Kg, which exceeds the NCDEQ screening level of 10 mg/Kg. Petroleum hydrocarbons were not detected in the soil samples collected from borings SB-1, SB-2, or SB-4. TPH concentrations below the 10 mg/Kg screening level, ranging from 0.94 to 9.2 mg/Kg, were reported for the soil samples collected from borings SB-3 and SB-6 through SB-9. The distribution of these TPH concentrations are illustrated on Figure 5.

6.0 CONCLUSIONS

Field and office review of the geophysical field investigation data correlated all identified geophysical anomalies to surface metallic debris and/or above ground metal structures. No potential anomalies were marked in the field, and the geophysical survey results suggest there are no buried metallic objects indicative of "Potential USTs" within the investigation area.

Petroleum hydrocarbons were identified in soil boring SB-5. The reported TPH concentration (C5-C35) of 166.2 mg/Kg exceeds the NCDEQ screening level of 10 mg/Kg. The proximity of this boring to the location of the kerosene UST removal and corrective action area infers that the identified contamination is associated with the prior kerosene release. Although RED Lab's computer algorithm did not result in a hydrocarbon fingerprint match (see Table 1 and Appendix C), the 2:1 hydrocarbon concentration ratio between diesel range organics (DRO, C10-C35) to gasoline range organics (GRO, C5-C10) is somewhat consistent with weathered kerosene.

Figure 5 shows a blue-shaded area indicating the estimated extent of soil contamination exceeding the 10 mg/Kg NCDEQ screening level. Because soil borings could not be constructed on the southern portion of the impact area due to underground utilities, a conservative estimate of the extent of soil contamination was prepared as follows: The area extends from the location of soil boring SB-5 approximately halfway to the locations of the two adjacent borings and extends across the full width of the investigation area (i.e., from edge-of-pavement to the innermost existing or proposed ROW/easement). The shaded area on Figure 5 is depicted by lines in the electronic Microstation C-5621_env_geo.dgn file. The electronic Microstation lines across the northern half of the impact area surrounding the location of soil boring SB-5 are shown as a "known contamination area", and the lines across the southern half of the impact area where soil borings could not be constructed due to underground utilities are shown as a "potential contamination area." Soils can be screened with a PID during construction activities to further refine the quantity of soils that will require proper off-site disposal.

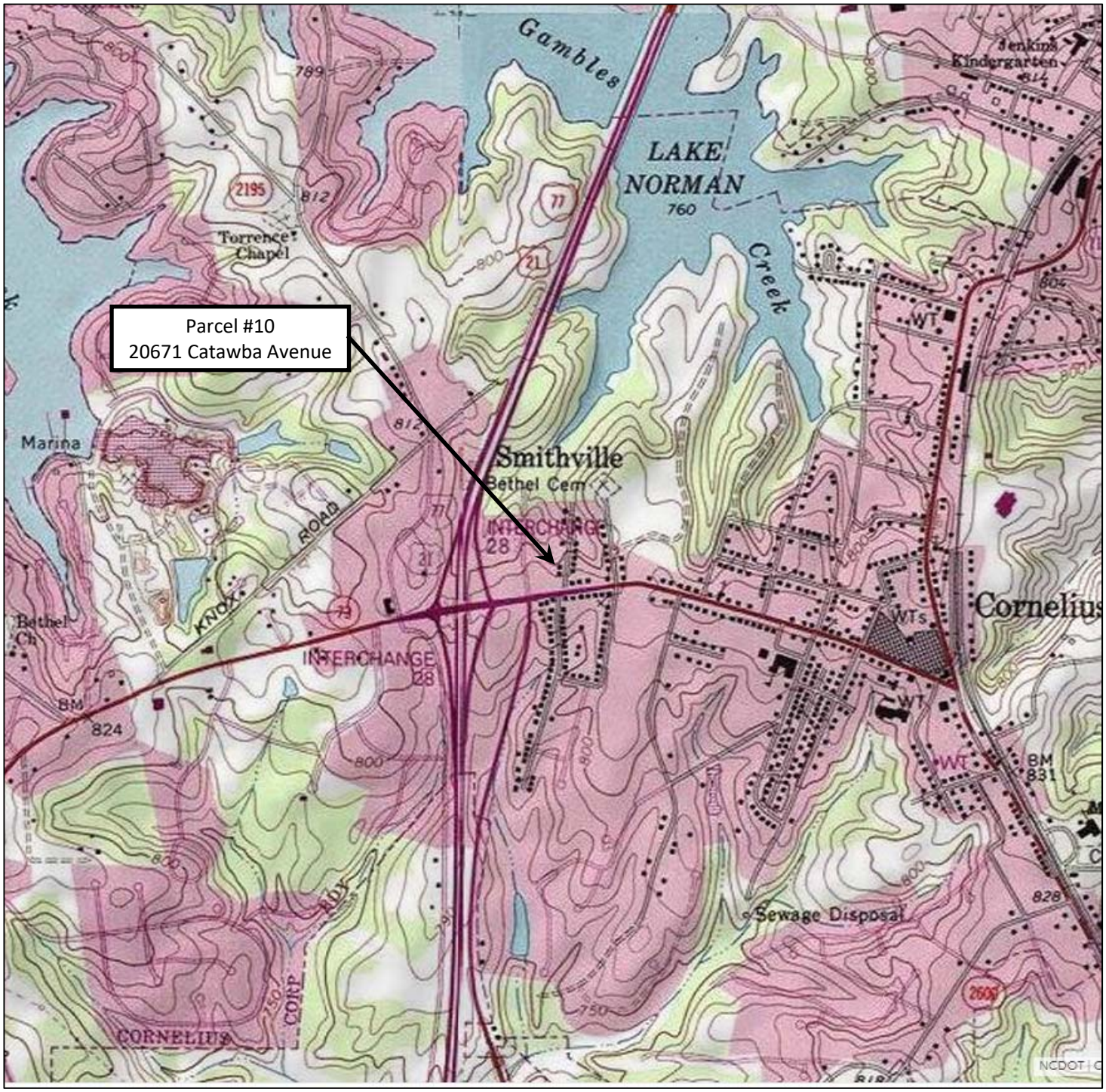
The estimated extent of soil contamination shown on Figure 5 is approximately 1,085 square feet. The field PID measurements performed on the soil retrieved from boring SB-5 (see Appendix B) suggest the contamination extends to a depth of about 7 feet bgs. The calculated volume of potentially contaminated soil from the ground surface to 7 feet bgs across the soil contamination area shown on Figure 5 is estimated at 280 cubic yards.

7.0 RECOMMENDATIONS

No additional environmental investigation of the soil at the site is recommended at this time. However, it is recommended that soil excavated in the vicinity of soil borings SB-5 as part of NCDOT's planned construction activities be handled appropriately as petroleum contaminated soil and further characterized for petroleum constituents, as warranted.

Although geophysical methods provide a high level of assurance for the location of subsurface objects, the possibility exists that not all features can or will be identified. Therefore, due caution should be used when performing subsurface excavation across the entire investigation area.

FIGURES



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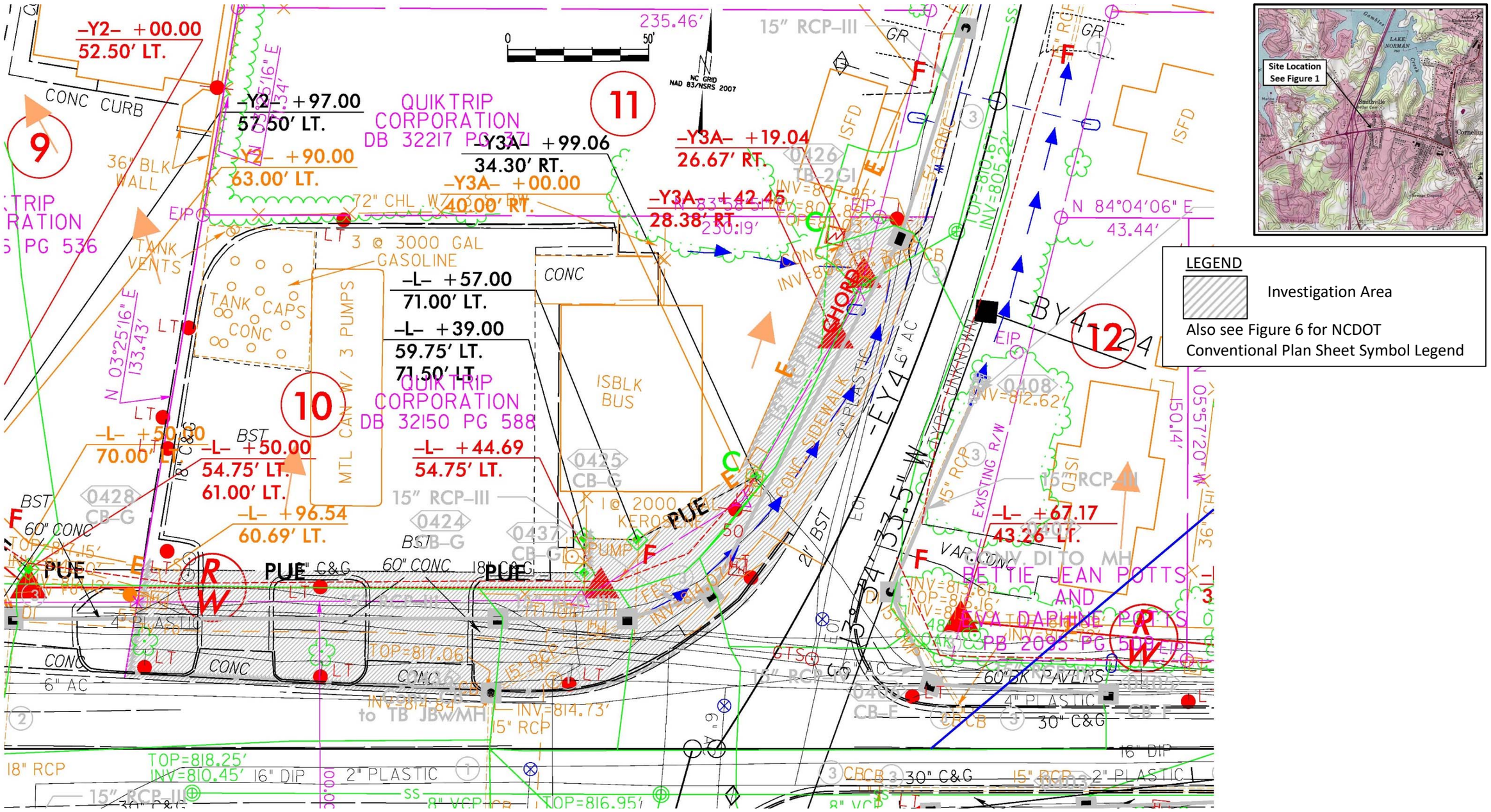
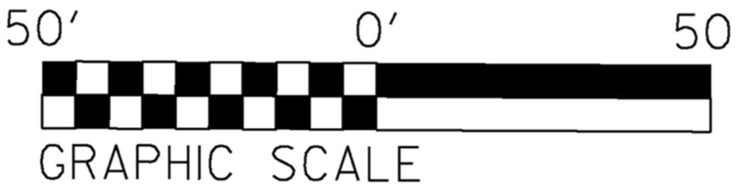
PROJECT: ncdt05419	DATE: September 5, 2019	
GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT INTERSECTION OF US 21 AND SR 2697 (CATAWBA AVENUE) CORNELIUS, MECKLENBURG COUNTY, NC TIP No. C-5621, WBS No. 50146.1.F1	SITE LOCATION MAP	FIGURE 1
	DRAWN BY: ADS	



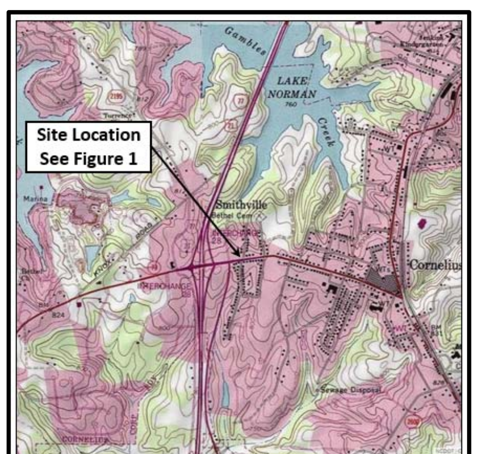
GEL Engineering of NC INC problem solved an affiliate of The GEL Group INC www.gel.com 2700 Sumner Boulevard, Suite 106 P 919.544.1100 Raleigh, NC 27616 F 919.237.9177	GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT INTERSECTION OF US 21 AND SR 2697 (CATAWBA AVENUE) CORNELIUS, MECKLENBURG COUNTY, NC TIP No. C-5621, WBS No. 50146.1.F1	**INVESTIGATION AREA** PROJECT: ncdt05419 DATE: September 5, 2019 **FIGURE 2**

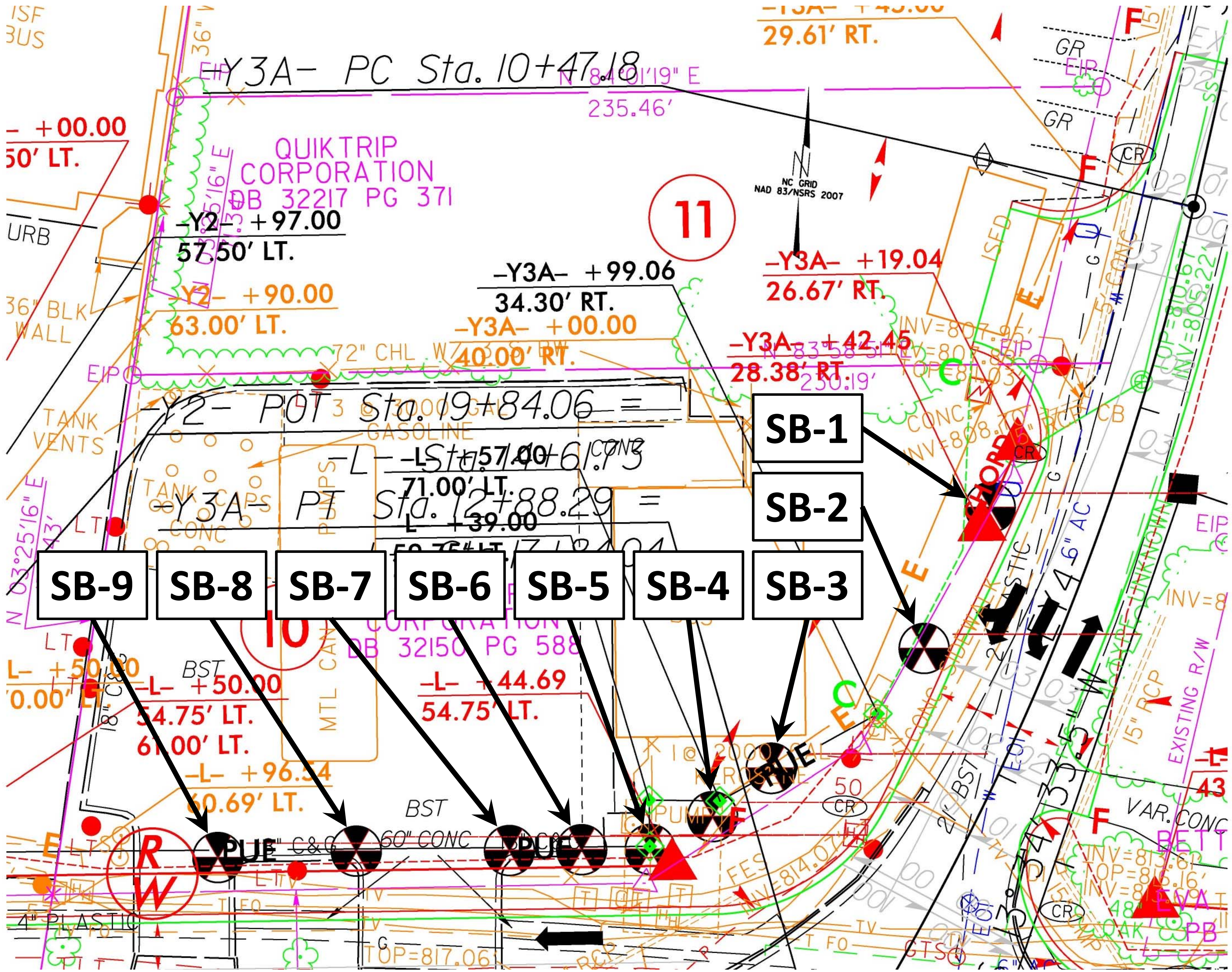


LEGEND

SB-# Geoenvironmental Boring

Also see Figure 6 for NCDOT Conventional Plan Sheet Symbol Legend





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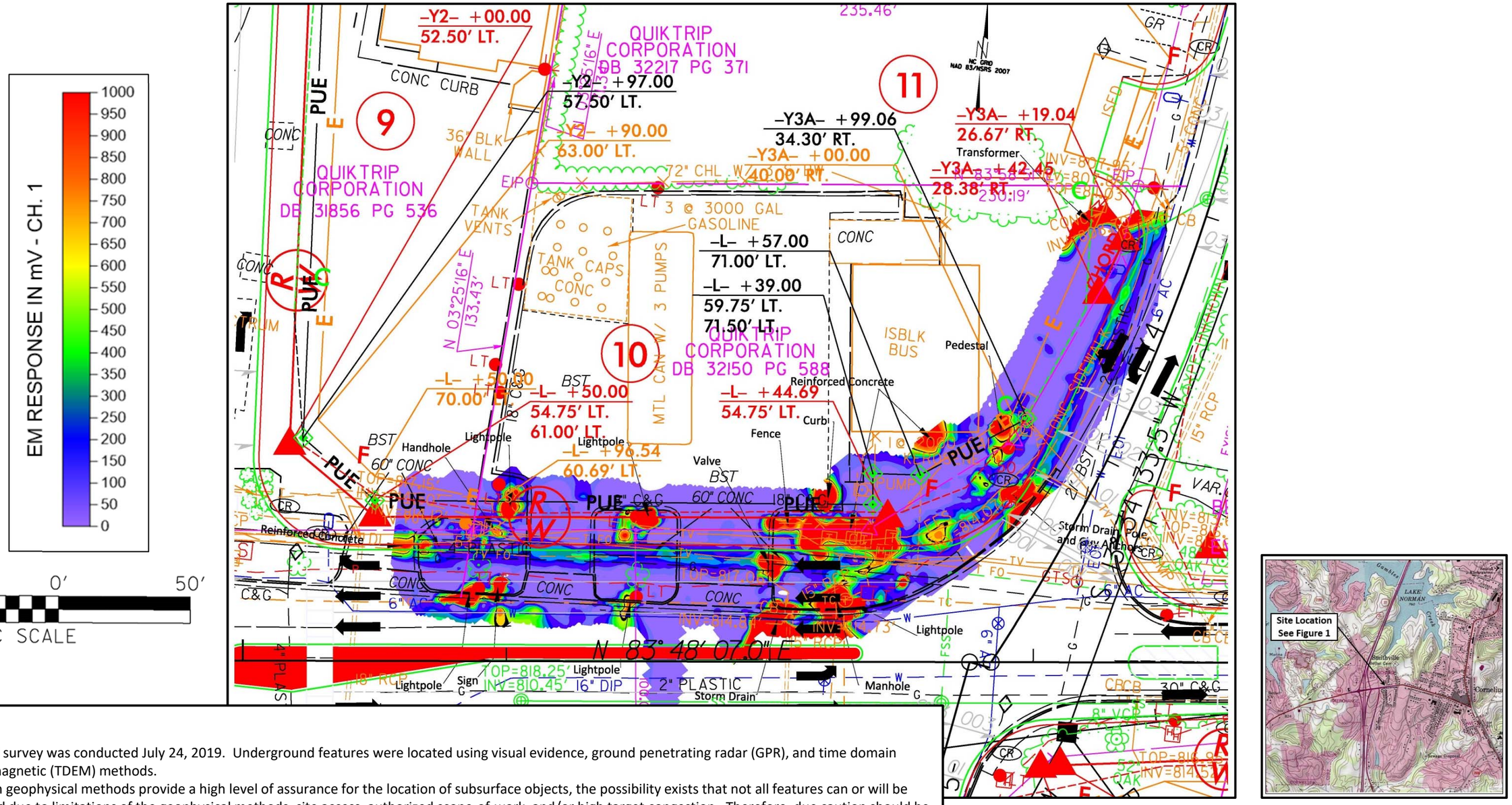
TIP No. C-5621, WBS No. 50146.1.F1

GEOENVIRONMENTAL BORING LOCATIONS

PROJECT: ncdt05419 | DATE: September 5, 2019 | **FIGURE 3**



NOTES

1) The field survey was conducted July 24, 2019. Underground features were located using visual evidence, ground penetrating radar (GPR), and time domain electromagnetic (TDEM) methods.
2) Although geophysical methods provide a high level of assurance for the location of subsurface objects, the possibility exists that not all features can or will be identified due to limitations of the geophysical methods, site access, authorized scope-of-work, and/or high target congestion. Therefore, due caution should be used when performing any subsurface excavation, and GEL Engineering of NC, Inc., is not liable for any damages that may occur. Identifying the location of some structures may only be possible with vacuum or other excavation methods.
3) See Figure 6 for NCDOT Conventional Plan Sheet Symbol Legend. GEL Engineering of NC, Inc., is not liable for the accuracy of the base map provided by NCDOT.

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TIME DOMAIN ELECTROMAGNETIC RESULTS

PROJECT: ncdt05419 | DATE: September 5, 2019 | **FIGURE 4**

LEGEND

SB-# #.# mg/Kg — Geoenvironmental Boring with Total Petroleum Hydrocarbon (TPH; C5-C35) Analytical Result, in milligrams per kilogram (mg/Kg)

Estimated Extent of Soil Contamination exceeding 10 mg/Kg TPH.

Also see Figure 6 for NCDOT Conventional Plan Sheet Symbol Legend

0 50'

NC GRID NAD 83/NSRS 2007

Site Location See Figure 1

SB-1 <0.43 mg/Kg

SB-2 <0.37 mg/Kg

SB-3 2.9 mg/Kg

SB-4 <0.15 mg/Kg

SB-5 166 mg/Kg

SB-6 0.94 mg/Kg

SB-7 2.4 mg/Kg

SB-8 3.0 mg/Kg

SB-9 9.2 mg/Kg

N 83° 48' 07.0" E

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SOIL SAMPLE TPH ANALYTICAL RESULTS AND ESTIMATED EXTENT OF SOIL CONTAMINATION

PROJECT: ncdt05419 | DATE: September 5, 2019 | **FIGURE 5**

04/05/15

NOTE:
Legend provided by NCDOT

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

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

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin
- 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:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite R/W Marker
- Proposed Control of Access Line with Concrete C/A Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage / Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement
- Proposed Permanent Easement with Iron Pin and Cap Marker

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
- 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 — AATUR
- End of Information — E.O.I.

GEL problem solved Engineering of NC INC
an affiliate of The GEL Group INC www.gel.com
2700 Sumner Boulevard, Suite 106 P 919.544.1100
Raleigh, NC 27616 F 919.237.9177

GEOENVIRONMENTAL PHASE II INVESTIGATION REPORT
INTERSECTION OF US 21 AND SR 2697 (CATAWBA AVENUE)
CORNELIUS, MECKLENBURG COUNTY, NC
TIP No. C-5621, WBS No. 50146.1.F1

NCDOT CONVENTIONAL PLAN SHEET SYMBOL LEGEND

PROJECT: ncdt05419 | DATE: September 5, 2019 | **FIGURE 6**

TABLE

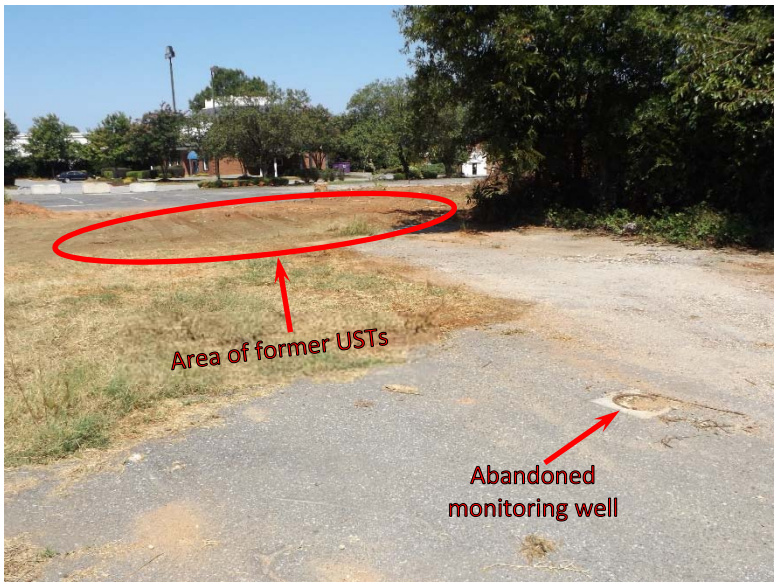
TABLE 1. SOIL SAMPLE ANALYTICAL RESULTS SUMMARY

Sample ID (Soil Boring ID)	Dilution used	BTEX (C6-C9) (mg/Kg)	GRO (C5 - C10) (mg/Kg)	DRO (C10-C35) (mg/Kg)	TPH (C5-C35) (mg/Kg)	Total Aromatics (C10-C35) (mg/Kg)	16 EPA PAH (mg/Kg)	BaP (mg/Kg)	Ratios			Fingerprint Match
									% light	% mid	% heavy	
SB-1	17.3	<0.43	<0.43	<0.43	<0.43	<0.09	<0.14	<0.017	0	0	0	Petroleum hydrocarbons not detected
SB-2	14.9	<0.37	<0.37	<0.37	<0.37	<0.07	<0.12	<0.015	0	0	0	Petroleum hydrocarbons not detected
SB-3	15.9	<0.4	<0.4	2.9	2.9	1.3	<0.13	<0.016	0	69.6	30.4	Degraded fuel 73%, (FCM)
SB-4	5.9	<0.15	<0.15	<0.15	<0.15	<0.03	<0.05	<0.006	0	0	0	Petroleum hydrocarbons not detected
SB-5	14.0	<0.35	52.8	113.4	166.2	64	2.5	<0.014	96.2	3.4	0.4	No match found
SB-6	10.8	<0.27	<0.27	0.94	0.94	0.49	<0.09	<0.011	0	68.8	31.2	Degraded petroleum hydrocarbons 76%, (FCM)
SB-7	12.2	<0.3	<0.3	2.4	2.4	1.3	<0.1	<0.012	0	69.7	30.3	Degraded fuel 75.8%, (FCM)
SB-8	12.7	<0.32	<0.32	3.0	3.0	1.4	<0.1	<0.013	0	66.4	33.6	Degraded petroleum hydrocarbons 75.3%, (FCM)
SB-9	12.8	<0.32	<0.32	9.2	9.2	5.0	0.22	<0.013	0	69.3	30.7	Very degraded petroleum hydrocarbons 75.4%, (FCM)

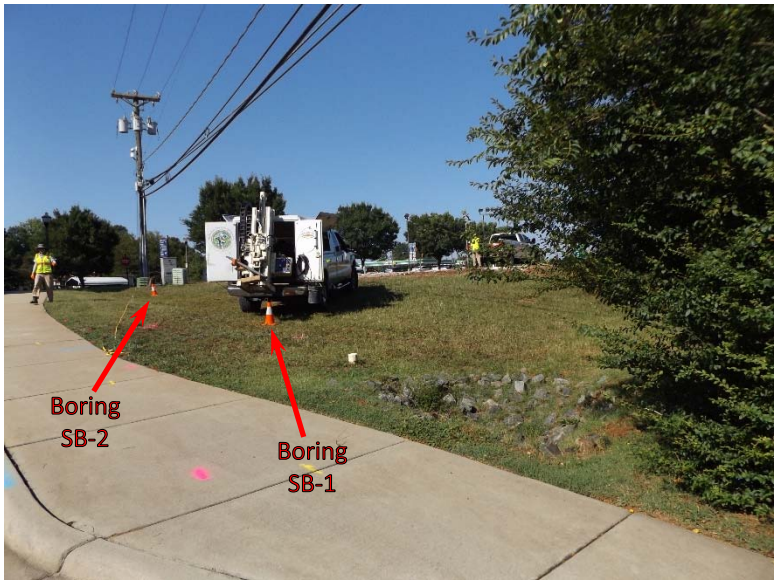
NOTES:
Results highlighted yellow exceed the NCDEQ screening level of 10 mg/Kg.
See Appendix C for the full analytical report prepared by RED Lab that includes the hydrocarbon fingerprint graphs and completed chain-of-custody form.
Results generated by a QED HC-1 analyzer.
Soil values are not corrected 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

APPENDIX A

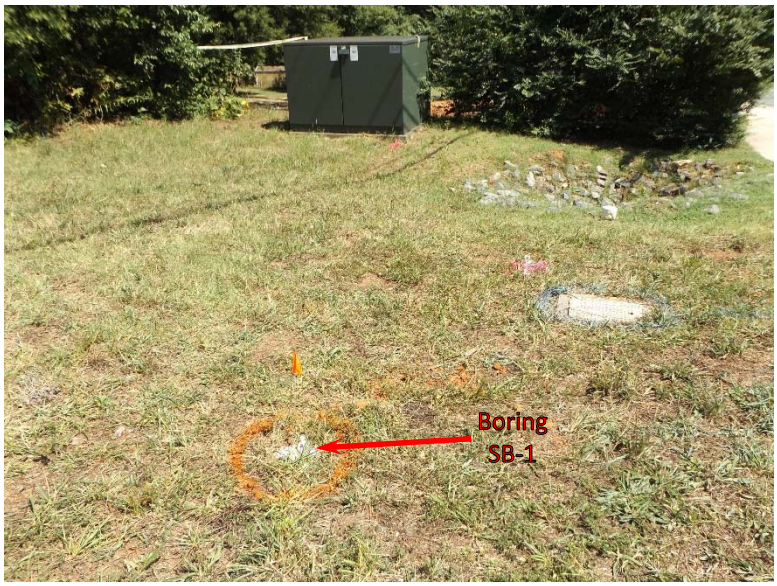
SITE PHOTOGRAPHS



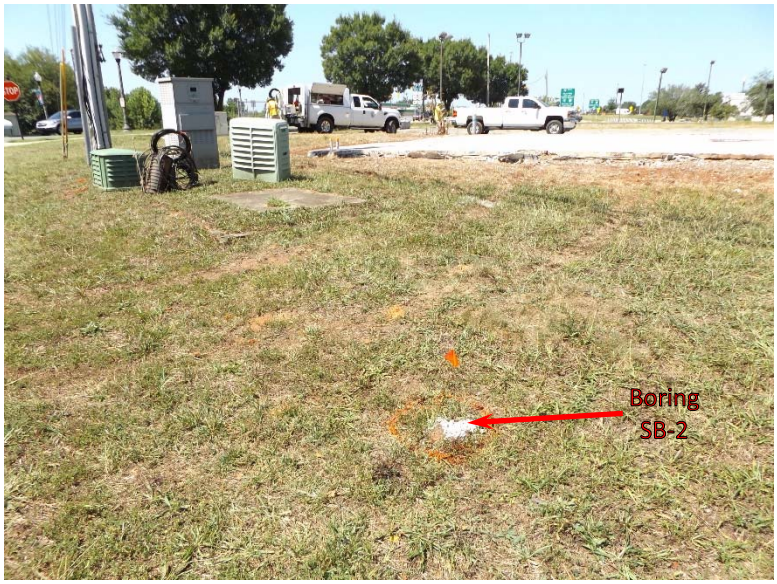
Photograph 1. Area of former gasoline USTs in northwest portion of parcel.



Photograph 2. Northeast portion of the investigation area.



Photograph 3. GeoEnvironmental soil boring location SB-1.



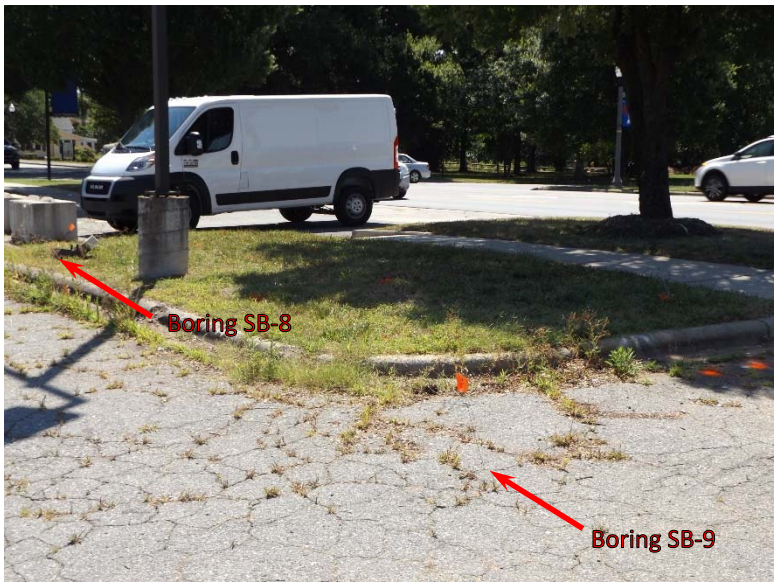
Photograph 4. GeoEnvironmental soil boring location SB-2.

Photograph 5. GeoEnvironmental soil boring location SB-3.

Photograph 6. GeoEnvironmental soil boring location SB-4.

Photograph 7. GeoEnvironmental soil boring location SB-5.

Photograph 8. GeoEnvironmental soil boring locations SB-5, SB-6, and SB-7.



Photograph 9. GeoEnvironmental soil boring locations SB-8 and SB-9.

Photograph 10. Southwest portion of the investigation area.

APPENDIX B

SOIL BORING LOGS

SOIL BORING LOGS

GEL Engineering, of NC, Inc., Raleigh, North Carolina

Project Name: NCDOT Intersection of US 21 and SR 2697 (Catawba Avenue), Cornelius, Mecklenburg County, NC; TIP No. C-5621, WBS No. 50146.1.F1 GEL Project Code: NCDT05419

Parcel Address: Parcel 10, 20671 Catawba Avenue, Cornelius, NC 28031

Drilling Date: July 24, 2019 Drilling Contractor: Regional Probing Services, Inc.; NC Cert No. 3322A

Drilling Method: Direct Push Technology (DPT) GEL Geologist: Brian P. Bastian

Depth (ft bgs)	PID (ppm)	Soil Description (depths are in feet below ground surface [ft bgs])	Laboratory Analysis
BORING ID: C-5621-SB-1			
0-1	0.3	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
1-2	0.3	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	●
2-3	0.1	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
4-5	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
5-6	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
6-7	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
7-8	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
BORING ID: C-5621-SB-2			
0-1	0.0	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
1-2	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	●
2-3	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	
4-5	0.1	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
5-6	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
6-7	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
7-8	0.0	Sandy CLAY (70% clay, 15% coarse grained sand, 7.5% medium grained sand, 7.5% fine grained sand), orange, slight moisture.	

SOIL BORING LOGS

GEL Engineering, of NC, Inc., Raleigh, North Carolina

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Parcel Address: Parcel 10, 20671 Catawba Avenue, Cornelius, NC 28031

Drilling Date: July 24, 2019 Drilling Contractor: Regional Probing Services, Inc.; NC Cert No. 3322A

Drilling Method: Direct Push Technology (DPT) GEL Geologist: Brian P. Bastian

Depth (ft bgs)	PID (ppm)	Soil Description (depths are in feet below ground surface [ft bgs])	Laboratory Analysis
BORING ID: C-5621-SB-3			
0-1	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
1-2	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	●
2-3	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
4-5	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	
5-6	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	
6-7	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	
7-8	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	
BORING ID: C-5621-SB-4			
0-1	0.0	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
1-2	0.1	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	●
2-3	0.3	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
3-4	0.3	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
4-5	0.2	Sandy CLAY (70% clay, 7.5% coarse grained sand, 15% medium grained sand, 7.5% fine grained sand), orange, dry, mica present.	
5-6	0.2	Sandy CLAY (70% clay, 7.5% coarse grained sand, 15% medium grained sand, 7.5% fine grained sand), orange, dry, mica present.	
6-7	0.3	Sandy CLAY (70% clay, 7.5% coarse grained sand, 15% medium grained sand, 7.5% fine grained sand), orange, dry, mica present.	
7-8	0.2	Sandy CLAY (70% clay, 7.5% coarse grained sand, 15% medium grained sand, 7.5% fine grained sand), orange, dry.	

SOIL BORING LOGS

GEL Engineering, of NC, Inc., Raleigh, North Carolina

Project Name: NCDOT Intersection of US 21 and SR 2697 (Catawba Avenue), Cornelius, Mecklenburg County, NC; TIP No. C-5621, WBS No. 50146.1.F1 GEL Project Code: NCDT05419

Parcel Address: Parcel 10, 20671 Catawba Avenue, Cornelius, NC 28031

Drilling Date: July 24, 2019 Drilling Contractor: Regional Probing Services, Inc.; NC Cert No. 3322A

Drilling Method: Direct Push Technology (DPT) GEL Geologist: Brian P. Bastian

Depth (ft bgs)	PID (ppm)	Soil Description (depths are in feet below ground surface [ft bgs])	Laboratory Analysis
BORING ID: C-5621-SB-5			
0-1	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
1-2	0.6	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	
2-3	186	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	●
3-4	75	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	
4-5	46	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	
5-6	70	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	
6-7	45	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange/brown dry.	
7-8	3.8	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange/brown, dry.	
BORING ID: C-5621-SB-6			
0-1	0.2	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture, asphalt present.	
1-2	0.2	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	●
2-3	0.1	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.4	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
4-5	0.2	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
5-6	0.4	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange, dry.	
6-7	0.2	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange, dry.	
7-8	0.3	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange, dry.	

SOIL BORING LOGS

GEL Engineering, of NC, Inc., Raleigh, North Carolina

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Parcel Address: Parcel 10, 20671 Catawba Avenue, Cornelius, NC 28031

Drilling Date: July 24, 2019 Drilling Contractor: Regional Probing Services, Inc.; NC Cert No. 3322A

Drilling Method: Direct Push Technology (DPT) GEL Geologist: Brian P. Bastian

Depth (ft bgs)	PID (ppm)	Soil Description (depths are in feet below ground surface [ft bgs])	Laboratory Analysis
BORING ID: C-5621-SB-7			
0-1	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry, asphalt present.	
1-2	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	●
2-3	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
4-5	0.1	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
5-6	0.1	Sandy CLAY (70% clay, 7.5% coarse grained sand, 15% medium grained sand, 7.5% fine grained sand), orange, slight moisture, mica present.	
6-7	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange, slight moisture.	
7-8	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15%fine grained sand), orange, slight moisture.	
BORING ID: C-5621-SB-8			
0-1	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture, asphalt present.	
1-2	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	●
2-3	0.0	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (80% clay, 10% medium grained sand, 10% fine grained sand), orange, dry.	
4-5	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
5-6	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	
6-7	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	
7-8	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, slight moisture.	

SOIL BORING LOGS

GEL Engineering, of NC, Inc., Raleigh, North Carolina

Project Name: NCDOT Intersection of US 21 and SR 2697 (Catawba Avenue), Cornelius, Mecklenburg County, NC; TIP No. C-5621, WBS No. 50146.1.F1 GEL Project Code: NCDT05419

Parcel Address: Parcel 10, 20671 Catawba Avenue, Cornelius, NC 28031

Drilling Date: July 24, 2019 Drilling Contractor: Regional Probing Services, Inc.; NC Cert No. 3322A

Drilling Method: Direct Push Technology (DPT) GEL Geologist: Brian P. Bastian

Depth (ft bgs)	PID (ppm)	Soil Description (depths are in feet below ground surface [ft bgs])	Laboratory Analysis
BORING ID: C-5621-SB-9			
0-1	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry, asphalt present.	
1-2	0.0	Sandy CLAY (65% clay, 8.75% coarse grained sand, 17.5% medium grained sand, 8.75% fine grained sand), orange, dry.	●
2-3	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
3-4	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
4-5	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
5-6	0.0	Sandy CLAY (80% clay, 5% coarse grained sand, 10% medium grained sand, 5% fine grained sand), orange, dry.	
6-7	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	
7-8	0.0	Sandy CLAY (70% clay, 15% medium grained sand, 15% fine grained sand), orange/tan, slight moisture.	

APPENDIX C

LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY RECORD FOR SOIL SAMPLES

QED REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS QROS

Hydrocarbon Analysis Results

Client: GEL ENGINEERING
Address:

Samples taken Wednesday, July 24, 2019
Samples extracted Wednesday, July 24, 2019
Samples analysed Thursday, July 25, 2019

Contact: ANDREW STAHL

Operator CAROLINE STEVENS

Project: NCDOT 5419

U04049

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	C-5621-SB-1	17.3	<0.43	<0.43	<0.43	<0.43	<0.09	<0.14	<0.017	0	0	0	PHC not detected
s	C-5621-SB-2	14.9	<0.37	<0.37	<0.37	<0.37	<0.07	<0.12	<0.015	0	0	0	PHC not detected
s	C-5621-SB-3	15.9	<0.4	<0.4	2.9	2.9	1.3	<0.13	<0.016	0	69.6	30.4	Deg Fuel 73%,(FCM)
s	C-5621-SB-5	14.0	<0.35	52.8	113.4	166.2	64	2.5	<0.014	96.2	3.4	0.4	No Match found
s	C-5621-SB-7	12.2	<0.3	<0.3	2.4	2.4	1.3	<0.1	<0.012	0	69.7	30.3	Deg Fuel 75.8%,(FCM)
s	C-5621-SB-8	12.7	<0.32	<0.32	3	3	1.4	<0.1	<0.013	0	66.4	33.6	Deg.PHC 75.3%,(FCM)
s	C-5621-SB-9	12.8	<0.32	<0.32	9.2	9.2	5	0.22	<0.013	0	69.3	30.7	V.Deg.PHC 75.4%,(FCM)
s	C-5621-SB-4	5.9	<0.15	<0.15	<0.15	<0.15	<0.03	<0.05	<0.006	0	0	0	PHC not detected
s	C-5621-SB-6	10.8	<0.27	<0.27	0.94	0.94	0.49	<0.09	<0.011	0	68.8	31.2	V.Deg.PHC 76%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 99 %

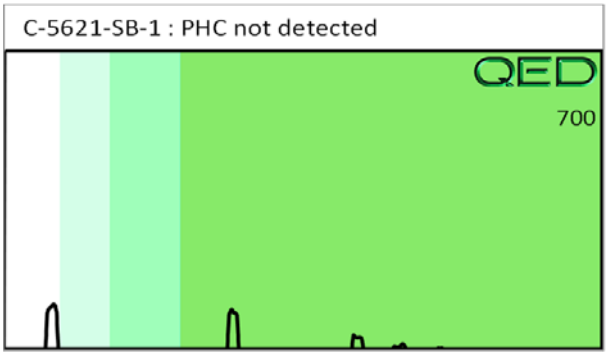
Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

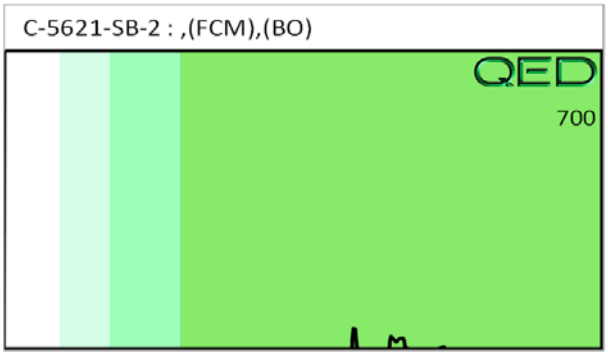
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

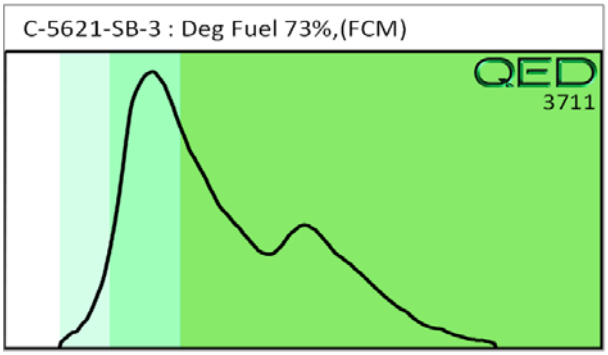
(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

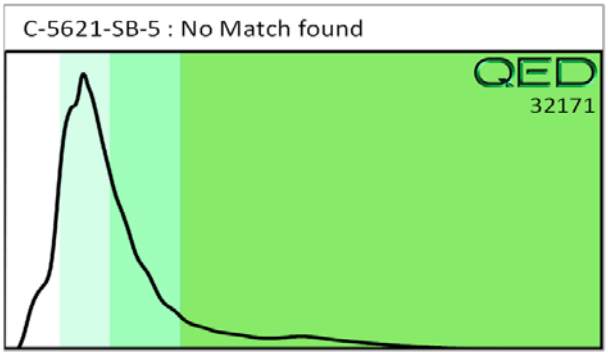
QED Hydrocarbon Fingerprints

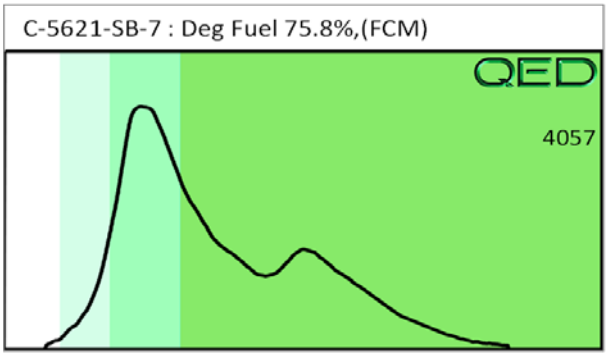
Project: NCDOT 5419 07/25/19

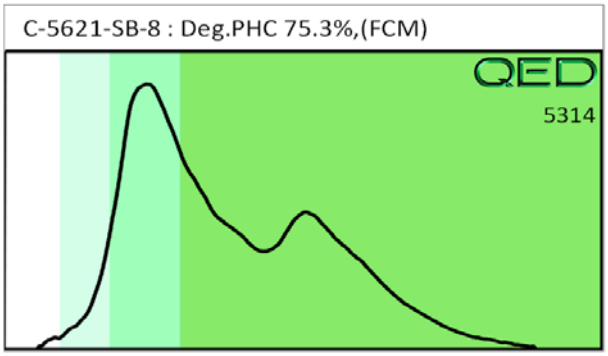


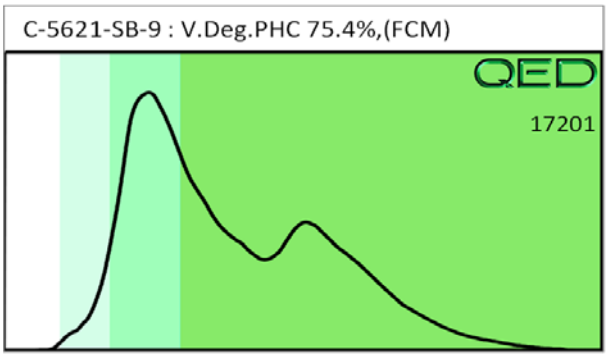


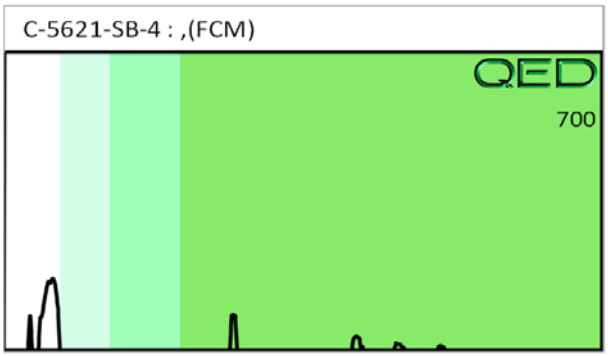


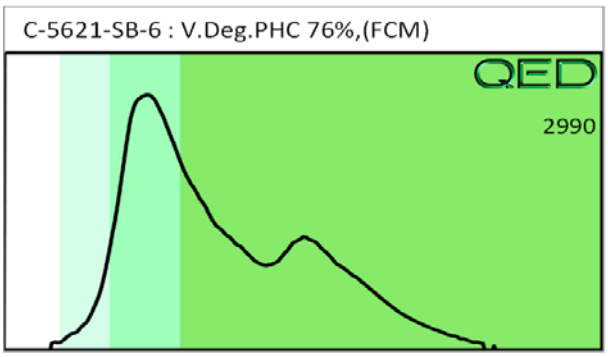












Client Name:	GEL Engineering
Address:	~~REDACTED~~
Contact:	Andrew Stahl
Project Ref.:	NCDOT 05419
Email:	Andrew.Stahl@GEL.com
Phone #:	919-819-2510
Collected by:	BPB

REDLAB™
RAPID ENVIRONMENTAL DIAGNOSTICS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM

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.

Sample Collection	TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
Date/Time	24 Hour	48 Hour	UVF	GC					
7-24-19/1000		X	X		BPB	C-5621-SB-1	54.1	44.3	9.8
7-24-19/1015		X	X		BPB	C-5621-SB-2	55.6	44.2	11.4
7-24-19/1130		X	X		BPB	C-5621-SB-3	54.8	44.1	10.7
7-24-19/1155		X	X		BPB	C-5621-SB-5	56.2	44.1	12.1
7-24-19/1220		X	X		BPB	C-5621-SB-7	55.3	43.8	11.5
7-24-19/1240		X	X		BPB	C-5621-SB-8	55.2	44.2	11.0
7-24-19/1300		X	X		BPB	C-5621-SB-9	55.1	44.2	10.9
7-24-19/1320		X	X		BPB	C-5621-SB-4	54.1	44.0	10.1
7-24-19/1340		X	X		BPB	C-5621-SB-6	57.0	44.0	13.0

COMMENTS/REQUESTS:

TARGET GC/UVF ANALYTES: BTEX, GRO, DRO, TPH, PAH, Total Aromatics, BaP

Relinquished by		Accepted by	Date/Time
[signature] 7-24-19	1515	CES	7/25/19 9:00
Relinquished by		Accepted by	Date/Time

RED Lab USE ONLY

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Ref. No

BJB1