Preliminary Site Assessment

I-95 Interchange Improvement

Parcel 274 PSH 42 - Robin Hood Oil Company

605 East Main Street, Benson, Johnston County, North Carolina

TIP No. I-5986B

WBS Element: 47532.1.3

November 21, 2019

Terracon Project No. 70197584

Prepared for:

North Carolina Department of Transportation
Raleigh, North Carolina

Prepared by:

Terracon Consultants, Inc.
Raleigh, North Carolina

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DocuSigned by:
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11/26/2019

NORTH CAROLINA LICENSED SEAL 2576 GEOLOGIST WILLIAM O. FRAZIER

William O. Frazier, PG
Staff Geologist

For:
Michael T. Jordan, PG, RSM
Department Manager

Donald R. Malone, PE, RSM
Senior Engineer

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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November 21, 2019

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

Re: Preliminary Site Assessment (PSA)
I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company
605 East Main Street, Benson, Johnston County, North Carolina
TIP No. I-5986B
WBS Element: 47532.1.3

Dear Mr. Pilipchuk:

Terracon Consultants, Inc. (Terracon) is pleased to submit a Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P70197584) dated October 1, 2019. 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.

Prepared by:

William O. Frazier, PG
Staff Geologist

Donald R. Malone, PE, RSM
Senior Engineer

Reviewed by:

for Michael T. Jordan, PG, RSM
Environmental Department Manager

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PRELIMINARY SITE ASSESSMENT

I-95 INTERCHANGE IMPROVEMENT
TIP NO. I-5986B
WBS ELEMENT: 47532.1.3
PARCEL 274 PSH 42 - ROBIN HOOD OIL COMPANY
605 EAST MAIN STREET, BENSON, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	Parcel 274 PSH 42 – Robin Hood Oil Company
Site Location/Address	605 East Main Street, Benson, North Carolina 27532 (Johnston County Tax PIN: 153915-62-5812)
General Site Description	The site consists of an approximate 0.56-acre parcel developed with a one-story commercial building currently operating as convenience store, coffee shop, and Exxon gas station. The gas station currently operates four underground storage tanks (USTs). The site is also improved with the associated fueling islands, pump canopy, paved parking areas, and landscaped grounds.

1.2 Site History

The site is located at 605 East Main Street in Benson, Johnston County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site was operating as an Exxon gas station (Facility ID: 00-0-0000001859). According to the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management UST Section Registered Tank Database, the facility currently operates three 6,000-gallon gasoline USTs and one 2,000-gallon diesel UST that were reportedly installed in December 1988. The facility reportedly operated one 2,000-gallon gasoline UST, two 3,000-gallon gasoline USTs, one 1,000-gallon diesel UST, and one 500-gallon new/used oil UST from 1964 to 1988. Petroleum releases have not been reported at the facility.

1.3 Scope of Work

Terracon conducted the following PSA scope of work (SOW) in accordance with Terracon's Proposal No. P70197584 dated October 1, 2019. This PSA is being completed prior to a planned upgrade of the I-95 interchange and widening of the interstate in Benson, North Carolina (site). 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 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 Proposal for Preliminary Site Assessment (Terracon Proposal No. P70197584) dated October 1, 2019 and were not conducted in 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 map of Benson, North Carolina, 1997. **Exhibits 2A and 2B** depict the site layout and indicate the approximate locations of the site features, soil boring locations, and analytical results.

2.1 Geophysical Survey

On October 28 and 29, 2019, Terracon conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs are 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.

The geophysical investigation identified a possible metallic UST within the proposed ROW area, as depicted on **Exhibits 2A and 2B**. The possible UST measured approximately 4 feet long and was located approximately 2.3 feet below land surface (bls). Surface features such as a vent pipe or fill port were not observed in association with the possible UST. Terracon advanced a probe rod and hand auger at the possible UST location in an effort to confirm the feature; however, refusal was encountered between 1 and 1.5 feet bls upon an apparent gravel and asphalt-containing layer.

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**.

2.2 Soil Sampling

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon oversaw the advancement of five soil borings (605-SB-01 through 605-SB-05) along the southern portion of the parcel and within the proposed NCDOT ROW. The borings were completed by a North Carolina Certified Well Contractor (Quantex, Inc.) using a truck-mount Geoprobe® 7822DT direct-push drill rig.

Soil samples were collected in 5-foot, 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 eV photoionization detector (PID). The PID data were collected in order to corroborate laboratory data and assist in selection of sample intervals for laboratory analysis. PID readings from the borings ranged from less than 1 part per million (ppm)

to 3,249 ppm, typically increasing with depth. The PID screening values are summarized in **Table 1**.

Based on the proposed disturbance depths and discussion with the NCDOT, each of the soil borings was advanced to a depth of approximately 10 feet below land surface (bls). Based on the results of the field screening, five soil samples, one from each boring, were collected from depths between approximately 4.5 feet and 9 feet bls. Soil samples were collected in the depth interval that was most likely to be impacted. Samples were placed in laboratory provided sample containers and shipped to REDLAB/QROS, LLC – Environmental Testing 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 bentonite pellets. Surface completion was achieved with either dirt or asphalt cold patch. Remaining investigation derived waste (IDW) was spread on the site.

Soil generally consisted of fine-grained sand to a depth of approximately 1 foot underlain by gravel and asphalt to approximately 2 feet bls and sandy clay and clayey sand to approximately 8 feet bls and lean clay to approximately 10 feet bls. Groundwater was not encountered in the soil borings. The soil boring logs are included in **Appendix B**. Sample locations were measured using a sub-foot Trimble Geo7X GPS unit and are depicted on **Exhibits 2A** and **2B**.

3.0 LABORATORY ANALYSES

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

- TPH-gasoline range organics (C_5-C_{10}) (TPH-GRO);
- TPH-diesel range organics (C_{10}-C_{35}) (TPH-DRO);
- Total petroleum hydrocarbons (C_5-C_{35}) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C_{10}-C_{35});
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Please refer to **Appendix C** 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 605-SB-01 through 605-SB-05:

- BTEX was reported within 605-SB-02 at a concentration of 41.1 milligrams per kilogram (mg/kg);
- TPH-GRO was reported within 605-SB-01 through 605-SB-04 at concentrations ranging from 14.6 mg/kg to 117.9 mg/kg;
- TPH-DRO was reported within each sample at concentrations ranging from 2.4 mg/kg to 215.6 mg/kg;
- TPH was reported within each sample at concentrations ranging from 17.3 mg/kg to 306.8 mg/kg;
- Total aromatics (C_{10}-C_{35}) was reported within each sample at concentrations ranging from 3.7 mg/kg to 138.7 mg/kg;
- 16 EPA PAHs was reported within 605-SB-04 and 605-SB-05 at concentrations ranging from 4.9 mg/kg to 5.3 mg/kg; and
- BaP was not detected above laboratory reporting limits within the samples collected.

Laboratory analysis identified concentrations of TPH-GRO and TPH-DRO in excess of the NCDEQ Action Levels (50 mg/kg and 100 mg/kg, respectively) within 605-SB-01 and 605-SB-02.

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

5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- The geophysical investigation identified a possible metallic UST within the proposed NCDOT ROW, measuring approximately 4 feet long and buried at a depth of approximately 2.3 feet bls. Surface features such as a vent pipe or fill port were not observed in

association with the possible UST. The feature could not be confirmed to be a UST, because the probe rod and hand auger encountered refusal at approximately 1 to 1.5 feet bls at the possible UST location.

- Laboratory analysis reported concentrations of BTEX, TPH-GRO, TPH-DRO, TPH, Total Aromatics, and 16 EPA PAHs in multiple soil borings at the site. The detected concentrations of TPH-GRO and TPH-DRO exceed the NCDEQ Action Levels in 605-SB-01 and 605-SB-02.

- The area of contamination appears to be located to the south of the existing pump islands and includes the area to the west of the identified possible UST. An estimated weight and volume of petroleum impacted soil in this area is 233 tons, or 156 cubic yards. This calculation is based on an impacted area of approximately 700 square feet and depths ranging from 4 to 10 feet bls, where evidence of contamination was encountered. The density was estimated at 1.5 tons of soil per cubic yard. 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 petroleum impacts.

- Terracon recommends NCDOT provide a copy of the results to the owner and/or operator of the site.

- Terracon recommends NCDOT provide a copy of the results to NCDEQ.

- Terracon does not recommend further assessment of the ROW at this site. However, based on detections of petroleum compounds, impacted soil and groundwater encountered during NCDOT's project should be managed and/or disposed of in accordance with applicable local and State requirements. In addition, construction workers should be alert for potential soil and/or groundwater impacts at the site.

6.0 REFERENCES

NCDOT, 2016. Revised GeoEnvironmental Report for Preliminary Site Assessments. "Hazardous Material Report." August 30, 2016.

TABLES

Table 1
Summary of PID Field Screening Values
Preliminary Site Assessment
Parcel# 274 PSH 42 - Robin Hood Oil Company
605 East Main Street, Benson, Johnston County, North Carolina
Terracon Project No. 70197584

Boring Depth (feet bls)	605-SB-01	605-SB-02	605-SB-03	605-SB-04	605-SB-05
(0 - 2)	<0.1	<0.1	<0.1	<0.1	<0.1
(3 - 4)	254	<0.1	<0.1	<0.1	<0.1
(4 - 6)	2317	25.8	5.7	66	151
(6 - 8)	3249	2.5	<0.1	<0.1	30.2
(8 - 10)	773	1171	393	233	93.2

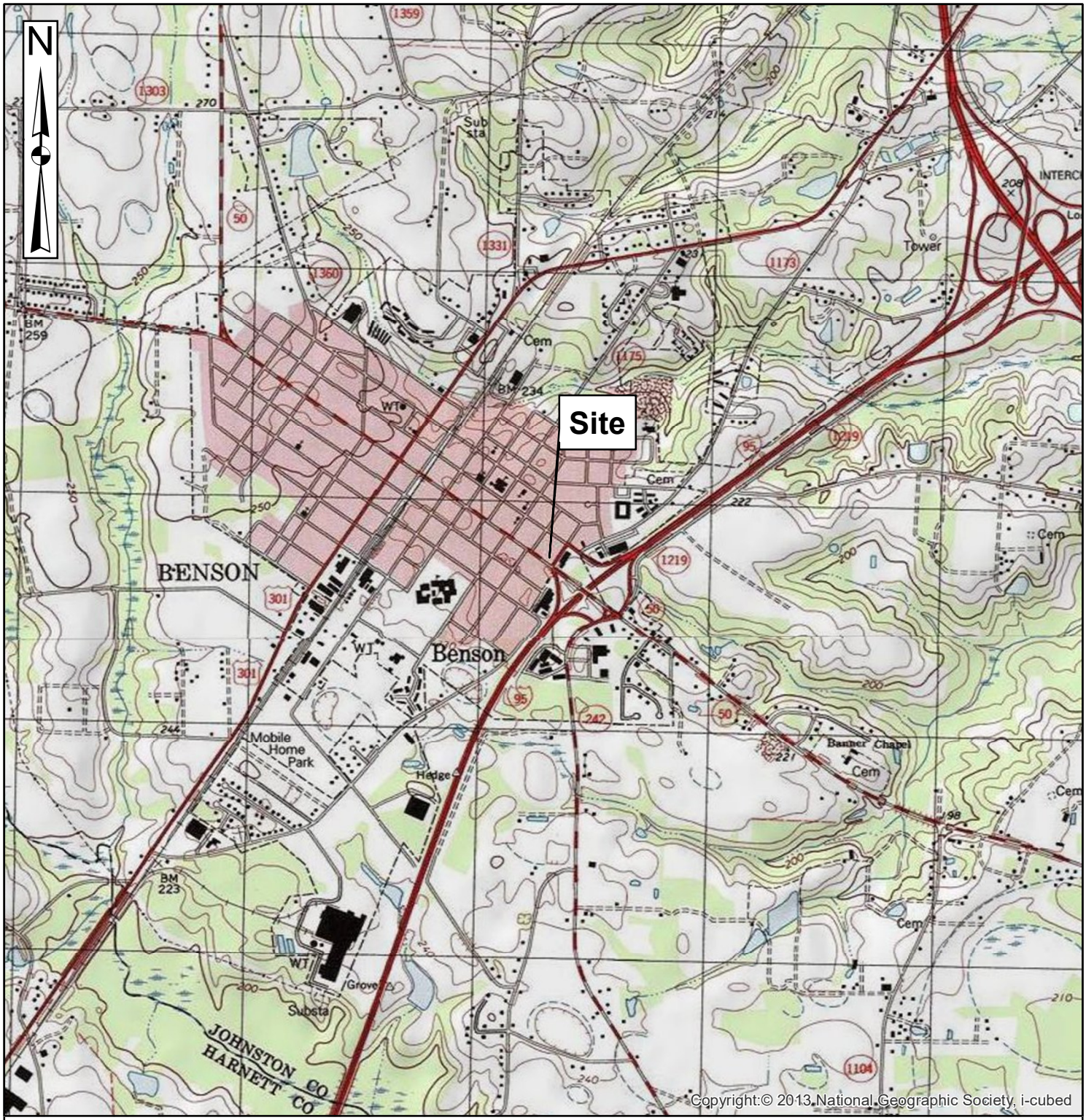
Notes:
Field screening was conducted on October 31, 2019
Values shown are given in parts per million (ppm)
PID - Photo-ionization detector
PID was calibrated using 100 ppm isobutylene gas
ft bls - feet below land surface.

Table 2
Summary of Soil Analytical Results
Preliminary Site Assessment
Parcel# 274 PSH 42 - Robin Hood Oil Company
605 East Main Street, Benson, Johnston County, North Carolina
Terracon Project No. 70197584

Sample ID: / Sample Depth (ft bls):	605-SB-01 / 8	605-SB-02 / 9.5	605-SB-03 / 9	605-SB-04 / 4.5	605-SB-05 / 4	NCDEQ Action Level	MSCC Industrial / Commercial
BTEX (C6 - C9)	<1.5	**41.1**	<0.49	<1.8	<1.6	**NE**	**NE**
GRO (C5 - C10)	**69.9**	**117.9**	**14.9**	**17.8**	<1.6	**50**	**NE**
DRO (C10 - C35)	**215.6**	**188.9**	**2.4**	**74.2**	**68.4**	**100**	**NE**
TPH (C5 - C35)	**285.5**	**306.8**	**17.3**	**92**	**68.4**	**NE**	**NE**
Total Aromatics (C10-C35)	**11.9**	**18.5**	**3.7**	**138.7**	**128.1**	**NE**	**NE**
16 EPA PAHs	<0.47	**0.71**	<0.16	**5.3**	**4.9**	**NE**	**NE**
BaP	<0.059	<0.021	<0.02	<0.07	<0.066	**NE**	**0.78**

Notes:
Soil samples were collected on October 31, 2019.
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).
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.

FIGURES



USGS TOPOGRAPHIC MAP
SITE: BENSON, NC QUADRANGLE (1997)
SOUTH: DUNN, NC QUADRANGLE (1997)

1 inch = 2,000 feet

PM: WOF	Project No. 70197584	Terracon	**Topographic Vicinity Map**	**EXHIBIT NO.**
Drawn By: WOF	Scale: 1:24,000		Preliminary Site Assessment Robin Hood Oil Company 605 East Main Street Benson, North Carolina	**1**
Checked By: MTJ	Filename: Exhibit 1 - Topo_605			
Approved By: MTJ	Date: Nov. 2019			

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

PROJECT REFERENCE NO.	EXHIBIT
47532.1.3 (I–5986B)	2A

SITE DIAGRAM WITH BORING LOCATIONS

PARCEL 274
ROBIN HOOD OIL CO.
605 EAST MAIN STREET
BENSON, JOHNSTON COUNTY, NC

LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- EXISTING EDGE OF PAVEMENT
- E — NEW TEMPORARY CONSTRUCTION EASEMENT
- KNOWN CONTAMINATION SITE
- S — KNOWN SOIL CONTAMINATION AREA
- BORING LOCATION
- POSSIBLE UST

605-SB-01
605-SB-02
605-SB-03
605-SB-04
605-SB-05
POSSIBLE UST
BEGIN 2'-6" C&G TIE TO EXIST. CURB
END SIDEWALK -Y18RPA- +22.63
274
296
20
PUE
TDE
CB
PLUG
48"
72"
ROBIN HOOD OIL COMPANY, INC
CANOPY OIL COMPANY, INC
LARRY'S COMMERCIAL PROPERTY, L.L.C.
JAMES R. & TERESA BLACKMON
LUHN FOUR, INC
SYLVIA P. WITHROW
Benson Public Utilities, 6" Unknown
FAYETTEVILLE ST 40' PAVED ROADWAY
E MAIN ST 42.5' PAVED ROADWAY
EXISTING R/W
R/W VARIES
30" C&G
30" RCP
48" RCP
18" RCP
10" PVC
10" VCP
48" WW ISBW
ISBK BUS
MICROPROCESSOR

0 40 80
FEET

ROBIN HOOD OIL COMPANY, INC

* 605-SB-01 (8 ft bls)	(mg/kg)
GRO (C5-C10)	69.9
DRO (C10-C35)	*215.6*
TPH (C5-C35)	*285.5*
Total Aromatics (C10-C35)	11.9

* 605-SB-02 (9.5 ft bls)	(mg/kg)
BTEX (C6-C9)	41.1
GRO (C5-C10)	*117.9*
DRO (C10-C35)	*188.9*
TPH (C5-C35)	306.8
Total Aromatics (C10-C35)	18.5
16 EPA PAHs	0.71

* 605-SB-03 (9 ft bls)	(mg/kg)
GRO (C5-C10)	14.9
DRO (C10-C35)	2.4
TPH (C5-C35)	17.3
Total Aromatics (C10-C35)	3.7

* 605-SB-05 (4.5 ft bls)	(mg/kg)
DRO (C10-C35)	68.4
TPH (C5-C35)	68.4
Total Aromatics (C10-C35)	128.1
16 EPA PAHs	4.9

* 605-SB-04 (4.5 ft bls)	(mg/kg)
GRO (C5-C10)	17.8
DRO (C10-C35)	74.2
TPH (C5-C35)	92
Total Aromatics (C10-C35)	138.7
16 EPA PAHs	5.3

605-SB-01
605-SB-02
605-SB-03
605-SB-04
605-SB-05

POSSIBLE UST

JB w/MH
CB
PLUG
TDE
PUE
END SIDEWALK +22.63
Y18RPA
TIE TO EXIST.
BEGIN 2'-0"

274
296
20

PROJECT REFERENCE NO.	EXHIBIT
47532.1.3 (I–5986B)	2B

SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA

PARCEL 274
ROBIN HOOD OIL CO.
605 EAST MAIN STREET
BENSON, JOHNSTON COUNTY, NC

LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- EXISTING EDGE OF PAVEMENT
- NEW TEMPORARY CONSTRUCTION EASEMENT
- KNOWN CONTAMINATION SITE
- KNOWN SOIL CONTAMINATION AREA
- BORING LOCATION
- POSSIBLE UST

NOTES

* COMPOUNDS DETECTED ABOVE LABORATORY REPORTING LIMITS ARE SUMMARIZED IN THE ANALYTICAL DATA TABLES

CONCENTRATIONS SHOWN IN ITALICS EXCEED THEIR NCDEQ ACTION LEVEL

mg/kg = MILLIGRAMS PER KILOGRAM

ft bls = FEET BELOW LAND SURFACE

0 40 80
FEET

APPENDIX A

GEOPHYSICAL SURVEY REPORT

November 8, 2019

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
Robin Hood Oil Company
605 East Main Street
Benson, Johnston County, North Carolina
ID: 35976; TIP: I-5986B; WBS Element No. 47532.1.3
Terracon Project No. 70197584

Dear Mr. Pilipchuk:

On October 28 and 29, 2019, a representative of Terracon Consultants, Inc. (Terracon) performed geophysical exploration services at the above referenced site in general accordance with Terracon Proposal No. P70197584 dated October 1, 2019. This report is presented as a summary of those geophysical services.

1.0 PROJECT DESCRIPTION

Based on the RFP from the NCDOT, PSAs are requested for the Robin Hood Oil Company site, located at 605 East Main Street in Benson, North Carolina. The project consisted of the exploration of an approximately 3,150 square-foot area of the existing right-of-way (ROW) of the existing gas station. The purpose of the geophysical exploration was to aid in identifying anomalies consistent with Underground Storage Tanks (USTs) utilizing non-intrusive geophysical methods.

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. 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 AND CONCLUSIONS

Terracon reviewed the EM and GPR data collected. Due to interreference from multiple buried utilities and above-ground structures, the anomalies consistent with USTs could not be isolated from the EM data. In general, soil conductivity measurements between -20 to 40 mS/m and magnetic susceptibly measurements between -4 to 4 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, an anomaly consistent with a UST was identified at coordinates 35.3779875 N, -78.5417551 W and approximately 3.25 feet below the existing grade and approximately 4 feet long. GPR is not able to provide accurate information regarding an anomaly’s diameter/width. Further details on the location of this anomaly is provided in Appendix A. The depth of GPR signal penetration across the site was approximately 8 feet below the existing grade.

4.0 LIMITATIONS

It should be noted that the process relies 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, cultural features, concrete/soil types, concrete/soil moisture, groundwater table depth, and/or reinforcing steel spacing. Interpretation of those signals is based on a combination of known factors combined with the experience of the operator and geophysical scientist evaluating the results. Utilizing conventional observation, sampling, and testing of select areas are 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.

4.0 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.

Joshua A. Lopez
Geophysicist

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

Attachments: Appendix A – Geophysical Exploration Results

SITE LOCATION DIAGRAM

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

EXPLORATION LOCATION DIAGRAM

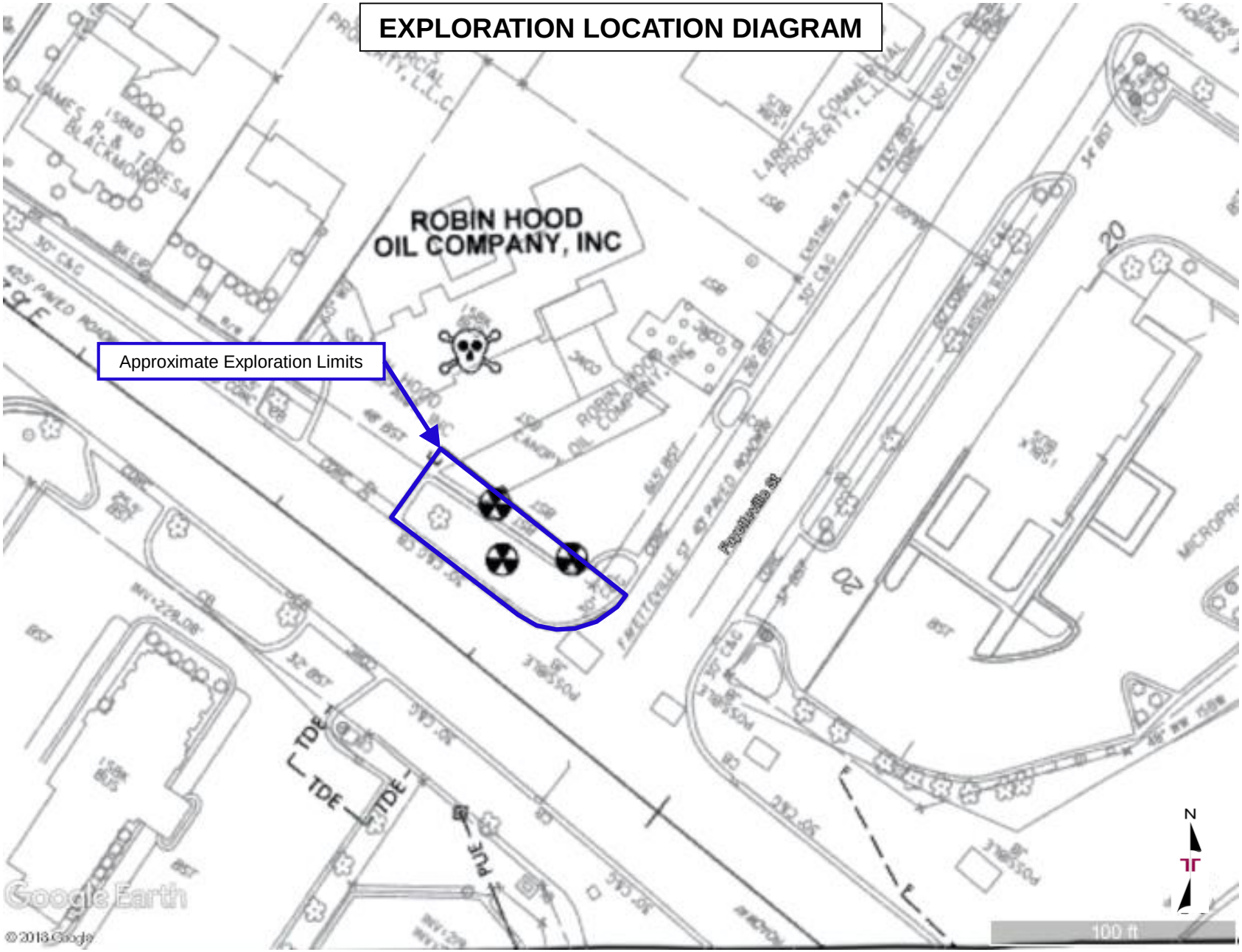


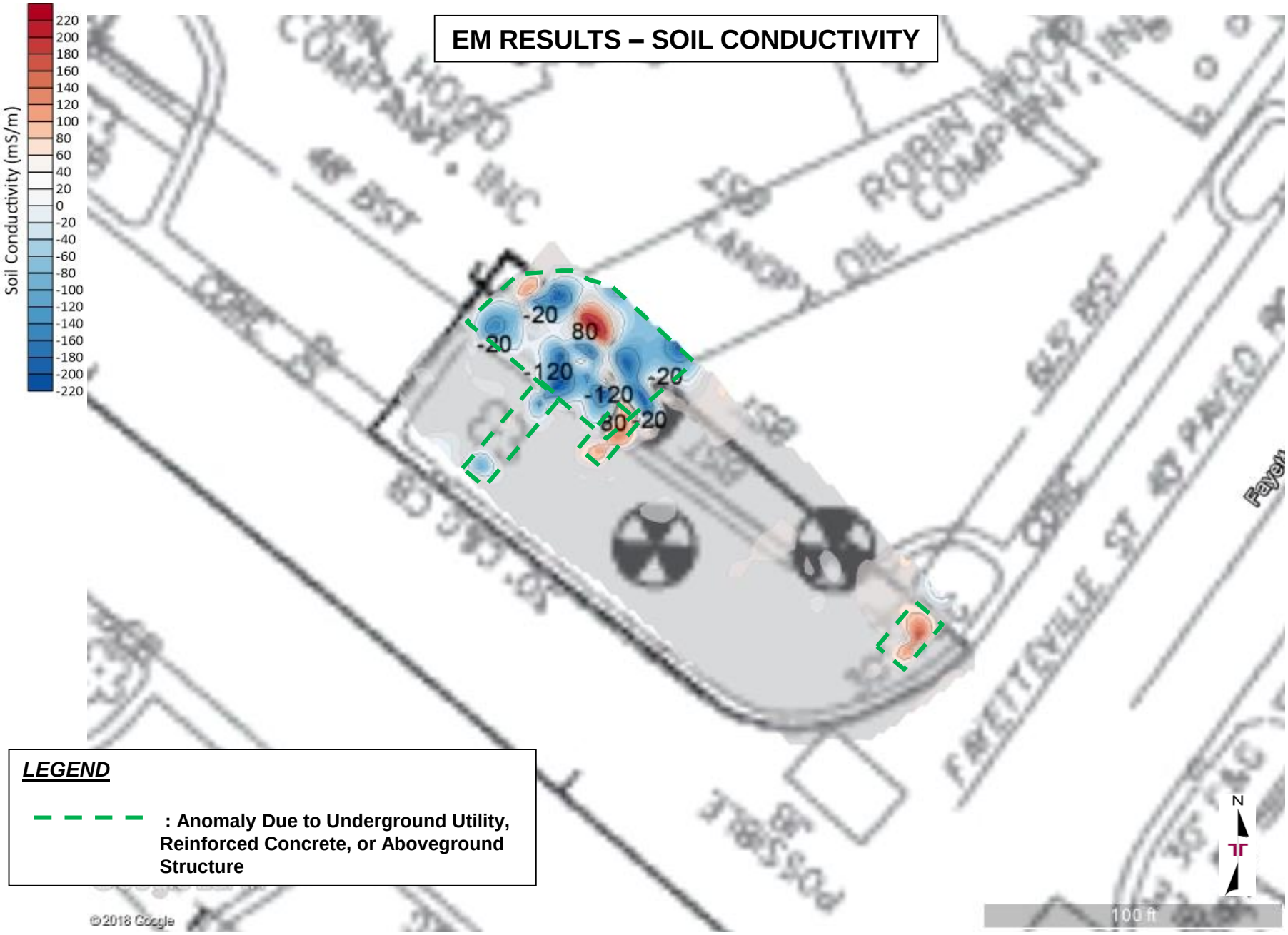
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

EXPLORATION LOCATION DIAGRAM

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Terracon GeoReport

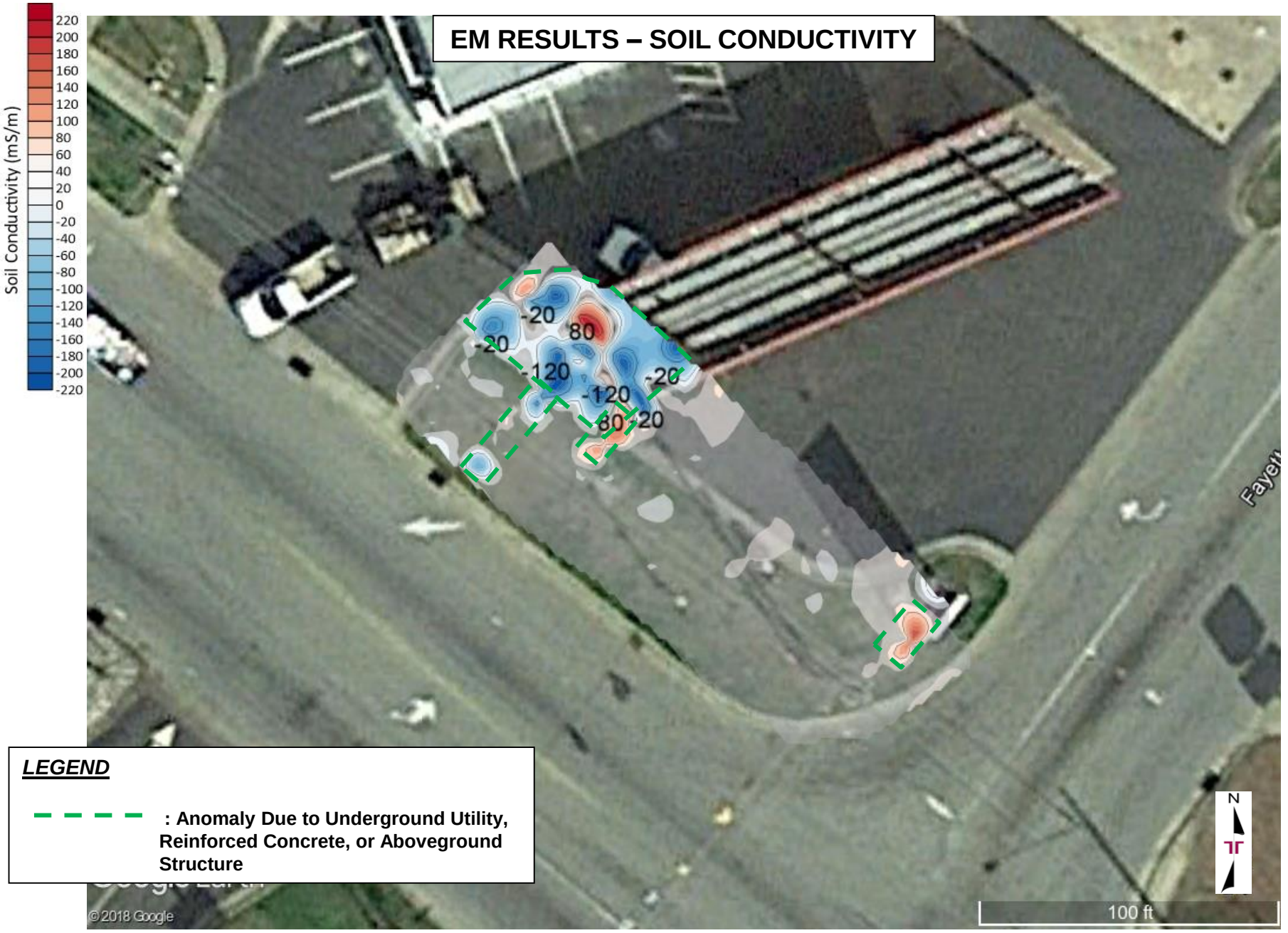
EM RESULTS – SOIL CONDUCTIVITY



LEGEND

: Anomaly Due to Underground Utility, Reinforced Concrete, or Aboveground Structure

EM RESULTS – SOIL CONDUCTIVITY

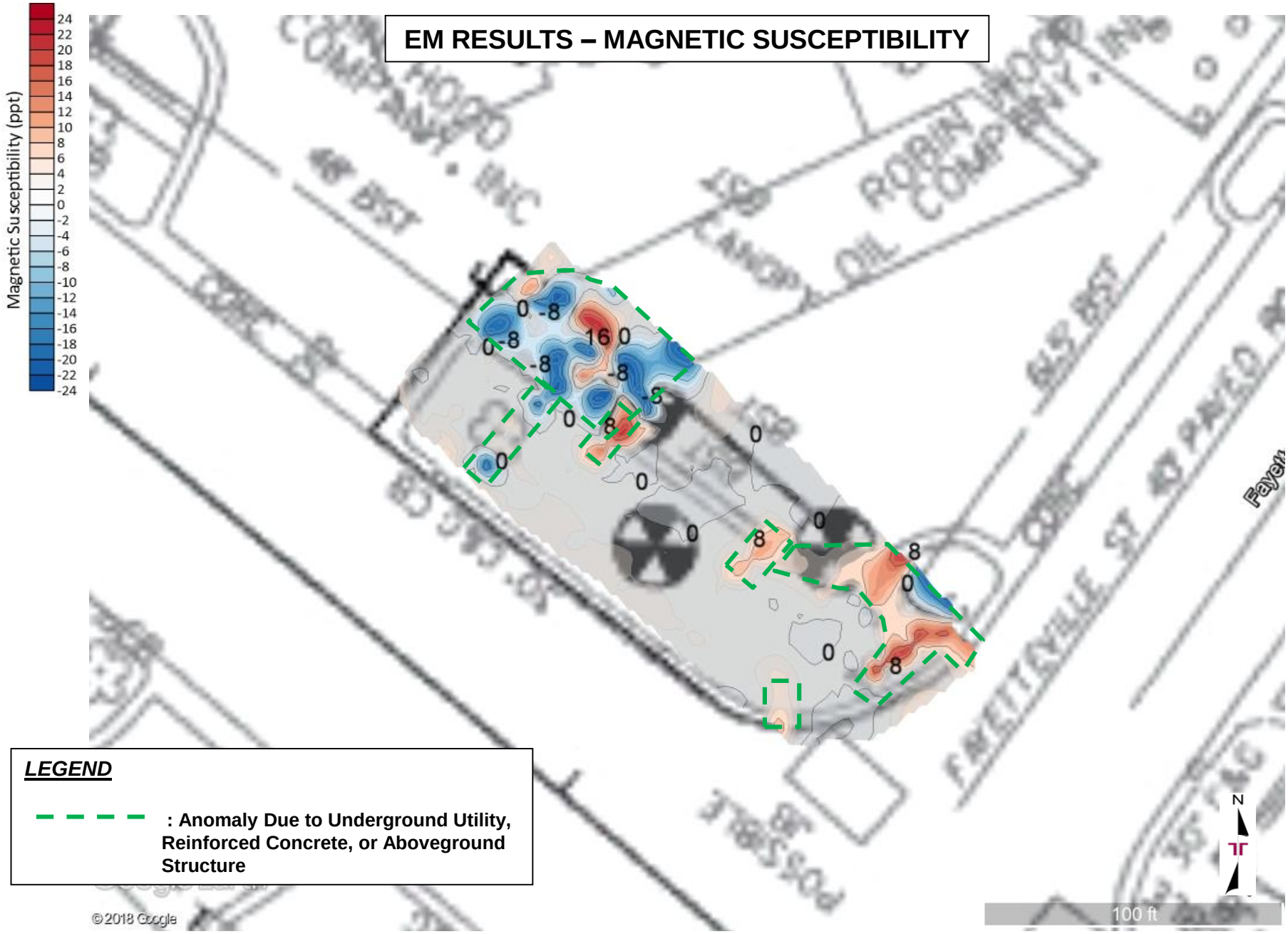


LEGEND

: Anomaly Due to Underground Utility, Reinforced Concrete, or Aboveground Structure

Terracon GeoReport

EM RESULTS – MAGNETIC SUSCEPTIBILITY



LEGEND

– – – : **Anomaly Due to Underground Utility, Reinforced Concrete, or Aboveground Structure**

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

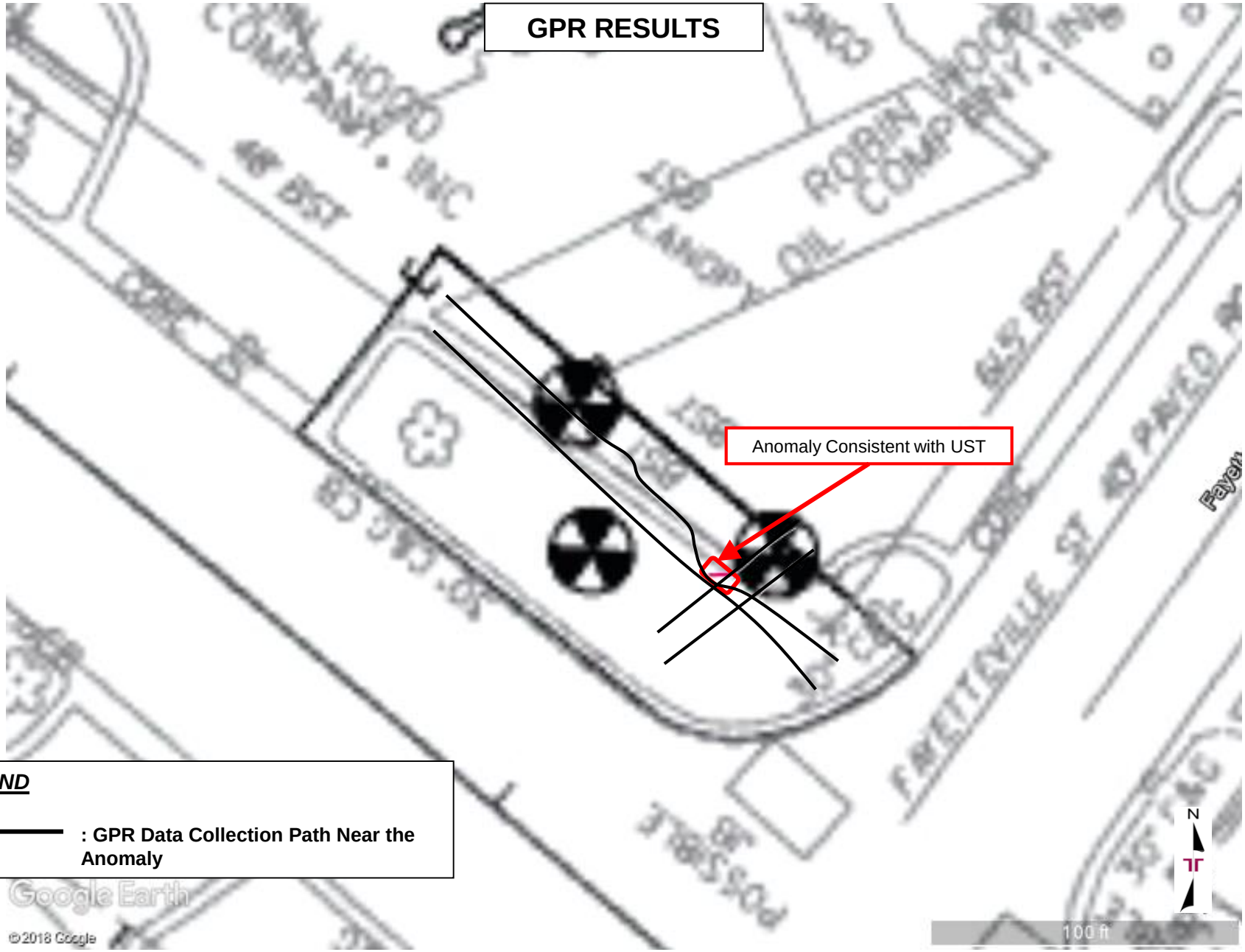
EM RESULTS – MAGNETIC SUSCEPTIBILITY

LEGEND

: **Anomaly Due to Underground Utility, Reinforced Concrete, or Aboveground Structure**

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

GPR RESULTS



LEGEND

: GPR Data Collection Path Near the Anomaly

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

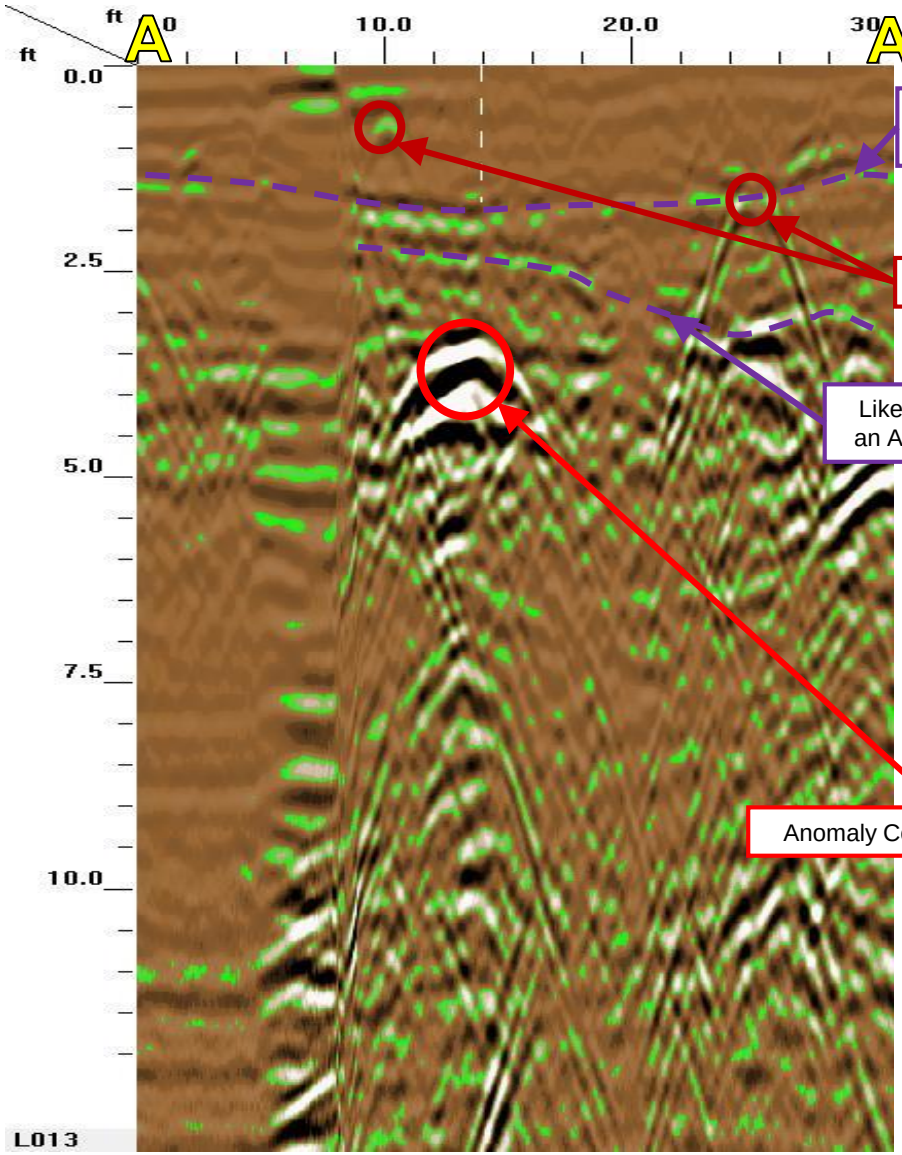
GPR RESULTS

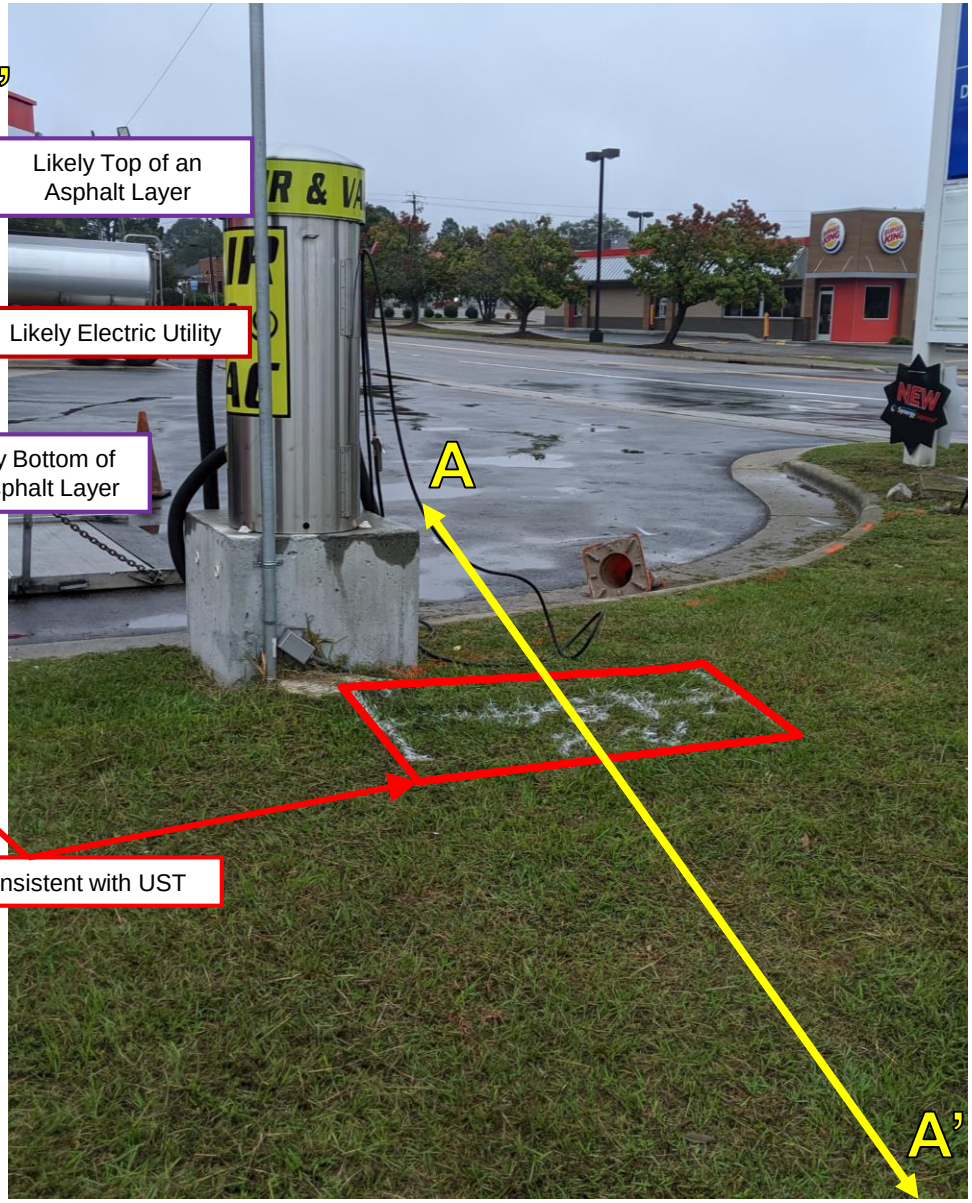
LEGEND

: GPR Data Collection Path Near the Anomaly

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

GPR RESULTS


ft
A
10.0
20.0
30
A'
ft
0.0
2.5
5.0
7.5
10.0
L013
Likely Top of an Asphalt Layer
Likely Electric Utility
Likely Bottom of an Asphalt Layer
Anomaly Consistent with UST


A
A'

APPENDIX B

SOIL BORING LOGS

BORING LOG NO. 605-SB-01

PROJECT: I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company

CLIENT: NCDOT
Raleigh, North Carolina

SITE: 605 East Main Street
Benson, Johnston County, North Carolina

LOCATION See Exhibit 2A

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	ASPHALT AND AGGREGATE BASE COURSE						
1.0						<0.1	
	CLAYEY SAND (SC), brown, moderate odor observed, moist					254	
2.0							
	FINE SAND (SC), trace clay, gray and tan, moderate odor observed, moist				36	17.8	
						255	
		5				1880	605-SB-01 (8 feet) UVF 12:45
						2317	
7.0							
	LEAN CLAY (CL), tan and gray, very strong odor observed, moist				52	3249	
						1418	
						773	
10.0		10					
	Boring Terminated at 10 Feet						

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-inch DPT

Abandonment Method:
Boring backfilled with bentonite upon completion.

Notes:
UVF: Ultraviolet fluorescence

WATER LEVEL OBSERVATIONS

Evidence of groundwater table not observed during boring advancement

Terracon
2401 Brentwood Rd, Ste 107
Raleigh, NC

Boring Started: 10-31-2019 | Boring Completed: 10-31-2019
Drill Rig: GeoProbe 7822DT | Driller: Quantex, Inc.
Project No.: 70197584 | Appendix B

BORING LOG NO. 605-SB-02

PROJECT: I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company

CLIENT: NCDOT
Raleigh, North Carolina

SITE: 605 East Main Street
Benson, Johnston County, North Carolina

LOCATION See Exhibit 2A

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	FINE SAND (SP), brown, odor not observed, dry to moist					<0.1	
1.0							
1.5	**ASPHALT AND AGGREGATE BASE COURSE**						
	FINE SAND (SP), brown, mild odor observed from 5 to 6 feet, dry to moist				28	<0.1	
						25.8	
		5					605-SB-02 (9.5 feet) UVF 11:50
6.0						<0.1	
	CLAYEY SAND (SC), gray, mild odor observed, moist				60	2.5	
9.0							
	LEAN CLAY (CL), tan and orange, moderate to moderately strong odor observed, moist					1171	
10.0		10					
	Boring Terminated at 10 Feet						

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-inch DPT

Abandonment Method:
Boring backfilled with bentonite upon completion.

Notes:
UVF: Ultraviolet fluorescence

WATER LEVEL OBSERVATIONS

Evidence of groundwater table not observed during boring advancement

Terracon
2401 Brentwood Rd, Ste 107
Raleigh, NC

Boring Started: 10-31-2019 | Boring Completed: 10-31-2019
Drill Rig: GeoProbe 7822DT | Driller: Quantex, Inc.
Project No.: 70197584 | Appendix B

BORING LOG NO. 605-SB-03

PROJECT: I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company

CLIENT: NCDOT
Raleigh, North Carolina

SITE: 605 East Main Street
Benson, Johnston County, North Carolina

LOCATION See Exhibit 2A

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	FINE SAND (SP), brown, odor not observed, dry					<0.1	
1.0	**ASPHALT AND AGGREGATE BASE COURSE**						
2.0	**CLAYEY SAND (SC)**, brown, mild odor observed, dry to moist				36	<0.1	
						5.7	
5.0	**FINE SAND (SP)**, brown, odor not observed, moist	5				<0.1	605-SB-03 (9 feet) UVF 12:00
					36	<0.1	
8.0	**SANDY LEAN CLAY (CL)**, gray and orange, moderate odor observed, moist					393	
10.0	***Boring Terminated at 10 Feet***	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-inch DPT

Abandonment Method:
Boring backfilled with bentonite upon completion.

Notes:
UVF: Ultraviolet fluorescence

WATER LEVEL OBSERVATIONS

Evidence of groundwater table not observed during boring advancement

Terracon
2401 Brentwood Rd, Ste 107
Raleigh, NC

Boring Started: 10-31-2019 | Boring Completed: 10-31-2019
Drill Rig: GeoProbe 7822DT | Driller: Quantex, Inc.
Project No.: 70197584 | Appendix B

BORING LOG NO. 605-SB-04

PROJECT: I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company

CLIENT: NCDOT
Raleigh, North Carolina

SITE: 605 East Main Street
Benson, Johnston County, North Carolina

LOCATION See Exhibit 2A

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	FINE SAND (SP), brown, odor not observed, dry					<0.1	
1.0	**ASPHALT AND AGGREGATE BASE COURSE**						
2.0	**SANDY LEAN CLAY (CL)**, brown, mild odor observed				41	<0.1	
						66	
		5					605-SB-04 (4.5 feet) UVF 12:15
5.5	**FINE SAND (SW)**, with gravel, brown, odors not observed, dry					<0.1	
6.5	**LEAN CLAY (CL)**, gray and orange, moderate odor observed between 9 and 10 feet, stiff				60	<0.1	
						233	
10.0	***Boring Terminated at 10 Feet***	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-inch DPT

Abandonment Method:
Boring backfilled with bentonite upon completion.

Notes:
UVF: Ultraviolet fluorescence

WATER LEVEL OBSERVATIONS

Evidence of groundwater table not observed during boring advancement

Terracon
2401 Brentwood Rd, Ste 107
Raleigh, NC

Boring Started: 10-31-2019 | Boring Completed: 10-31-2019
Drill Rig: GeoProbe 7822DT | Driller: Quantex, Inc.
Project No.: 70197584 | Appendix B

BORING LOG NO. 605-SB-05

PROJECT: I-95 Interchange Improvement
Parcel 274 PSH 42 - Robin Hood Oil Company

CLIENT: NCDOT
Raleigh, North Carolina

SITE: 605 East Main Street
Benson, Johnston County, North Carolina

LOCATION See Exhibit 2A

DEPTH	MATERIAL DESCRIPTION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	ASPHALT AND AGGREGATE BASE COURSE					<0.1	
2.0	**LEAN CLAY (CL)**, brown, odor not observed, moist, (gray staining and moderate odor observed at 4 feet)				46	<0.1	
4.0						151	
4.5	**FINE SAND (CL)**, with gravel, tan, mild odor observed, dry						
	SANDY LEAN CLAY (CL), tan and orange, mild odor observed	5				15.6	605-SB-05 (4 feet) UVF 12:30
8.0					60	30.2	
	LEAN CLAY (CL), tan, gray, and orange, moderate odor observed, moist to wet, (sand seam at 9.5 feet)					93.2	
10.0		10					
	Boring Terminated at 10 Feet						

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-inch DPT

Abandonment Method:
Boring backfilled with bentonite upon completion.

Notes:
UVF: Ultraviolet fluoresence

WATER LEVEL OBSERVATIONS

Evidence of groundwater table not observed during boring advancement

Terracon
2401 Brentwood Rd, Ste 107
Raleigh, NC

Boring Started: 10-31-2019 | Boring Completed: 10-31-2019
Drill Rig: GeoProbe 7822DT | Driller: Quantex, Inc.
Project No.: 70197584 | Appendix B

APPENDIX C

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD ROAD #107
RALEIGH NC

Contact: WILL FRAZIER

Project: #70197584

Samples taken Thursday, October 31, 2019
Samples extracted Thursday, October 31, 2019
Samples analysed Friday, November 1, 2019

Operator MAX MOYER

U00902

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
										C5 - C10	C10 - C18	C18	
s	904-SB-01	21.0	<0.52	<0.52	<0.52	<0.52	<0.1	<0.17	<0.021	0	0	0	PHC not detected
s	904-SB-02	20.5	<0.51	<0.51	<0.51	<0.51	<0.1	<0.16	<0.02	0	0	0	PHC not detected
s	903-SB-01	10.7	<0.27	1.7	0.27	1.97	0.2	<0.09	<0.011	96.5	2.4	1.1	Deg.PHC 72.4%,(FCM)
s	903-SB-02	22.8	<0.57	8.3	3.5	11.8	1.7	<0.18	<0.023	87.5	9.5	3	Deg.PHC 70.5%,(FCM)
s	903-SB-03	21.8	<0.55	0.97	2.4	3.4	1.4	<0.17	<0.022	66.7	26.9	6.5	Deg Fuel 79.9%,(FCM)
s	903-SB-04	22.0	<0.55	<0.55	<0.55	<0.55	<0.11	<0.18	<0.022	0	0	0	PHC not detected
s	903-SB-05	22.4	<0.56	1.7	5.7	7.4	3.6	<0.18	<0.022	57	34	9	Deg Fuel 77.2%,(FCM)
s	605-SB-01	58.6	<1.5	69.9	215.6	285.5	11.9	<0.47	<0.059	99.7	0.3	0	Deg.Kerosene 81.4%,(FCM)
s	605-SB-02	21.0	41.1	117.9	188.9	306.8	18.5	0.71	<0.021	99.7	0.2	0.1	Deg.Kerosene 68.5%,(FCM),(P)
s	605-SB-03	19.5	<0.49	14.9	2.4	17.3	3.7	<0.16	<0.02	98.7	1.1	0.2	No Match found

Initial Calibrator QC check OK

Final FCM QC Check OK 101.2 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

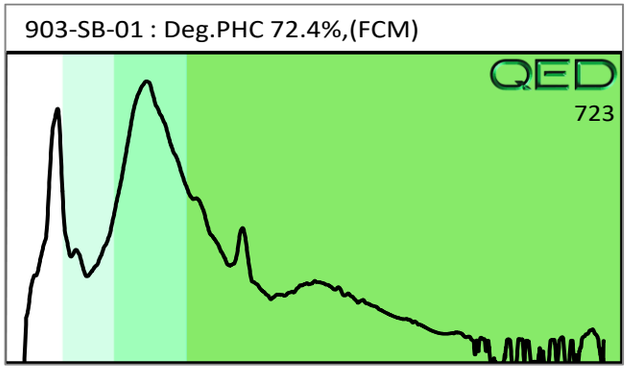
QED Hydrocarbon Fingerprints

Project: #70197584 ##################

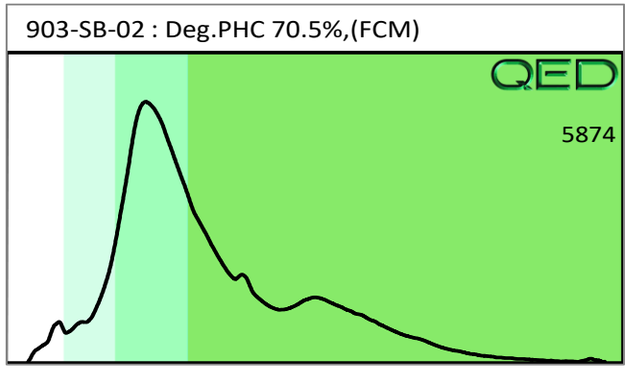
904-SB-01 : PHC not detected

904-SB-02 : PHC not detected

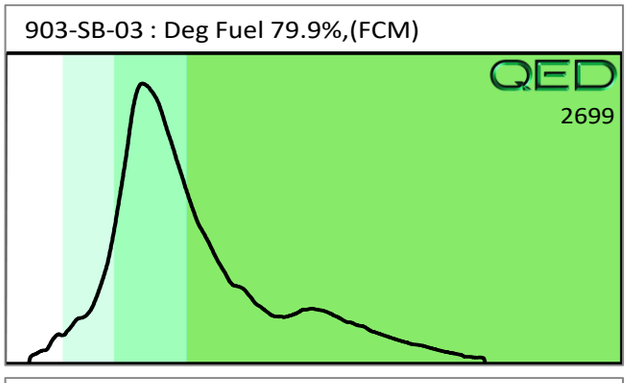
903-SB-01 : Deg.PHC 72.4%,(FCM)



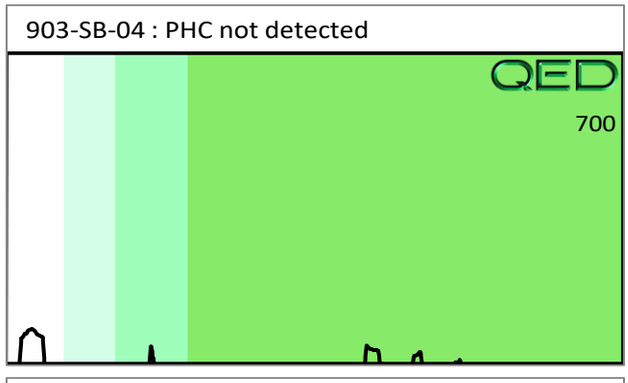
903-SB-02 : Deg.PHC 70.5%,(FCM)



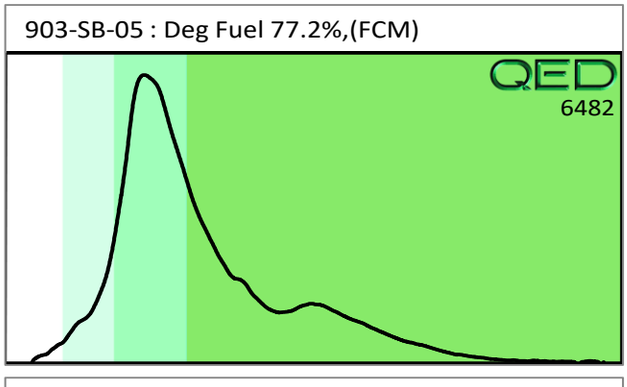
903-SB-03 : Deg Fuel 79.9%,(FCM)



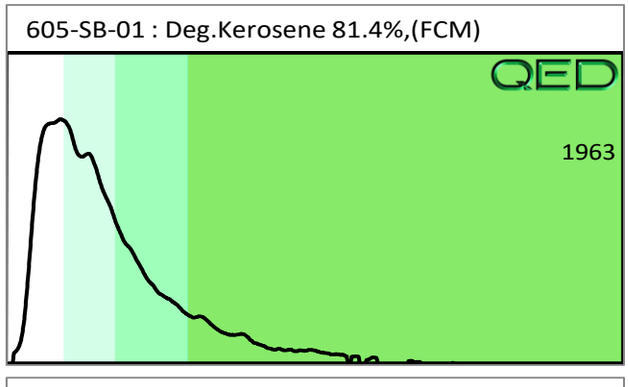
903-SB-04 : PHC not detected



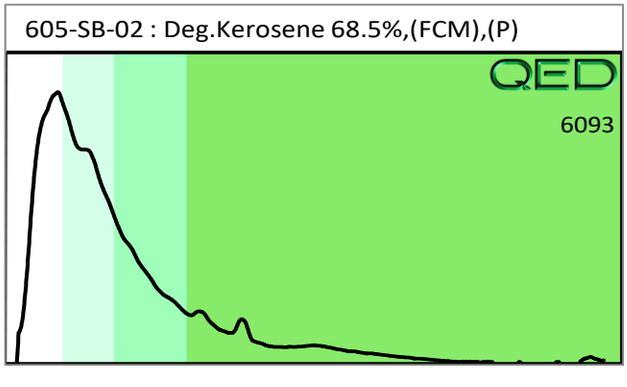
903-SB-05 : Deg Fuel 77.2%,(FCM)



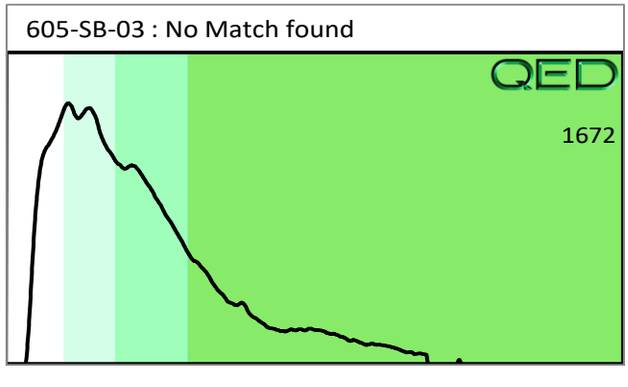
605-SB-01 : Deg.Kerosene 81.4%,(FCM)



605-SB-02 : Deg.Kerosene 68.5%,(FCM),(P)



605-SB-03 : No Match found



QED

REDLAB™ RAPID ENVIRONMENTAL DIAGNOSTICS

AQROS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD ROAD #107
RALEIGH NC

Contact: WILL FRAZIER

Project: #70197584

Samples taken Thursday, October 31, 2019
Samples extracted Thursday, October 31, 2019
Samples analysed Friday, November 1, 2019

Operator MAX MOYER

U00902

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
										C5 - C10	C10 - C18	C18	
s	605-SB-04	70.1	<1.8	17.8	74.2	92	138.7	5.3	<0.07	58.5	32.5	9	Deg.Fuel 85.3%,(FCM)
s	605-SB-05	65.6	<1.6	<1.6	68.4	68.4	128.1	4.9	<0.066	0	77.8	22.2	Deg.Fuel 86%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 98.9 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

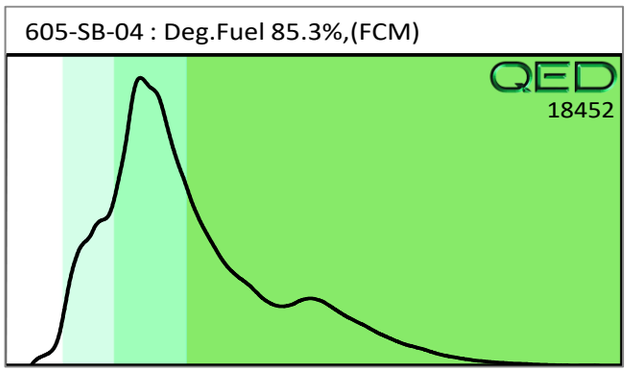
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

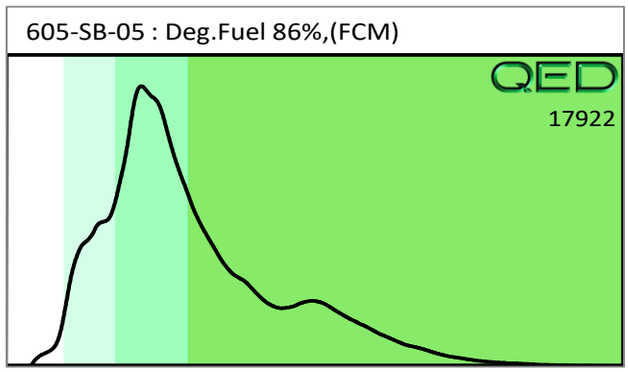
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

QED Hydrocarbon Fingerprints

Project: #70197584 ##################





B143

Client Name:	Terracon Consultants
Address:	2401 Brentwood Rd #107 Raleigh NC
Contact:	Will Frazier
Project Ref.:	70197584
Email:	wafrazier@terracon.com
Phone #:	984-202-4059
Collected by:	W. Frazier

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 sample will be analyzed for BTEX, GRO, DRO, TPH, PAH total aromatics and BaP

Sample Collection Date/Time	TAT Requested 24 Hour	TAT Requested 48 Hour	Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
10/31/19 0920		✓	WOF	904-SB-01	57.4	45.0	12.4
0930		✓	WOF	904-SB-02	57.7	45.0	12.7
0945		✓	WOF	903-SB-01	58.2	45.1	13.1
1000		✓	WOF	903-SB-02	56.6	45.2	11.4
1010		✓	WOF	903-SB-03	56.9	45.0	11.9
1025		✓	WOF	903-SB-04	56.8	45.0	11.8
1040		✓	WOF	903-SB-05	56.6	45.0	11.6
1245		✓	WOF	605-SB-01	59.1	45.1	14.0
1150		✓	WOF	605-SB-02	57.5	45.1	12.4
1200		✓	WOF	605-SB-03	58.4	45.1	13.3
1215		✓	WOF	605-SB-04	56.9	45.2	11.7
1230		✓	WOF	605-SB-05	57.3	44.8	12.5

Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
W. Frazier	10/31/19 1500	MM 11/1/19	1150
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

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