September 7, 2018

North Carolina Department of Transportation
GeoEnvironmental Engineering Unit
Century Center Complex
Building B
1020 Birch Ridge Road
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)
Norfolk Southern Mainline Grade Crossing Separation at Rogers Road Crossing in Kannapolis
Parcel 53 – Chester & Patricia Cook Property
1309 S. Ridge Avenue, Kannapolis, North Carolina
TIP No. Y-4810K
WBS Element: 40325.1.46

Dear Mr. Haden

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. P70187265) dated May 14, 2018. This report includes the findings of the investigation, and provides our conclusions and recommendations.

Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation. If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

Terracon Consultants, Inc.

DocuSigned by:
Prepared by: 9/19/2018
BFAD0E85DCED418...

David W. Hawkins, PG
Staff Geologist

DocuSigned by:
Reviewed by: 9/19/2018
8E4FE90F5C944D5...

Michael B. Dail, PG
Senior Geologist

NORTH CAROLINA LICENSED SEAL 2187 GEOLOGIST MICHAEL BRYANT DAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Preliminary Site Assessment

Norfolk Southern Mainline Grade Crossing Separation at Rogers Road in Kannapolis

Parcel 53 – Chester & Patricia Cook Property

1309 S. Ridge Avenue, Kannapolis, North Carolina

TIP No. Y-4810K

WBS Element: 40325.1.46

September 7, 2018

Terracon Project No. 70187265

Prepared for:

North Carolina Department of Transportation
Raleigh, North Carolina

Prepared by:

Terracon Consultants, Inc.
Raleigh, North Carolina

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PRELIMINARY SITE ASSESSMENT

NORFOLK SOUTHERN MAINLINE GRADE CROSSING SEPARATION AT ROGERS ROAD CROSSING IN KANNAPOLIS
TIP NO. Y-4810K
WBS ELEMENT: 40325.1.46
PARCEL 53 – CHESTER & PATRICIA COOK PROPERTY
1309 S. RIDGE AVENUE, KANNAPOLIS, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	Norfolk Southern Mainline Grade Crossing Separation at Rogers Road Crossing in Kannapolis
Site Location/Address	1309 S. Ridge Avenue, Kannapolis, North Carolina 28083 (Cabarrus County Tax PIN: 56136293020000)
General Site Description	The site currently consists of vacant grassed and gravel land and a small barn structure.

1.2 Site History

The site is located at 1309 S. Ridge Avenue in Kannapolis, Cabarrus County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site consisted of vacant grassed and gravel land, a small barn structure, and miscellaneous debris. The site address does not appear on the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management UST Section Registered Tank Database. According to information provided by the client, the facility is currently used by Kleen Cut Tree Service for equipment storage. Additional information pertaining to the site was not provided (NCDOT, 2013).

1.3 Scope of Work

Terracon conducted the following PSA scope of work (SOW) in accordance with Terracon's Proposal for PSA (Proposal No. P70187265) dated May 14, 2018. This PSA is being completed prior to planned bridge addition over the Norfolk Southern Railroad in the vicinity of Rogers Lake Road and S. Ridge Avenue in Kannapolis, North Carolina (site). The scope of work included a geophysical investigation, collection of soil and 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 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. P70187265) dated May 14, 2018 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 Concord, NC (1987). **Exhibits 2A and 2B** depict a site layout plan that includes the approximate locations of the site features, soil boring locations, and analytical results.

2.1 Geophysical Survey

Between June 19 and 21, 2018, Geophysical Survey Investigations, PLLC conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs were present beneath the proposed ROW area and provide utility clearance prior to drilling activities. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit.

The geophysical investigation did not identify probable USTs on the parcel. In addition to metal detection and GPR scans, the NC One Call public utility locator service was used to identify underground utility lines and to clear boring locations. A copy of the geophysical report is included 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 twelve (12) soil borings (B-19 through B-30) throughout the parcel. The borings were completed by a North Carolina Certified Well Contractor (Innovative Environmental Technologies, Inc.) using a track-mounted 9520-VTR PowerProbe™ 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 assist in selection of sample intervals for laboratory analysis.

Based on the proposed disturbance depths and discussion with the NCDOT, six (6) of the soil borings were advanced to a depth of approximately 10 feet below land surface (bls). Shallow rock refusal was encountered across the parcel in six (6) borings at depths ranging from 2.5 to 8 feet bls. Based on the results of the field screening, one soil sample from each boring, was collected from depths shallower than 8 feet bls. Soil samples were collected in the depth interval that was most likely to be impacted or from variable depths to provide spatial coverage with depth across the site.

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 hydrated bentonite pellets. Investigation derived waste (IDW) from the three (3) parcels

associated with TIP No. Y-4810K was containerized in one 55-gallon drum staged on parcel 48 pending disposal.

Soil generally consisted of silty clay and silt from the surface to variable depths underlain by silty sand. Groundwater was not encountered in these borings. The soil boring logs are included in **Appendix B**. Sample locations were measured using a Trimble Geo7x GPS and are depicted on **Exhibits 2A and 2B**.

3.0 LABORATORY ANALYSES

Soil samples were placed in laboratory provided sample containers and shipped to REDLAB/QROS, LLC – Environmental Testing for analysis by Ultraviolet Fluorescence (UVF) for 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

Table 1 summarizes the results of the analyses of the soil samples. **Exhibit 2B** depicts the boring locations and analytical data.

Constituents from the UVF analysis were not detected at concentrations above applicable standards in the soil samples.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- The geophysical investigation did not identify a probable UST within the parcel.

- Laboratory analysis did not report concentrations above applicable standards in the soil samples.

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

- Terracon does not recommend further assessment of the ROW at this site. However, based on detections of petroleum compounds in soil, construction workers should be alert for potential soil and/or groundwater impacts in other locations at the site.

6.0 REFERENCES

NCDOT, 2013. GeoEnvironmental Report for Planning Y-4810K. "Hazardous Materials Report." December 2, 2013

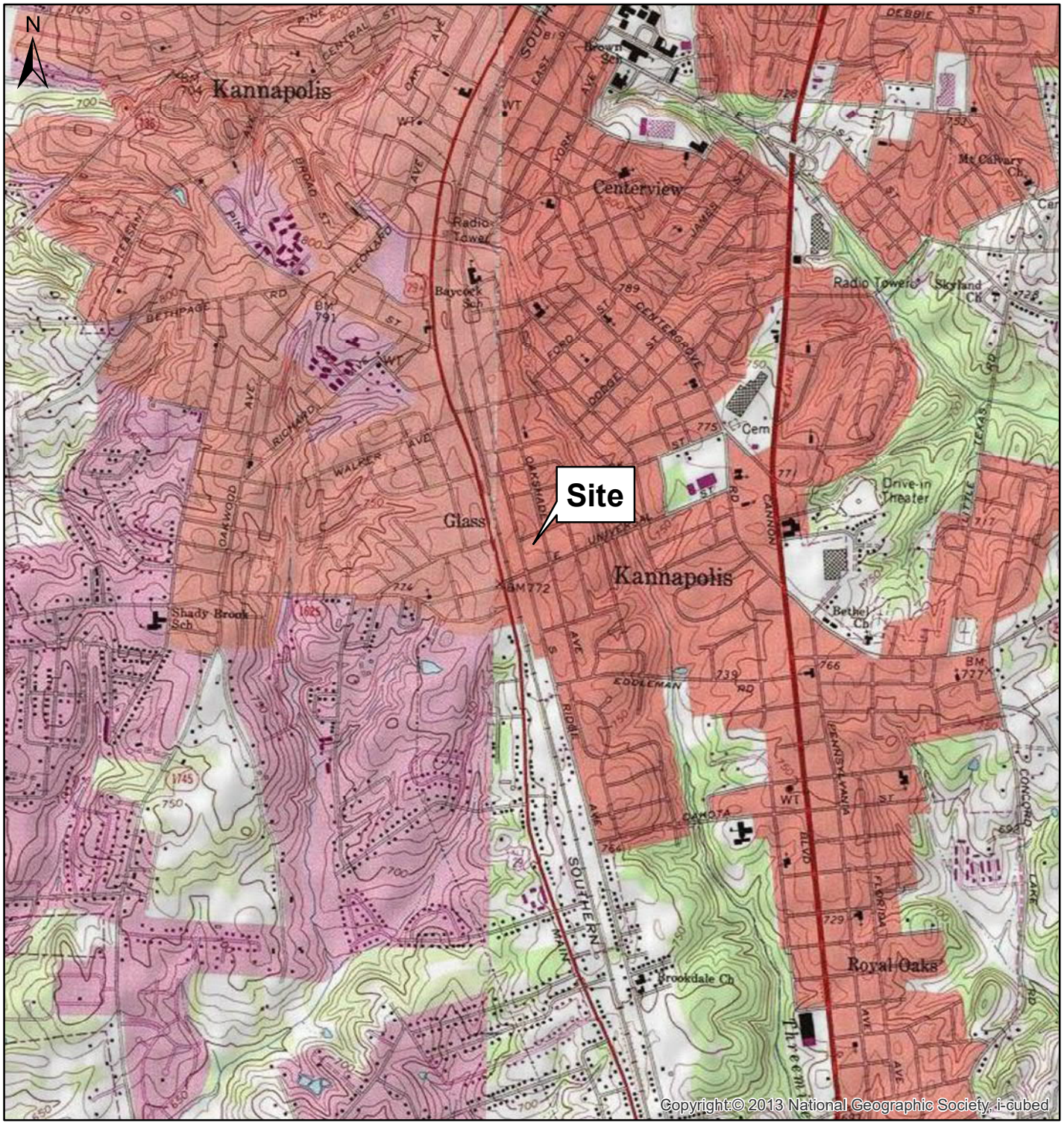
TABLES

Table 1
Summary of Soil Analytical Results
Preliminary Site Assessment
Parcel 53 - Chester & Patricia Cook Property
Kannapolis, Cabarrus County, North Carolina
Terracon Project No. 70187265

Sample ID: / Sample Depth (ft bls):	B-19 2-4	B-20 4-6	B-21 0-2	B-22 3-5	B-23 2-4	B-24 6-8	B-25 2-4	B-26 3-5	B-27 4-6	B-28 3-5	B-29 2-4	B-30 3-5	NCDEQ Action Level	MSCC Industrial/ Commercial	PSRG Industrial/ Commercial
BTEX (C6 - C9)	<0.66	<0.64	<0.70	<0.60	<0.63	<0.64	<0.40	<0.73	<0.68	<0.62	<0.34	<0.40	NE	NE	NE
GRO (C5 - C10)	<0.66	<0.64	<0.70	<0.60	<0.63	<0.64	<0.40	<0.73	<0.68	<0.62	<0.34	<0.40	50	NE	NE
DRO (C10 - C35)	<0.05	<0.05	0.57	<0.05	<0.05	<0.05	<0.03	<0.06	<0.05	<0.05	<0.03	<0.03	100	NE	NE
TPH (C5 - C35)	<0.66	<0.64	0.57	<0.60	<0.63	<0.64	<0.40	<0.73	<0.68	<0.62	<0.34	<0.40	NE	NE	NE
Total Aromatics (C10-C35)	<0.13	<0.13	0.56	<0.12	<0.13	<0.13	<0.08	<0.15	<0.14	<0.12	<0.07	<0.08	NE	NE	NE
16 EPA PAHs	<0.03	<0.03	<0.03	<0.02	<0.03	<0.03	<0.02	<0.03	<0.03	<0.02	<0.01	<0.02	NE	NE	NE
BaP	<0.013	<0.013	<0.014	<0.012	<0.013	<0.013	<0.008	<0.015	<0.014	<0.012	<0.007	<0.008	NE	0.78	2.1

Notes:
Soil samples were collected on July 9, 2018.
Concentrations are reported in milligrams per kilogram (mg/kg).
ft bls - feet below land surface.
BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.
GRO - Gasoline Range Organics.
DRO - Diesel Range Organics.
TPH - Total Petroleum Hydrocarbons.
16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, anthracene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene, chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).
NE - Standard not established.
Bold: Constituent concentration reported above the method detection limit.
North Carolina Department of Environmental Quality (NCDEQ) State Action Level for Total Petroleum Hydrocarbons (GRO/DRO) (July 2016).
MSCC Industrial/Commercial - Maximum Soil Contaminant Concentration Levels Industrial/Commercial soil cleanup levels (April 2012).
NCDEQ Industrial/Commercial Preliminary Soil Remediation Goals (PSRGs) (February 2018).

FIGURES



CONTOUR INTERVAL 10 FEET

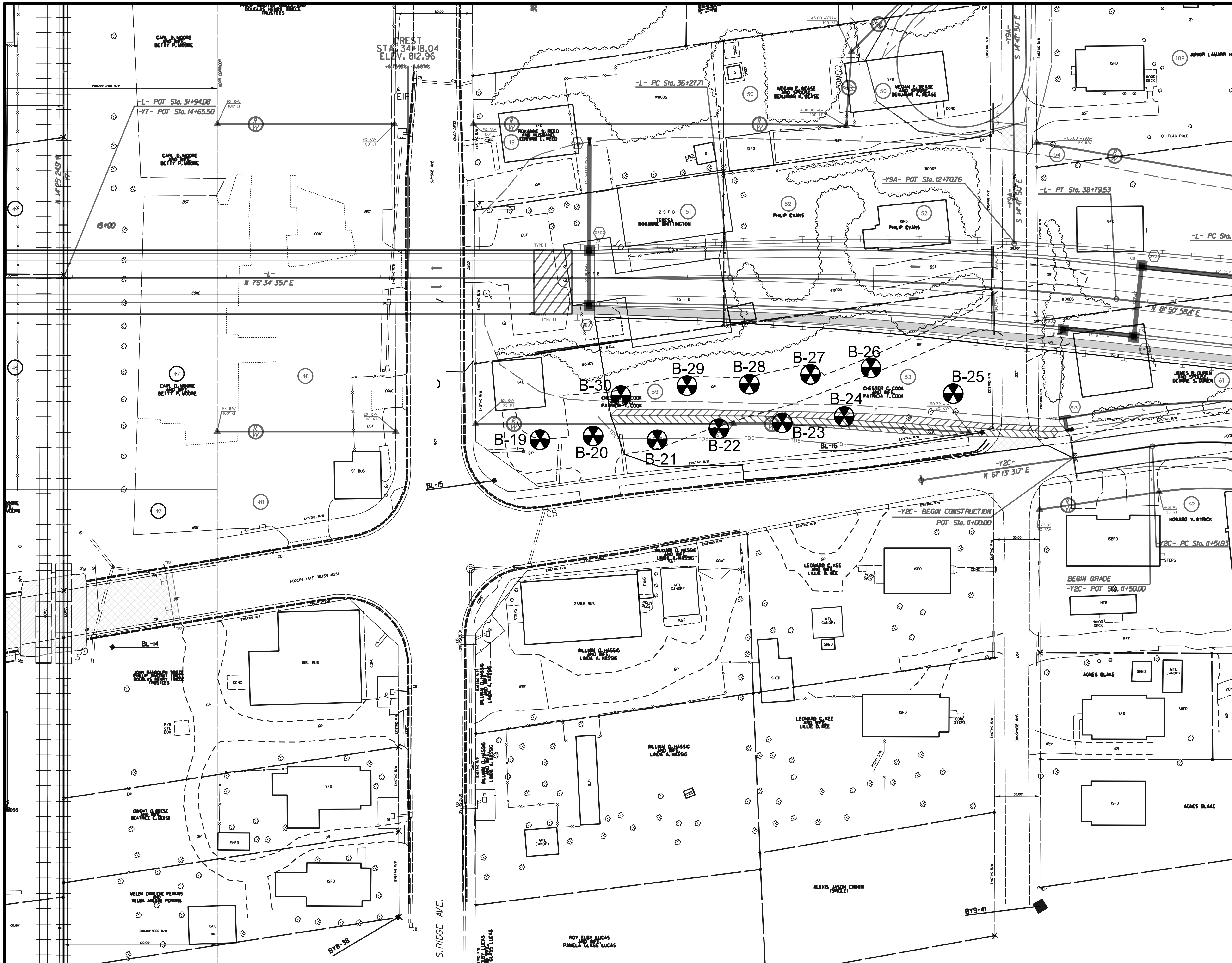
USGS TOPOGRAPHIC MAP
SITE: CONCORD, NC QUADRANGLE (1987)
NORTH: KANNAPOLIS, NC QUADRANLE (1993)

PM: SJK	Project No. 70187265	Terracon	**Topographic Vicinity Map**	EXHIBIT NO.
Drawn By: DWH	Scale: 1:24,000		**Preliminary Site Assessment** **Parcel 53 - Chester & Patricia Cook Property** **Kannapolis, Cabarrus County, North Carolina**	1
Checked By: SJK	File Path:			
Approved By: MTJ	Date: 8/27/2018	2401 Brentwood Drive, Suite 107 Raleigh, NC 27604 Phone: (919) 873-2211 Fax: (919) 873-9555		

PROJECT REFERENCE NO.	EXHIBIT
40325.1.46 (Y-4810K)	2A

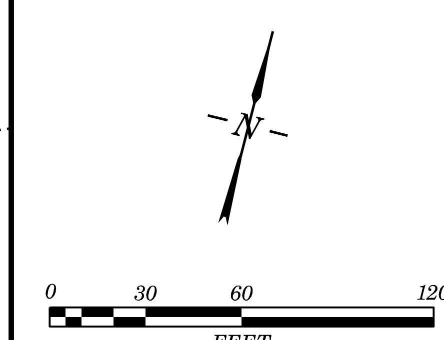
SITE DIAGRAM WITH BORING LOCATIONS

PARCEL 53
CHESTER & PATRICIA COOK PROPERTY
1309 SOUTH RIDGE AVENUE
KANNAPOLIS, CABARRUS COUNTY,
NORTH CAROLINA



LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- NEW RIGHT OF WAY LINE WITH PIN AND CAP
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF TRAVEL
- F / C — PROPOSED CUT / FILL LINE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- TDE — PROPOSED TEMPORARY DRAINAGE EASEMENT
- BORING LOCATION



PROJECT REFERENCE NO.	EXHIBIT
40325.1.46 (Y-4810K)	2B

SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA

PARCEL 53
CHESTER & PATRICIA COOK PROPERTY
1309 SOUTH RIDGE AVENUE
KANNAPOLIS, CABARRUS COUNTY, NORTH CAROLINA

B-28 (3-5 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-27 (4-6 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-29 (2-4 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-26 (3-5 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-30 (3-5 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-25 (3-5 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-19 (2-4 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-20 (4-6 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-22 (2-5 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-24 (6-8 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-23 (2-4 ft bls)
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

B-21 (0-2 ft bls)	(mg/kg)
DRO (C10-C35)	0.57
TPH (C5-C35)	0.57
Total Aromatics (C10-C35)	0.56

LEGEND

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- NEW RIGHT OF WAY LINE WITH PIN AND CAP
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF TRAVEL
- PROPOSED CUT / FILL LINE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- TDE — PROPOSED TEMPORARY DRAINAGE EASEMENT
- BORING LOCATION

NOTES

mg/kg - MILLIGRAMS PER KILOGRAM

ft bls - FEET BELOW LAND SURFACE

DRO - DIESEL RANGE ORGANICS
GRO - GASOLINE RANGE ORGANICS

0 30 60 120
FEET

APPENDIX A

GEOPHYSICAL SURVEY REPORT

TERRACON CONSULTANTS, INC.

GEOPHYSICAL INVESTIGATION TO LOCATE METALLIC USTS

Chester & Patricia Cook (Parcel 53) Property
1309 South Ridge Avenue
Kannapolis, North Carolina

June 27, 2018
Geophysical Survey Investigations, PLLC
Project No. 2018-28

4 Willimantic Drive, Greensboro, NC 27455
Office Tel: (336) 286-9718
denilm@bellsouth.net

TERRACON CONSULTANTS, INC.
GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS
Chester & Patricia Cook (Parcel 53) Property
1309 South Ridge Avenue
Kannapolis, North Carolina

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FIGURES

Prepared by: Mark J. Denil

Mark J. Denil, P.G.

1.0 INTRODUCTION

Geophysical Survey Investigations, PLLC (GSI) conducted an electromagnetic (EM) metal detection survey, ground penetrating radar (GPR) scanning and buried, utility line clearance search for Terracon Consultants, Inc. on June 19-21, 2018 across the Chester & Patricia Cook (Parcel 53) property located at 1309 South Ridge Avenue in Kannapolis, North Carolina. The geophysical work was conducted as part of the North Carolina Department of Transportation (NCDOT) site assessment for TIP Project Y-4810K (Norfolk Southern Mainline grade crossing separation at Rogers Road Crossing).

The geophysical investigation was conducted to determine if metallic, underground, storage tanks (USTs) are present on the Chester & Patricia Cook property. Terracon Consultants representatives Mr. Stephen Kerlin and Mr. David Hawkins, PG provided site information and guidance to Geophysical Survey Investigations, PLLC personnel prior and during data acquisition. The geophysical survey area has a maximum length and width of 355 feet and 110 feet, (0.9 acres) respectively. Presently, the property primarily consists of open, grass/gravel-covered terrain with an abandoned building located in the northwest corner of the site. Dense, wooded terrain lies along the northerly portion of the property which was excluded from the geophysical investigation.

2.0 FIELD METHODOLOGY

The EM investigation was performed across the survey area using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit. EM61 metal detection data and GPS coordinates were digitally collected in latitude and longitude geodetic format (NAD83) using a Juniper data recorder at approximately 1.0 foot intervals along survey lines spaced approximately five feet apart. The Trackmaker NAV61MK2 software program was used with the data recorder to view the relative positions of the survey lines in real time during data acquisition.

According to the instrument specifications, the EM61-MK2A can detect a metal drum down to a maximum depth of approximately 8 to 10 feet. Objects less than one foot in size can be detected to a maximum depth of 4 or 5 feet. The EM61 and GPS data were downloaded to a computer and

processed in the field using the Trackmaker61MK2 and Surfer for Windows software programs. GPS coordinates were converted during data processing to Universal Transverse Mercator (UTM) coordinates (in feet) which are used as location control in this report.

GPR scanning was conducted across selected EM61 differential metal detection anomalies and across areas containing steel reinforced concrete. GPR scans were performed along northerly-southerly and easterly-westerly directions spaced primarily 3 to 5 feet apart across the selected EM61 differential anomalies using the Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna. GPR data were viewed in real time in a continuous mode using a vertical scan of 512 samples, at a sampling rate of 48 scans per second. A 70 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were viewed to a maximum investigating depth of approximately 6.0 feet based on an estimated two-way travel time of 8.0 nanoseconds per foot.

Following the UST investigation, the areas around proposed boring locations were scanned with the GPR unit and a DitchWitch 910 utility locator for buried utility line clearance purposes. Detected buried lines/conduits were marked in the field with orange marking paint and pin flags. Photographs of the geophysical equipment used for the investigation and of the site are presented in **Figure 1**.

3.0 DISCUSSION OF RESULTS

Contour plots of the EM61 early time gate results and the EM61 differential results are presented in **Figures 2 and 3**, respectively. The early time gate results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The early time gate response can be used to delineate metallic conduits or utility lines, small, isolated, metal objects and areas containing insignificant metal debris. The differential results are obtained from the difference between the early time gate channel and late time gate channel of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST-size objects and ignore the smaller, insignificant, metal objects and debris.

The linear, EM61 early time gate anomalies intersecting UTM coordinates 1752716-E 12880426-N, 1752724-E 12880424-N, 1752806-E 12880454-N, 1752831-E 12880481-N, and 1752870-E 12880515-N are probably in response to buried lines and/or conduits. The EM61 early time gate anomalies intersecting coordinates 1752579-E 12880392-N and 1752606-E 12880407-N are probably in response to buried, miscellaneous metal debris and the building. The EM61 early time gate anomalies intersecting coordinates 1752546-E 12880420-N, 1752583-E 12880353-N and 1752611-E 12880344-N are probably in response to known surface objects and to buried, utility line-related objects.

GPR scanning suggests the EM61 anomalies intersecting coordinates 1752824-E 12880460-N and 1752822-E 12880469-N are in response to portions of the buried line that leads to a PVC clean-out pipe located adjacent to Oakshade Avenue. GPR scanning suggests the EM61 anomalies intersecting centered near 1752862-E 12880537-N are in response to a buried utility line(s). The remaining EM61 anomalies not discussed in this summary are probably in response to known surface objects, buried utility lines and/or to buried, miscellaneous, metal debris. The geophysical investigation suggests that the surveyed portion of Parcel 53 does not contain metallic USTs.

As previously mentioned, scanning for utility line clearance purposes was conducted across the proposed boring locations. Detected lines or conduits were marked in the field with orange marking paint and pin flags.

4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the Chester & Patricia Cook (Parcel 53) property located at 1309 South Ridge Avenue in Kannapolis, North Carolina provides the following summary and conclusions:

- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 6 feet.

- The dense, wooded terrain that lies along the northerly portion of the property was omitted from the geophysical investigation.

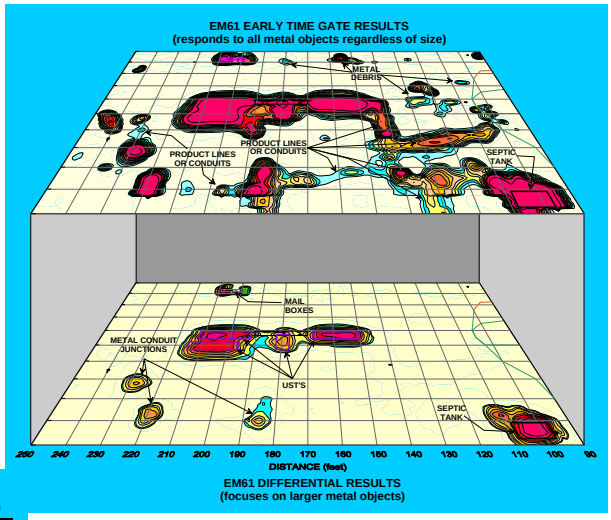
- The linear, EM61 early time gate anomalies intersecting UTM coordinates 1752716-E 12880426-N, 1752724-E 12880424-N, 1752806-E 12880454-N, 1752831-E 12880481-N, and 1752870-E 12880515-N are probably in response to buried lines and/or conduits.

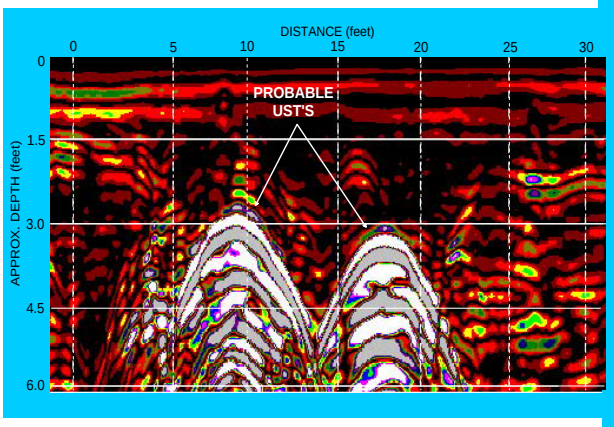
- GPR scanning suggests the EM61 anomalies intersecting coordinates 1752824-E 12880460-N and 1752822-E 12880469-N are in response to portions of the buried line that leads to a PVC clean-out pipe located adjacent to Oakshade Avenue.

- The geophysical investigation suggests that the surveyed portion of Parcel 53 does not contain metallic USTs.

5.0 LIMITATIONS

EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. Some of the EM61 and GPR anomalies interpreted as possible/probable USTs, utility lines, conduits, steel reinforced concrete, or miscellaneous, metal debris may be attributed to other surface or subsurface features and/or interference from cultural features.

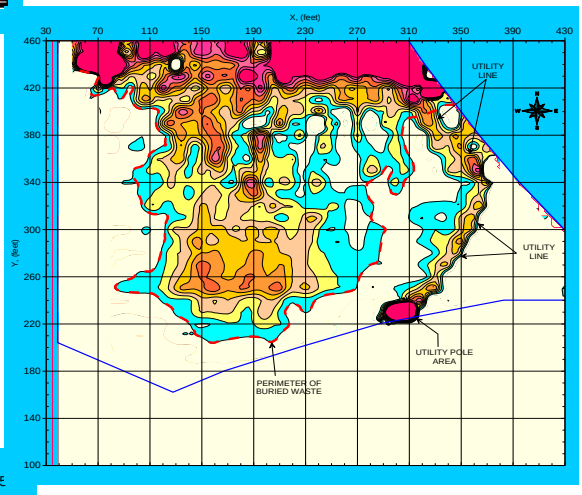


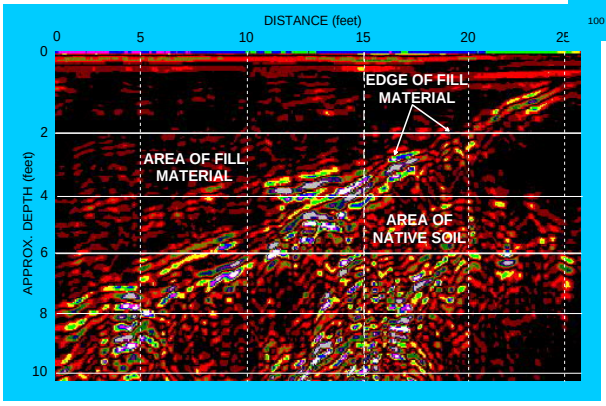


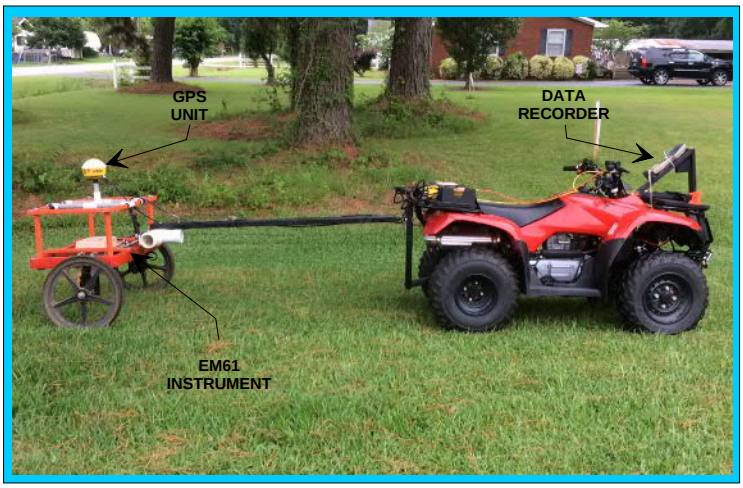
REPORT FIGURES

(on the following pages)

Figures shown on this page are for esthetic purposes only and are not related to the site discussed in this report







EM61 METAL DETECTOR

The photograph shows the Geonics EM61-MK2A metal detector, a Hemisphere A101 GPS unit, a Juniper data recorder, and a Honda Recon ATV which were used to conduct the metal detection survey across the proposed ROW & easement areas of Parcel 53.

GROUND PENETRATING RADAR UNIT

The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equiped with a 400 MHz antenna that were used to conduct the GPR scanning across selected areas.

DITCHWITCH UTILITY LOCATOR

The photograph shows the DitchWitch 910 utility locator which was used to detect buried lines across the proposed boring locations.

GEOPHYSICAL SURVEY AREA

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 53. The geophysical investigation was conducted on June 19-21, 2018.

1752540 1752560 1752580 1752600 1752620 1752640 1752660 1752680 1752700 1752720 1752740 1752760 1752780 1752800 1752820 1752840 1752860 1752880

12880560 12880540 12880520 12880500 12880480 12880460 12880440 12880420 12880400 12880380 12880360 12880340

UTM-Northing (feet)

UTM-Easting (feet)

ADJACENT PROPERTY

ADJACENT PROPERTY

DENSE WOODED TERRAIN (AREA NOT INVESTIGATED)

GRASS/GRAVEL SURFACE

BUILDING

OAKSHADE AVENUE

SOUTH RIDGE AVENUE

ROGERS LAKE ROAD

EM61 ANOMALY PROBABLY IN RESPONSE TO BUILDING, UTILITY POLE & ROAD SIGN

EM61 ANOMALIES PROBABLY IN RESPONSE TO BUILDING,KNOWN SURFACE OBJECTS & BURIED, MISC. METAL DEBRIS/SMALL OBJECTS

LINEAR EM61 ANOMALIES PROBABLY IN RESPONSE TO BURIED LINES/CONDUITS

PROBABLE MISC. METAL DEBRIS

PVC CLEAN-OUT PIPE

GPR SCANNING SUGGESTS LINEAR EM61 ANOMALIES PROBABLY IN RESPONSE TO BURIED LINES/CONDUITS

LINEAR EM61 ANOMALY PROBABLY IN RESPONSE TO BURIED LINE(S)

GPR SCANNING SUGGESTS HIGH-AMPLITUDE EM61 ANOMALIES IN RESPONSE TO PORTION OF BURIED LINE/CONDUIT

PROBABLE MISC. METAL OBJECTS

PROBABLE MISC. METAL OBJECTS

EM61 ANOMALIES PROBABLY IN RESPONSE TO KNOWN SURFACE OBJECTS & BURIED, MISC. METAL OBJECTS/CONDUITS

PROBABLE MISC. METAL OBJECT(S)

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 53.

LEGEND

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- FIRE HYDRANT
- UTILITY POLE
- GUY WIRE
- UTILITY LINE BOX OR VALVE COVER
- ROAD SIGN
- WATER METER
- PVC CLEAN-OUT PIPE

N W E S APPROXIMATE NORTH

EM61 EARLY TIME GATE RESPONSE (in millivolts/meter)

-5000 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects, lines and conduits regardless of size. GPR scans were conducted across selected EM61 anomalies and steel reinforced concrete using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna. The geophysical investigation was conducted on June 19-21, 2018.

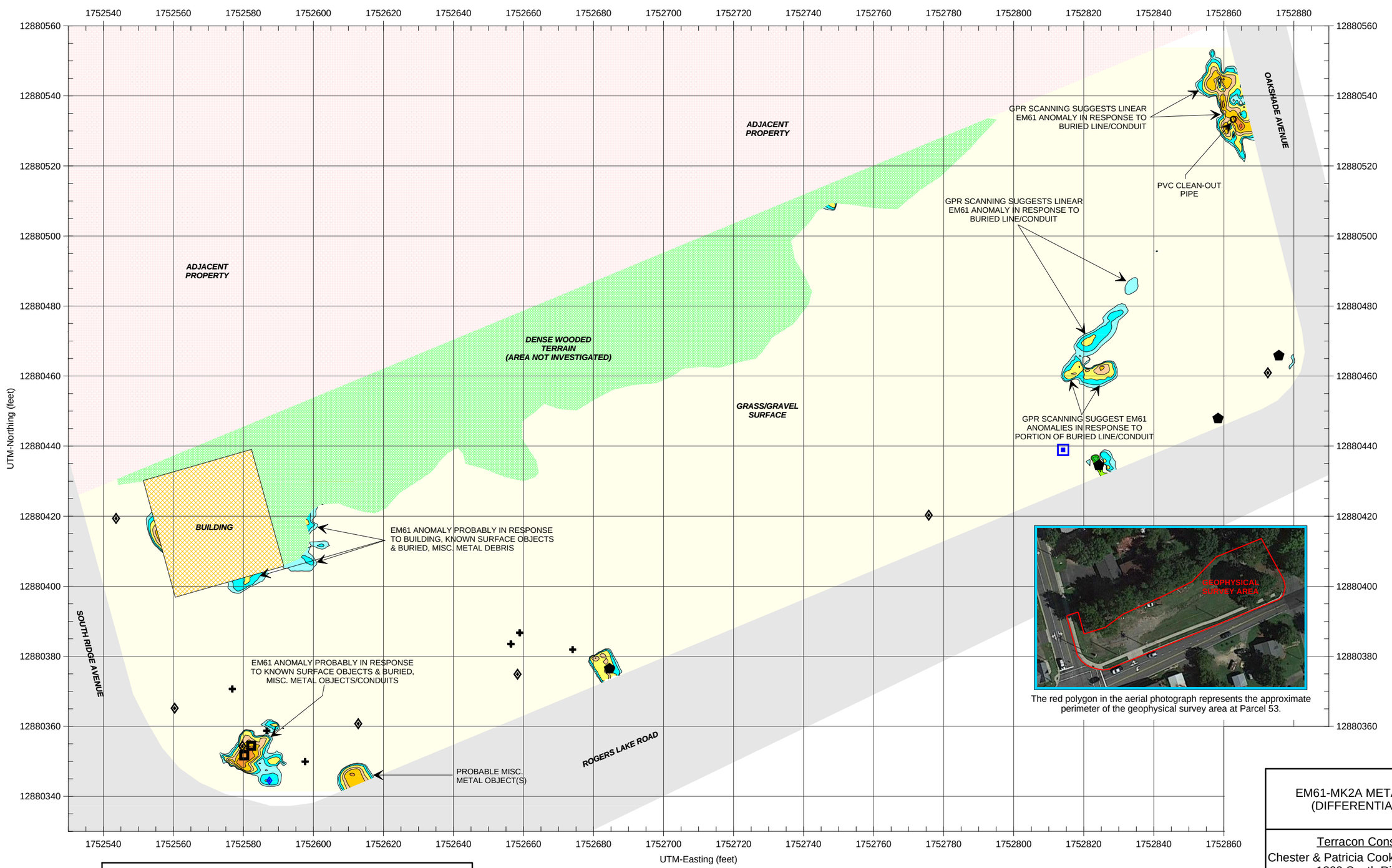
EM61-MK2A METAL DETECTION (EARLY TIME GATE RESULTS)

Terracon Consultants, Inc.

Chester & Patricia Cook (Parcel 53) Property
1309 South Ridge Avenue
Kannapolis, North Carolina

GEOPHYSICAL SURVEY INVESTIGATIONS

06/27/18 336-286-9718 FIGURE 2



The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 53.

LEGEND

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- FIRE HYDRANT
- UTILITY POLE
- GUY WIRE
- UTILITY LINE BOX OR VALVE COVER
- ROAD SIGN
- WATER METER
- PVC CLEAN-OUT PIPE

N W E S APPROXIMATE NORTH

EM61 DIFFERENTIAL RESPONSE (in millivolts/meter)

-5000 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

Note: The contour plot shows the differential response between the early time gate and the late time gate channels of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The differential response focuses on larger, buried, metallic objects such as drums and USTs and ignores smaller miscellaneous, metal debris. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna. The geophysical investigation was conducted on June 19-21, 2018.

EM61-MK2A METAL DETECTION (DIFFERENTIAL RESULTS)

Terracon Consultants, Inc.

Chester & Patricia Cook (Parcel 53) Property
1309 South Ridge Avenue
Kannapolis, North Carolina

GEOPHYSICAL SURVEY INVESTIGATIONS

06/27/18 336-286-9718 FIGURE 3

APPENDIX B

SOIL BORING LOGS

Lithology Log

Boring ID: B-19

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1300	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1305	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	46	<0.1	CL	0'-6': brown, silty CLAY, dry	B-19 (2-4), 1305	NA- Well Not Installed
		<0.1				
		<0.1				
5-10	37	<0.1	SM	6'-10': tan-light brown, silty SAND, micaceous, dry		
		<0.1		odor not observed		
				boring terminated at 10' bls per scope.		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: **B-20**

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1310	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1315	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	58	<0.1	SP	0'-1.5': brown, SAND, dry	B-20 (4-6), 1315	NA- Well Not Installed
		<0.1	CL	1.5'-5': reddish brown, clayey SILT, weathered rock fabric, micaceous		
		<0.1				
5-10	60	<0.1	SM	5'-10': tan-light brown, silty SAND, dry		
		<0.1		odor not observed		
				boring terminated at 10' bls per scope		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-21

Project Number:	70187265	Start Date/Time:	7/9/2018 / 1315	**Sample Method**	**Drilling Method**
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1320	☐ Hand Auger	X DPT
Weather:	Sunny 80s	Boring Diameter:	2-inch	X Macro-Core	☐ HSA
Logged By:	D. Hawkins	Total Depth:	3'	☐ Split Spoon	☐ Mud Rotary
Drilling Sub:	IET	Water Level:	NA	☐ Shelby Tube	☐ Air Rotary
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		☐ Rock Core

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-2.5	24	<0.1	SM	0'-2.5': tan-light brown, silty SAND, dry, micaceous, weathered rock fabric	B-21 (0-2), 1320	NA- Well Not Installed
				refusal 2.5' bls for B-21a and B-21		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-22

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1320	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1325	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	8.5'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	54	<0.1	CL	0'-1': dark brown, silty CLAY, dry organics	B-22 (3-5), 1330	NA- Well Not Installed
		<0.1	SM	1'-4': tan-brown, silty SAND, weathered minerals abundant		
		<0.1	CL	4'-5': reddish brown, silty CLAY, stiff, micaceous		
5-8	38	<0.1	SW	5'-8': brown-tan, SAND, abundant minerals, granitic texture		
				refusal at 8.5' bls		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: **B-23**

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1330	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1335	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	6'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-1': dark brown, silty CLAY, dry	B-23 (2-4), 1335	NA- Well Not Installed
		<0.1	ML	1'-4': brown, clayey SILT, dry, micaceous		
		<0.1	SP	4'-6': tan-beige, SAND, weathered rock fabric, dry		
5-6	12			odor not observed		
				refusal at 6' bls		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-24

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1335	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1345	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	56	<0.1	ML	0'-6': brown, gravelly SILT w/ some clayey SILT intermixed, adundant weathered rock fragments, dry	B-23 (6-8), 1340	NA- Well Not Installed
		<0.1				
		<0.1				
5-10	52	<0.1	SM	6'-10': tan, silty SAND, dry		
		<0.1				
				boring terminated at 10' bls per scope.		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-25

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1345	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1350	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	38	<0.1	CL	0'-3': reddish brown, silty CLAY, dry	B-25 (2-4), 1350	NA- Well Not Installed
		<0.1				
		<0.1	ML	4'-5': brown, clayey SILT, dry		
5-10	58	<0.1	SM	5'-10': tan-beige, silty SAND, weathered rock fabric		
		<0.1				
				boring terminated at 10' bls per scope.		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-26

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1350	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1355	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-4': reddish brown, silty CLAY, dry	B-26 (3-5), 1355	NA- Well Not Installed
		<0.1				
5-10	38	<0.1	SM	4'-10': light-brown to tan, silty SAND, dry, odor not observed, abundant mineral grains		
		<0.1				
		<0.1				
				boring terminated at 10' bls per scope.		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-27

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1355	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1400	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	10'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-3': reddish brown, silty CLAY, hard, dry	B-27 (4-6), 1400	NA- Well Not Installed
		<0.1				
		<0.1	SP	3'-10': light brown-tan, SAND, dry, weathered rock fabric		
5-10	30	<0.1				
		<0.1				
				boring terminated at 10' bls per scope.		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-28

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1400	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1405	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	6'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-5': reddish brown, silty CLAY, dry	B-28 (3-5), 1405	NA- Well Not Installed
		<0.1				
		<0.1				
5-6	12		SP	5'-6': tan-beige, SAND, dry, weathered rock		
				refusal at 6' bls		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: B-29

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1410	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1415	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	5'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-4': reddish brown, silty CLAY, dry	B-29 (2-4), 1415	NA- Well Not Installed
		<0.1				
		<0.1	SP	4'-5': light-brown, SAND, micaceous, weathered rock, odor not obsereved		
				refusal at 5' bls		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

Lithology Log

Boring ID: **B-30**

				Sample Method	Drilling Method
Project Number:	70187265	Start Date/Time:	7/9/2018 / 1415	☐ Hand Auger	X DPT
Site Location:	Kannapolis, NC	End Date/Time:	7/9/2018 / 1420	X Macro-Core	☐ HSA
Weather:	Sunny 80s	Boring Diameter:	2-inch	☐ Split Spoon	☐ Mud Rotary
Logged By:	D. Hawkins	Total Depth:	5'	☐ Shelby Tube	☐ Air Rotary
Drilling Sub:	IET	Water Level:	NA		☐ Rock Core
Drill Rig:	9520-VTR PowerProbe™	Well Installed:	No		

Depth (ft bls)	Recovery (inches)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, time	Well Construction
0-5	60	<0.1	CL	0'-4': brown-reddish brown, silty CLAY, dry	B-30 (3-5), 1420	NA- Well Not Installed
		<0.1				
		<0.1	SP	4'-5': light-brown to tan, SAND, weathered rock fabric, odor not observed		
				refusal at 5' bls		

Notes:

ppm: parts per million ppb: parts per billion NA: Not applicable bls: below land surface

APPENDIX C

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS

QED REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS QROS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD RD.
SUITE 107
RALEIGH NC 27604

Contact: DAVID HAWKINS
COLLECTED BY DAVID HAWKINS
Project: #70187265

Samples taken Monday, July 9, 2018
Samples extracted Monday, July 9, 2018
Samples analysed Wednesday, July 11, 2018

Operator NICK HENDRIX

F03640

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	B-1 (2-4)	22.0	<0.55	<0.55	<0.04	<0.55	<0.11	<0.02	<0.011	0	0	0	PHC not detected,(OCR)
s	B-2 (4-6)	26.0	<0.65	<0.65	11	11	8.3	0.45	<0.013	0	95.4	4.3	Deg Fuel 88.6%,(FCM)
s	B-3 (3-5)	31.7	<0.79	<0.79	<0.06	<0.79	<0.16	<0.03	<0.016	0	0	0	Residual HC
s	B-4 (2-4)	28.3	<0.71	<0.71	<0.06	<0.71	<0.14	<0.03	<0.014	0	0	0	PHC not detected,(OCR)
s	B-5 (3-5)	25.2	<0.63	<0.63	5.4	5.4	5.3	0.28	<0.013	0	94.5	5.1	Deg Fuel 73.9%,(FCM)
s	B-7 (8-10)	29.9	<0.75	<0.75	<0.06	<0.75	<0.15	<0.03	<0.015	0	0	0	PHC not detected,(OCR)
s	B-8 (8-10)	11.9	<0.3	<0.3	<0.02	<0.3	<0.06	<0.01	<0.006	0	0	0	PHC not detected
s	B-9 (2-4)	13.3	<0.33	<0.33	8.7	8.7	6	0.32	<0.007	0	95.2	4.5	Deg Fuel 74%,(FCM)
s	B-10 (4-6)	13.3	<0.33	<0.33	4.1	4.1	2.1	0.12	<0.007	0	95.3	4.4	Deg Fuel 75.5%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 91

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

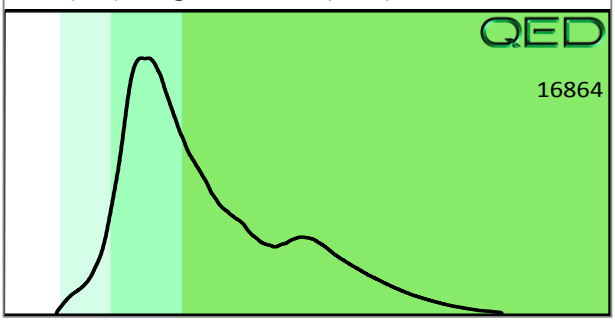
(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

QED Hydrocarbon Fingerprints

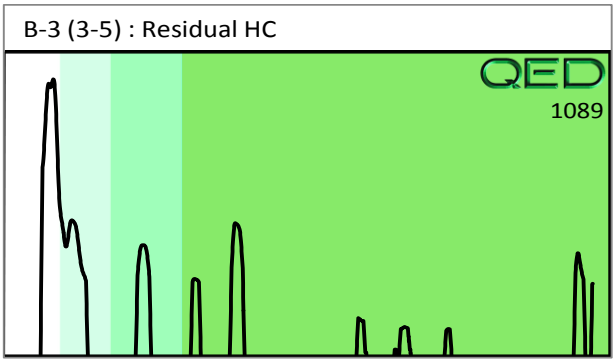
Project: #70187265 ##################

B-1 (2-4) : PHC not detected,(OCR)

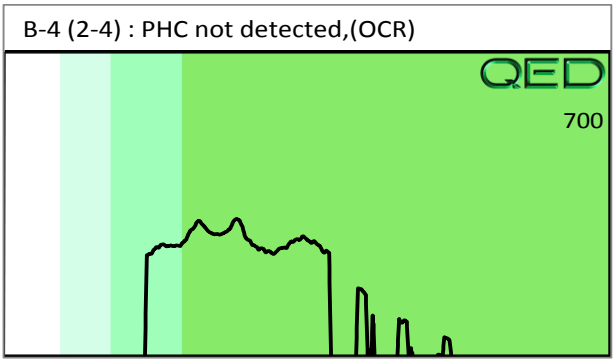
B-2 (4-6) : Deg Fuel 88.6%,(FCM)



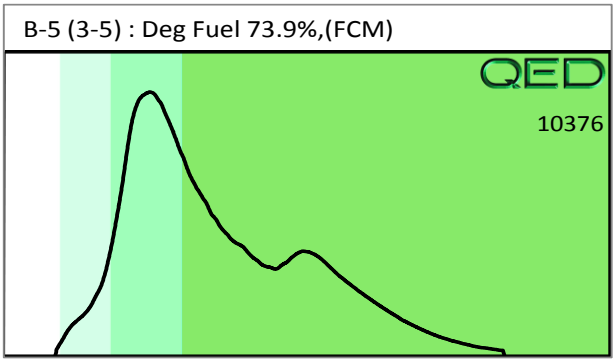
B-3 (3-5) : Residual HC



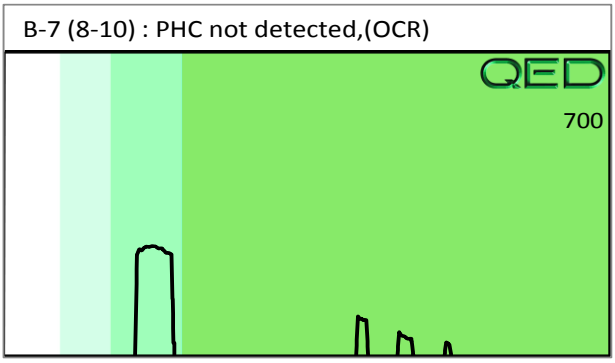
B-4 (2-4) : PHC not detected,(OCR)



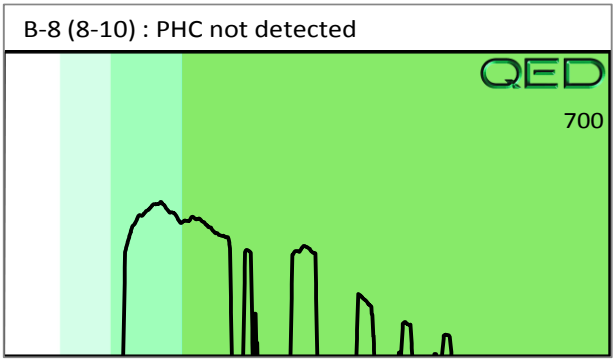
B-5 (3-5) : Deg Fuel 73.9%,(FCM)



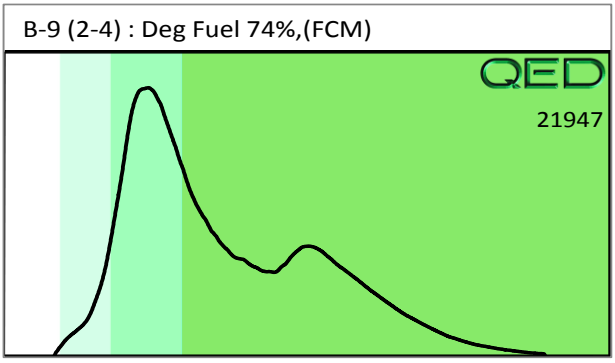
B-7 (8-10) : PHC not detected,(OCR)



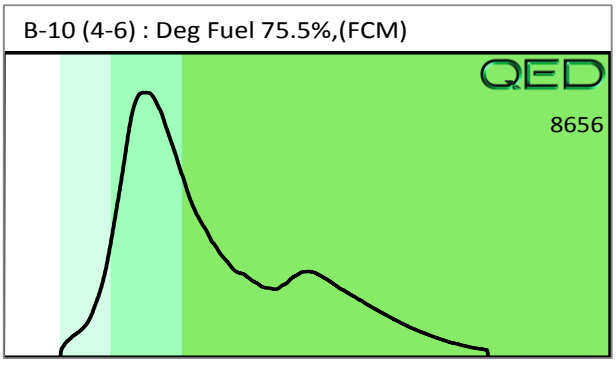
B-8 (8-10) : PHC not detected



B-9 (2-4) : Deg Fuel 74%,(FCM)



B-10 (4-6) : Deg Fuel 75.5%,(FCM)



QED REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS QROS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD RD.
SUITE 107
RALEIGH NC 27604

Contact: DAVID HAWKINS
COLLECTED BY DAVID HAWKINS
Project: #70187265

Samples taken Monday, July 9, 2018
Samples extracted Monday, July 9, 2018
Samples analysed Wednesday, July 11, 2018

Operator NICK HENDRIX

F03640

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	B-11 (1-3)	27.4	<0.68	<0.68	32.5	32.5	25	1.2	<0.014	0	98	1.9	Deg Fuel 90.6%,(FCM)
s	B-12 (2-4)	23.9	<0.6	<0.6	1.2	1.2	1.2	0.06	<0.012	0	96.3	3.4	V.Deg.PHC 89.4%,(FCM)
s	B-13 (4-6)	23.6	<0.59	<0.59	<0.05	<0.59	<0.12	<0.02	<0.012	0	0	0	PHC not detected,(OCR)
s	B-14 (6-8)	28.5	<0.71	<0.71	<0.06	<0.71	<0.14	<0.03	<0.014	0	0	0	PHC not detected,(OCR)
s	B-15 (2-4)	24.8	<0.62	<0.62	1.2	1.2	0.38	<0.02	<0.012	0	94.4	5.2	Deg Fuel 91.9%,(FCM),(OCR)
s	B-16 (3-5)	27.4	<0.68	<0.68	<0.05	<0.68	<0.14	<0.03	<0.014	0	0	0	PHC not detected,(OCR)
s	B-17 (2-4)	22.6	<0.57	<0.57	0.95	0.95	0.94	0.05	<0.011	0	89.9	9.2	V.Deg.PHC 91.7%,(FCM)
s	B-18 (8-10)	25.2	<0.63	<0.63	<0.05	<0.63	<0.13	<0.03	<0.013	0	0	0	PHC not detected,(OCR)
s	B-19 (2-4)	26.3	<0.66	<0.66	<0.05	<0.66	<0.13	<0.03	<0.013	0	0	0	PHC not detected,(OCR)
s	B-20 (4-6)	25.5	<0.64	<0.64	<0.05	<0.64	<0.13	<0.03	<0.013	0	0	0	PHC not detected,(OCR)

Initial Calibrator QC check OK Final FCM QC Check OK 105

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

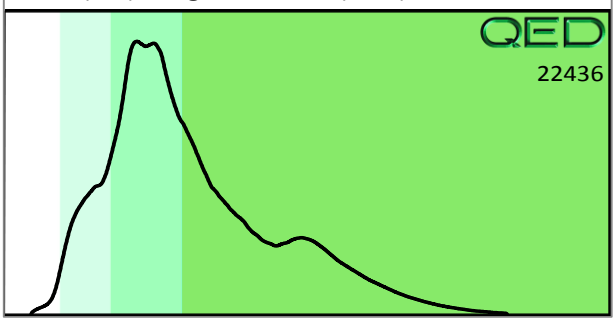
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

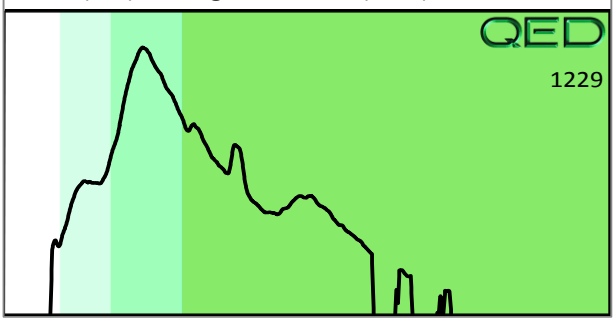
QED Hydrocarbon Fingerprints

Project: #70187265 ##################

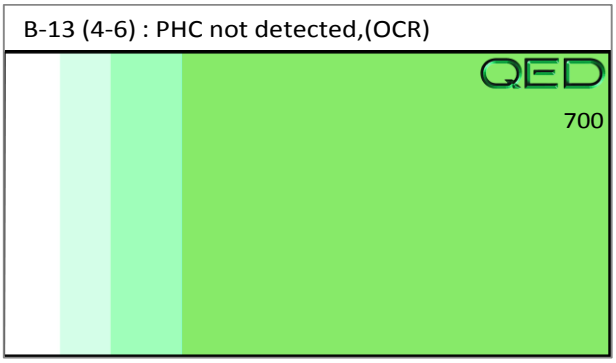
B-11 (1-3) : Deg Fuel 90.6%,(FCM)



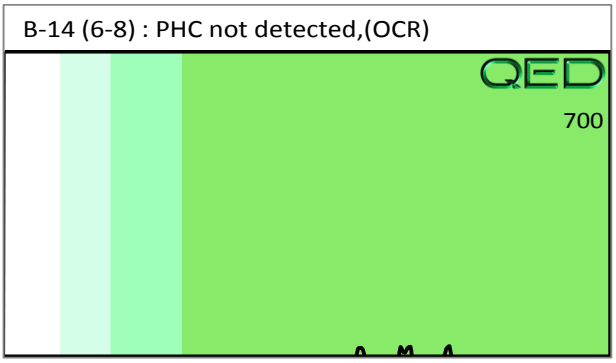
B-12 (2-4) : V.Deg.PHC 89.4%,(FCM)



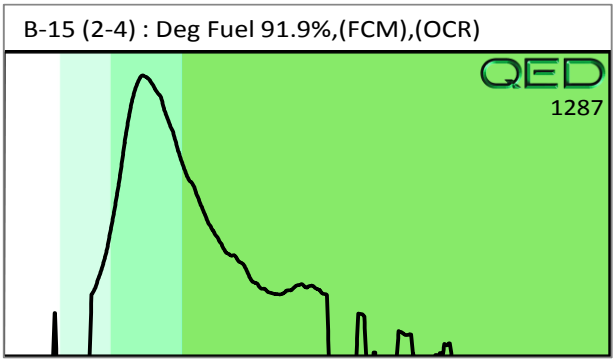
B-13 (4-6) : PHC not detected,(OCR)



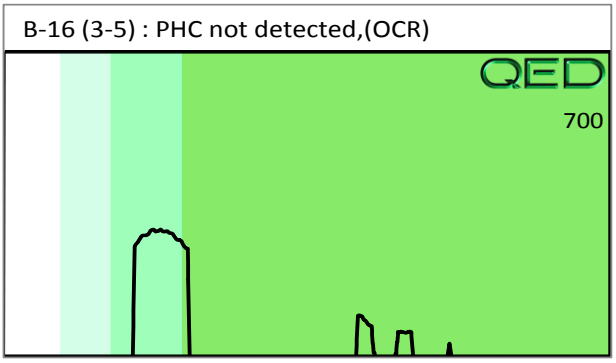
B-14 (6-8) : PHC not detected,(OCR)



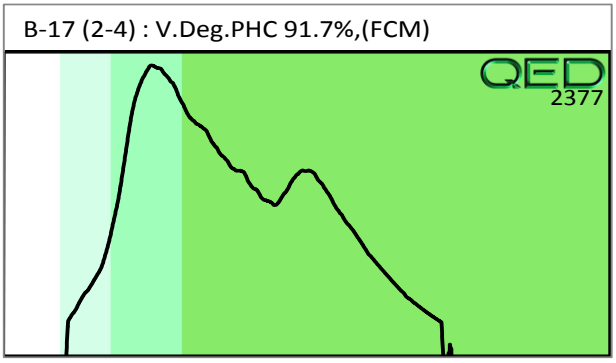
B-15 (2-4) : Deg Fuel 91.9%,(FCM),(OCR)



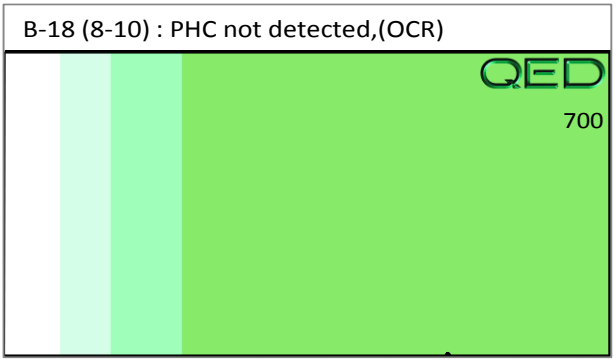
B-16 (3-5) : PHC not detected,(OCR)



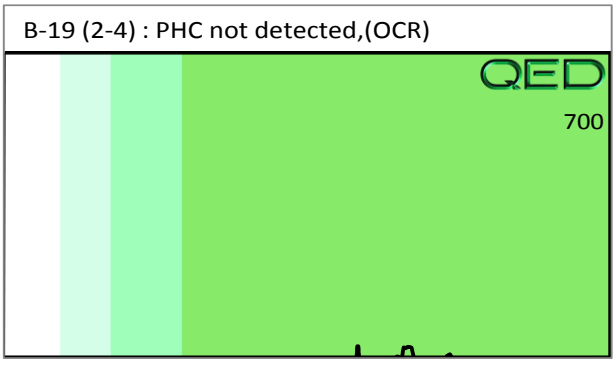
B-17 (2-4) : V.Deg.PHC 91.7%,(FCM)



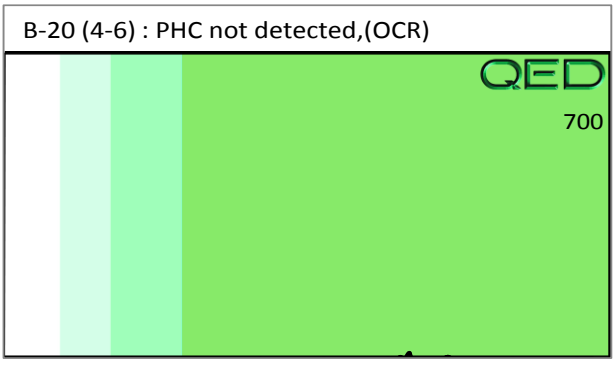
B-18 (8-10) : PHC not detected,(OCR)



B-19 (2-4) : PHC not detected,(OCR)



B-20 (4-6) : PHC not detected,(OCR)



QED REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS QROS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD RD.
SUITE 107
RALEIGH NC 27604

Contact: DAVID HAWKINS
COLLECTED BY DAVID HAWKINS
Project: #70187265

Samples taken Monday, July 9, 2018
Samples extracted Monday, July 9, 2018
Samples analysed Wednesday, July 11, 2018

Operator NICK HENDRIX

F03640

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	B-21 (0-2)	28.0	<0.7	<0.7	0.57	0.57	0.56	<0.03	<0.014	0	88.7	10.4	V.Deg.PHC 90.6%,(FCM)
s	B-22 (3-5)	24.1	<0.6	<0.6	<0.05	<0.6	<0.12	<0.02	<0.012	0	0	0	PHC not detected,(OCR)
s	B-23 (2-4)	25.0	<0.63	<0.63	<0.05	<0.63	<0.13	<0.03	<0.013	0	0	0	PHC not detected,(OCR)
s	B-24 (6-8)	25.7	<0.64	<0.64	<0.05	<0.64	<0.13	<0.03	<0.013	0	0	0	PHC not detected,(OCR)
s	B-25 (2-4)	16.1	<0.4	<0.4	<0.03	<0.4	<0.08	<0.02	<0.008	0	0	0	PHC not detected,(OCR)
s	B-26 (3-5)	29.2	<0.73	<0.73	<0.06	<0.73	<0.15	<0.03	<0.015	0	0	0	PHC not detected,(OCR)
s	B-27 (4-6)	27.4	<0.68	<0.68	<0.05	<0.68	<0.14	<0.03	<0.014	0	0	0	PHC not detected,(OCR)
s	B-28 (3-5)	24.8	<0.62	<0.62	<0.05	<0.62	<0.12	<0.02	<0.012	0	0	0	PHC not detected,(OCR)
s	B-29 (2-4)	13.6	<0.34	<0.34	<0.03	<0.34	<0.07	<0.01	<0.007	0	0	0	PHC not detected
s	B-30 (3-5)	16.1	<0.4	<0.4	<0.03	<0.4	<0.08	<0.02	<0.008	0	0	0	PHC not detected,(OCR)

Initial Calibrator QC check OK Final FCM QC Check OK 108

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

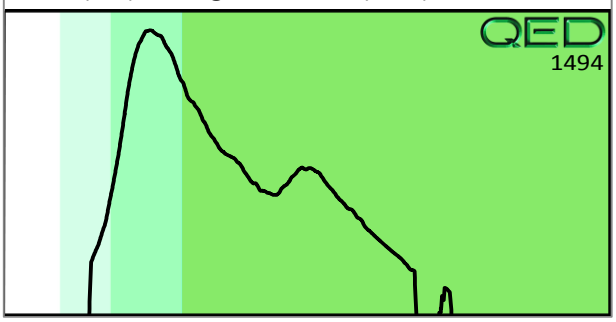
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

QED Hydrocarbon Fingerprints

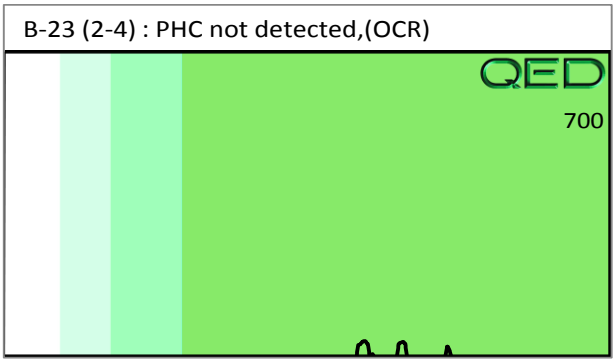
Project: #70187265 ##################

B-21 (0-2) : V.Deg.PHC 90.6%,(FCM)

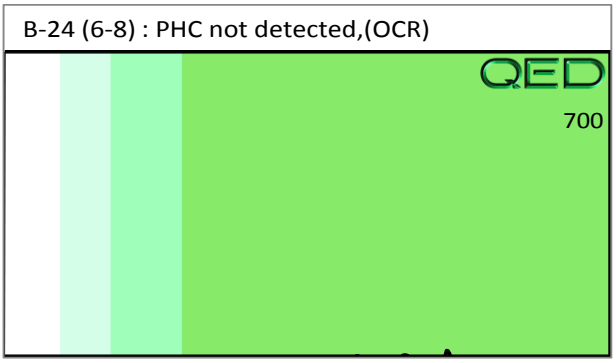


B-22 (3-5) : PHC not detected,(OCR)

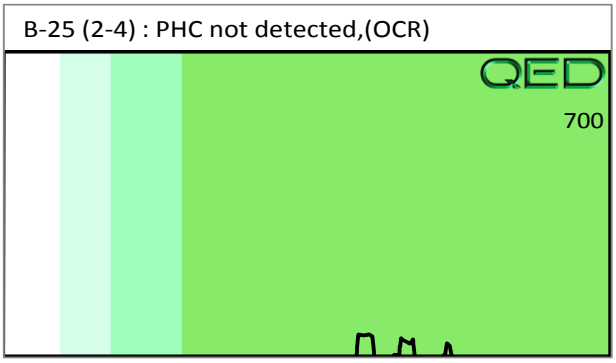
B-23 (2-4) : PHC not detected,(OCR)



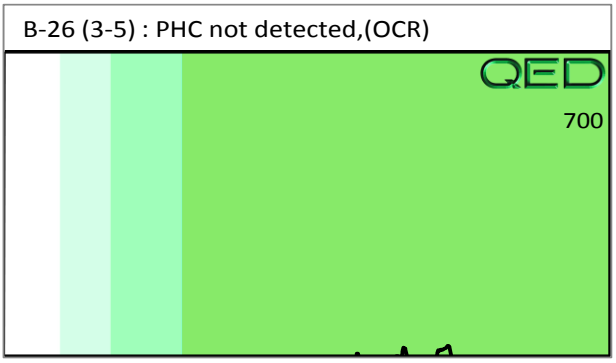
B-24 (6-8) : PHC not detected,(OCR)



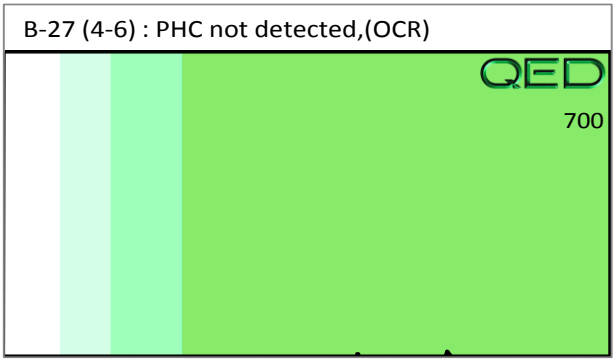
B-25 (2-4) : PHC not detected,(OCR)



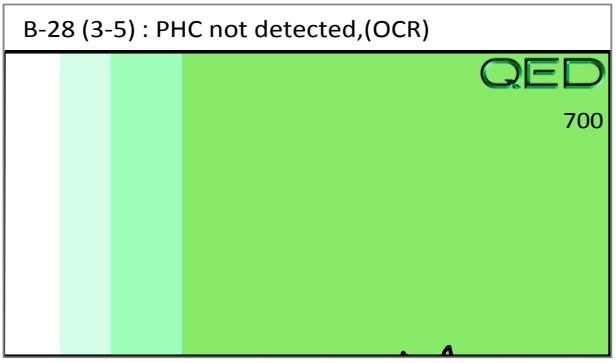
B-26 (3-5) : PHC not detected,(OCR)



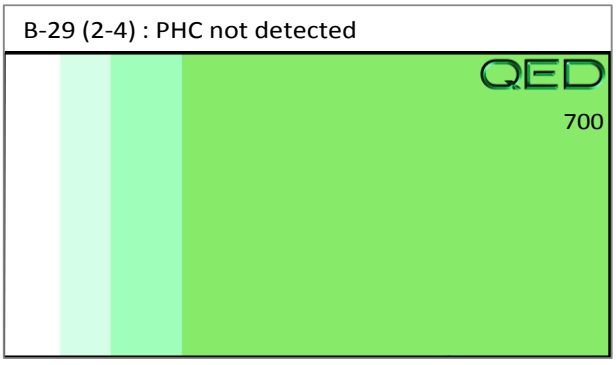
B-27 (4-6) : PHC not detected,(OCR)



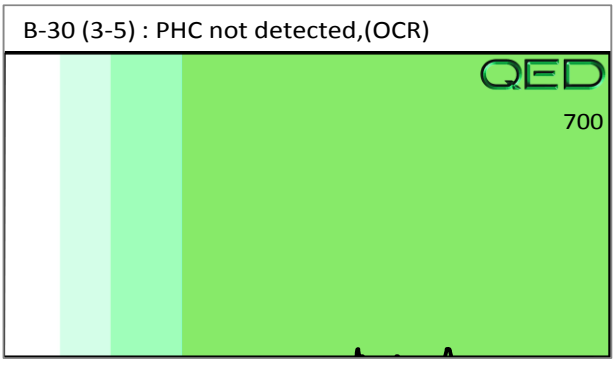
B-28 (3-5) : PHC not detected,(OCR)



B-29 (2-4) : PHC not detected



B-30 (3-5) : PHC not detected,(OCR)



QED

REDLAB™ RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD RD.
SUITE 107
RALEIGH, NC 27604

Contact: DAVID HAWKINS
COLLECTED BY DAVID HAWKINS
Project: #70187265

Samples taken Monday, July 9, 2018
Samples extracted Monday, July 9, 2018
Samples analysed Wednesday, July 11, 2018

Operator MAX MOYER

H0

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	B-8 (13-15)	10.2	<0.26	<0.26	0.49	0.49	0.33	<0.08	<0.01	0	70.9	29.1	Deg.Fuel 81.5%,(FCM),(P)

Initial Calibrator QC check OK

Final FCM QC Check OK 99

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.

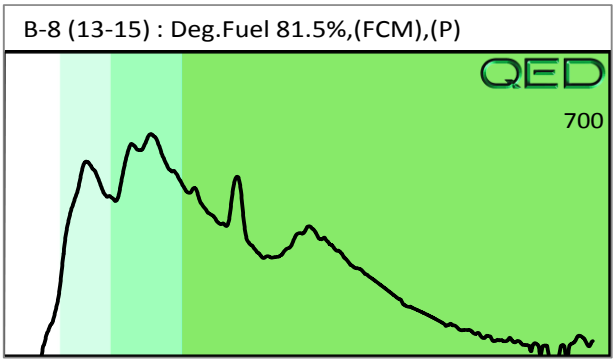
Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

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: #70187265 ##################



887

Client Name:	Terracon
Address:	2401 Brentwood Rd. Suite 107, Raleigh NC 27604
Contact:	David Hawkins
Project Ref.:	70187265
Email:	David.hawkins@terracon.com
Phone #:	540-905-2544
Collected by:	David Hawkins

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	Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
7/9/18, 920		X	S	B-1 (2-4)	X		55.5	43.7	11.8
7/9/18, 930		X	S	B-2 (4-6)	X		54.0	44.0	10.0
7-9-18, 940		X	S	B-3 (3-5)	X		52.3	43.4	8.2
7-9-18, 945		X	S	B-4 (2-4)	X		53.3	44.1	9.2
7-9-18, 1000		X	S	B-5 (3-5)	X		54.5	44.2	10.3
7-9-18, 1005		X	S	B-7 (8-10)	X		52.5	43.8	8.7
7-9-18, 1025		X	S	B-8 (8-10)	X		52.5	44.1	8.4
7-9-18, 1030		X	S	B-8 (13-15) HOLD	X		53.6	43.8	9.8
7-9-18, 1045		X	S	B-9 (2-4)	X		54.4	43.9	10.5
7-9-18, 1055		X	S	B-10 (4-6)	X		54.3	43.8	10.5
7-9-18, 1105		X	S	B-11 (1-3)	X		54.0	44.5	9.5
7-9-18, 1110		X	S	B-12 (2-4)	X		54.5	43.6	10.9
7-9-18, 1115		X	S	B-13 (4-6)	X		55.7	44.7	11.0
7-9-18, 1120		X	S	B-14 (6-8)	X		53.3	44.2	9.1
7-9-18, 1125		X	S	B-15 (2-4)	X		54.2	43.7	10.5
7-9-18, 1140		X	S	B-16 (3-5)	X		54.1	44.6	9.5
7-9-18, 1140		X	S	B-17 (2-4)	X		55.7	44.2	11.5
7-9-18, 1200		X	S	B-18 (8-10)	X		54.5	44.2	10.3
7-9-18, 1305		X	S	B-19 (2-4)	X		54.2	44.3	9.9
7-9-18, 1315		X	S	B-20 (4-6)	X		54.6	44.4	10.2

Comments: Place B-8 (13-15) on HOLD, will confirm if want to run.

Relinquished by	Date/Time	Accepted by	Date/Time
	7/10/18, 0900	DH 7/11/18 11:30	
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

ZW

B87

Client Name:	Terracon
Address:	2401 Brownwood Rd. Suite 107, Raleigh NC 27604
Contact:	David Hawkins
Project Ref.:	70187205
Email:	David.hawkins@terracon.com
Phone #:	540-905-2544
Collected by:	David Hawkins

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	Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
7-9-18 1320		X		B-21 (0-2)	X		53.4	44.1	9.3
7-9-18, 1330		X		B-22 (3-5)	X		54.8	44.0	10.8
7-9-18, 1335		X		B-23 (2-4)	X		54.7	44.3	10.4
7-9-18, 1340		X		B-24 (6-8)	X		54.1	44.0	10.1
7-9-18, 1350		X		B-25 (2-4)	X		52.5	43.8	8.7
7-9-18, 1355		X		B-26 (3-5)	X		53.2	44.3	8.9
7-9-18, 1400		X		B-27 (4-6)	X		53.1	43.6	9.5
7-9-18, 1405		X		B-28 (3-5)	X		54.8	44.3	10.5
7-9-18, 1415		X		B-29 (2-4)	X		54.7	44.4	10.3
7-9-18, 1420		X		B-30 (3-5)	X		53.3	44.6	8.7

Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
	7/10/18, 0900	NH 7/11/18 1:5	
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

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