



April 29, 2019

North Carolina Department of Transportation
Geotechnical Unit
Mail Service Center 1592
Raleigh, North Carolina 27699-1592

Attention: Mr. Craig Haden

email: cehaden@ncdot.gov

Reference: **Preliminary Site Assessment Report**
NCDOT Project I-5986B, WBS Element 47532.1.3
Parcel 216-Lucky's Storage Lot
Sadler Drive
Dunn, Harnett County, North Carolina
S&ME Project 4305-18-175A

Dear Mr. Haden:

S&ME, Inc. (S&ME) is submitting this Preliminary Site Assessment (PSA) Report to the North Carolina Department of Transportation (NCDOT). This report presents the background/project information, field activities, findings, conclusions, and recommendations. These services were performed in general accordance with S&ME Proposal No. 4305-18-175 CO-01 REV-01 dated January 2, 2019, and Contract Number 7000018853 dated April 12, 2018 between NCDOT and S&ME, Inc., authorized by NCDOT in its January 8, 2019 Notice to Proceed Letter.

◆ Background/Project Information

Based on NCDOT's November 2, 2018, Request for Technical and Cost Proposal, the PSA was conducted within the NCDOT right-of-way (ROW) and/or easement as indicated on the preliminary plan sheets provided by NCDOT at the following property:

NCDOT Parcel No.	Property Owner	Site Address
216	RSL, LLC	(Lucky's Storage Lot) Sadler Drive, Dunn, NC

The property is a vacant lot used for the storage of trailers, metal bleachers and chairs by the nearby Lucky's Truck and Trailer Sales facility. The property is not listed with registered petroleum underground storage tanks (USTs) (active or closed). The property is also not listed with North Carolina Department of Environmental Quality (NCDEQ) Incidents associated with petroleum releases from USTs or aboveground storage tanks.

The PSA included a geophysical survey and subsequent limited soil sampling (two soil borings up to 10 feet below ground surface (ft.-bgs.), within accessible areas of the proposed ROW/easement in preparation for construction activities. Groundwater was not encountered during the advancement of soil borings at the site. Therefore,



groundwater sampling was not performed. **Figure 1** shows the vicinity and site location, and **Figure 2** shows the site and boring locations. Soil sampling results are shown on **Figure 3**.

◆ Field Services

Prior to field activities, a site specific Health and Safety Plan was prepared as required by the Occupational Health and Safety Act (OSHA). Underground utilities were located and marked by the North Carolina One-Call Service. A private utility locator (Troxler Geologic, Inc.) was also used to locate and mark underground utilities.

◆ Geophysical Survey

On February 7, 2019, S&ME personnel performed a geophysical survey within accessible areas of the proposed ROW/easement at Parcel 216. S&ME used a combination of the Time Domain Electromagnetic (TDEM) and Ground Penetrating Radar (GPR) methods to explore for buried subsurface features at the site such as underground storage tanks (USTs) and other possible buried obstructions. Brief descriptions of these complementary geophysical techniques are presented in the following paragraphs.

Time Domain Electromagnetics (TDEM)

TDEM measures the electrical conductivity of subsurface materials and discriminates between moderately conductive earth materials and very conductive metallic targets within the shallow subsurface. The conductivity is determined by transmitting a time-varying magnetic pulse into the subsurface and measuring the amplitude and phase shift of the secondary magnetic field. The secondary magnetic field is created when the conductive materials become an inductor as the primary magnetic field is passed through them. TDEM data are acquired continuously at a walking pace typically along a series of parallel or perpendicular lines. The system generates audible and visual indications when metallic targets are encountered. These measurements can also be supported with a global positioning system (GPS) which is output directly into the TDEM data file.

We used a Geonics Limited EM-61 MK2 TDEM system in general accordance with ASTM D6820-02 (2007) "*Standard Guide for Use of the Time Domain Electromagnetic Method for Subsurface Investigation.*" Data was collected along lines spaced at approximately five feet using a Juniper® Systems Geode™ sub-meter GPS as positioning support. The presence of storage equipment, fences, and other surficial obstructions within the requested survey area however prevented TDEM data collection in several locations. The approximate TDEM data collection paths are presented in **Figure 4**. Golden Software's Surfer® program was used to grid and plot the data (**Figures 5 and 6**). The TDEM data has been presented as Plots A and B in order to provide both opaque and transparent views, respectively.

Ground Penetrating Radar (GPR)

GPR transmits electromagnetic waves into the subsurface from an antenna at a specific frequency and measures the time for wave reflections to be received by interfaces between materials with differing material properties (e.g. soil/metal, etc.). The intensity of the reflected GPR wave is a function of the contrast in the material properties (i.e. dielectric permittivity) at the interface, the conductivity of the material that the wave is traveling through, and the frequency of the signal.



We used a Geophysical Survey Systems, Inc. (GSSI) SIR[®] 3000 GPR system equipped with a 400 MHz antenna in general accordance with ASTM D6432-11 "*Standard Guide for Using the Surface Ground Penetrating Radar Method for Subsurface Investigation*" to further characterize anomalies/features identified during the TDEM survey.

A total of eight GPR profiles (Lines 1 through 8) were collected for documentation (**Figure 7**). The data was post-processed using the GSSI Radan[®] 7 GPR software program for additional analysis.

Geophysical Findings

Responses indicative of a potential UST were not identified in the geophysical data sets collected at the site. Anomalous features unrelated to known surficial targets were not identified in the geophysical data sets collected at the site. However, a culvert was identified under the paved entrance (**Figures 5 through 7**).

◆ Soil Sampling

On February 19, 2019, Troxler Geologic, Inc. (Troxler's) drill crew utilized a track mounted Geoprobe[®] rig to advance two soil borings (B-1 and B-2) and to collect soil samples within accessible areas of the proposed ROW/easement at Parcel 216. The approximate location of the soil borings are shown in **Figure 2**. A photographic log is included in **Appendix I**. Troxler's drill crew advanced the Geoprobe[®] borings to a depth of approximately 10 ft.-bgs. During the advancement of the soil borings, groundwater was not encountered. Soil samples were continuously collected in four-foot long disposable acetate-plastic sleeves that line the hollow stainless-steel sample probes. Soil recovered from the sleeves was classified on-site by S&ME personnel and screened with a Photoionization Detector (PID) at approximately two foot depth intervals to measure relative headspace concentrations of volatile organic compounds (VOCs).

VOC headspace readings were obtained from an aliquot of each soil sample that was placed in a re-sealable bag. Another portion of the sample was placed in a separate re-sealable bag and stored in an insulated container with ice for possible laboratory analyses. After waiting approximately 15 minutes to allow the sample to reach ambient temperature and headspace equilibrium, the PID probe was inserted into the bag to obtain a headspace reading. A summary of the PID readings and logs of the soil borings are included in **Appendix II**.

No petroleum odors, staining or elevated PID readings were noted within the collected soil samples. Therefore, two soil samples (two to four foot depth interval and eight to ten foot depth interval) were selected from each boring and provided to RED Lab, LLC (Red Lab) for on-site analysis. A total of four soil samples (two per boring) were analyzed by RED Lab for Total Petroleum Hydrocarbons (TPH)-Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) using ultra-violet fluorescence (UVF) spectroscopy with product (fuel) identification.

Upon completion of the soil sampling, the soil borings were backfilled with bentonite pellets and soil cuttings. Investigative derived wastes (IDW), such as additional soil cuttings generated during the soil boring advancement and decontamination water, were spread on the ground in accordance with the procedures specified by North Carolina Department of Environmental Quality (NCDEQ). Used gloves, re-sealable bags and acetate sleeves were bagged and disposed off-site.



Soil Analytical Results

Based upon analytical results of soil samples analyzed by RED Lab using UVP spectroscopy, TPH-GRO and TPH-DRO were not reported at concentrations exceeding the laboratory method reporting limits. A summary of the soil analytical results is presented in **Table 1** and shown on **Figure 3**. A copy of the laboratory analytical report provided by RED Lab is presented in **Appendix III**.

◆ Conclusion and Recommendations

Anomalous features unrelated to known surficial targets were not identified in the geophysical data sets collected at the site. However, a culvert was identified under the paved entrance. Responses indicative of a potential UST were not identified in the geophysical data sets collected at the site.

S&ME advanced two soil borings (B-1 and B-2) to a depth of approximately 10 ft.-bgs at the site. No petroleum odors, staining or elevated PID readings were noted within soil samples collected from the soil borings. Selected soil samples from the soil borings were analyzed onsite for TPH-GRO and TPH-DRO using UVF spectroscopy. TPH-GRO and TPH-DRO were not reported at concentrations exceeding the laboratory method reporting limits. During the soil boring advancement, groundwater was not encountered. Therefore, groundwater sampling was not performed.

Based on the findings of the geophysical survey and analytical results of soil samples, no recommendations are provided.

◆ Limitations

The results of this preliminary investigation are limited to the boring locations presented herein. The results of this Preliminary Site Assessment are not all inclusive and may not represent existing conditions across the entire property. These results only reflect the current conditions at the locations sampled on the date this Preliminary Site Assessment was performed. This report has been prepared in accordance with generally accepted environmental engineering and geophysical practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

The geophysical methods used for this survey have inherent limitations. Site metallic features (e.g., buildings, reinforced concrete, vehicles, etc.) and overhead transmission lines can produce a false electromagnetic response and may mask subsurface features. The depth of exploration of the GPR signal is highly site specific, and is greatly limited by signal attenuation (absorption) of the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities such as clay soils, and lowest in relatively low conductivity materials such as unsaturated sand. For this project location, the GPR data sets appear to have a maximum depth of penetration of approximately about five ft.-bgs.

Regardless of the thoroughness of a geophysical study, there is always a possibility that actual conditions may not match the interpretations. The results should be considered accurate only to the degree implied by the methods used and the method's limitations and data coverage. Accordingly, the possibility exists that not all features at a



project site will be located due to either subsurface soil conditions or the occurrence of features outside the lateral limits and below the depth of penetration of the methods used. As with most surface geophysical methods, resolution of the subsurface will also decrease with depth. As such, the size and/or contrast of features compared to the imaged subsurface media must be significant enough to produce the anticipated response. The location and/or determination (or the lack thereof) of potential buried features is based on our review of the provided information and of the geophysical survey. Under no circumstances does S&ME assume any responsibility for damages resulting from the presence of subsurface features that may exist but were not identified by our survey.

This Preliminary Site Assessment was performed solely for NCDOT regarding the above-referenced site and assessment area. This report is provided for the sole use of NCDOT. Use of this report by any other parties will be at such party's sole risk. S&ME disclaims liability for any such use or reliance by third parties. The observations presented in this report are indicative of conditions during the time of the assessment and of the specific areas referenced.

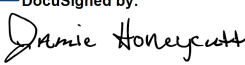
◆ Closing

S&ME appreciates the opportunity to provide these services to you. If you have any questions or comments regarding this report, please contact us at your convenience.

Sincerely,

S&ME, Inc.

Jamie T Honeycutt
 Environmental Professional
jhoneycutt@smeinc.com

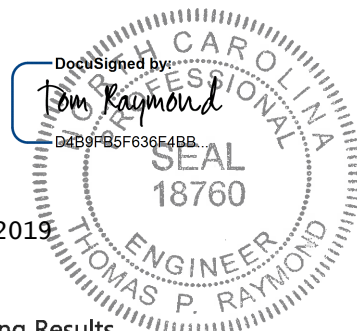
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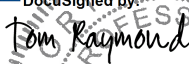
Michael W. Pfeifer
 Senior Project Manager
mpfeifer@smeinc.com

DocuSigned by:

 861E52DDEFAF4C7...

Thomas P. Raymond, P.E., P.M.P.
 Senior Consultant
traymond@smeinc.com



DocuSigned by:

 D4B9FB5F636F4BB...

5/6/2019

Attachments:

Table 1: Summary of Soil Sampling Results

Figure 1: Vicinity Map

Figure 2: Site Map

Figure 3: Soil Constituent Map

Figure 4: TDEM Path Location Plan

Figure 5: TDEM Data Plot A



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Dunn, Harnett County, North Carolina
S&ME Project No. 4305-18-175A

Figure 6: TDEM Data Plot B

Figure 7: Geophysical Anomaly Location Plan

Appendix I: Photographs

Appendix II: Boring Logs

Appendix III: Laboratory Analytical Reports and Chain of Custody

Tables



TABLE 1
SUMMARY OF SOIL SAMPLING RESULTS
NCDOT Project I-5986B
Parcel 216 - (Lucky's Storage Lot)
Sadler Drive
Dunn, Harnett County, North Carolina
S&ME Project No. 4305-18-175A

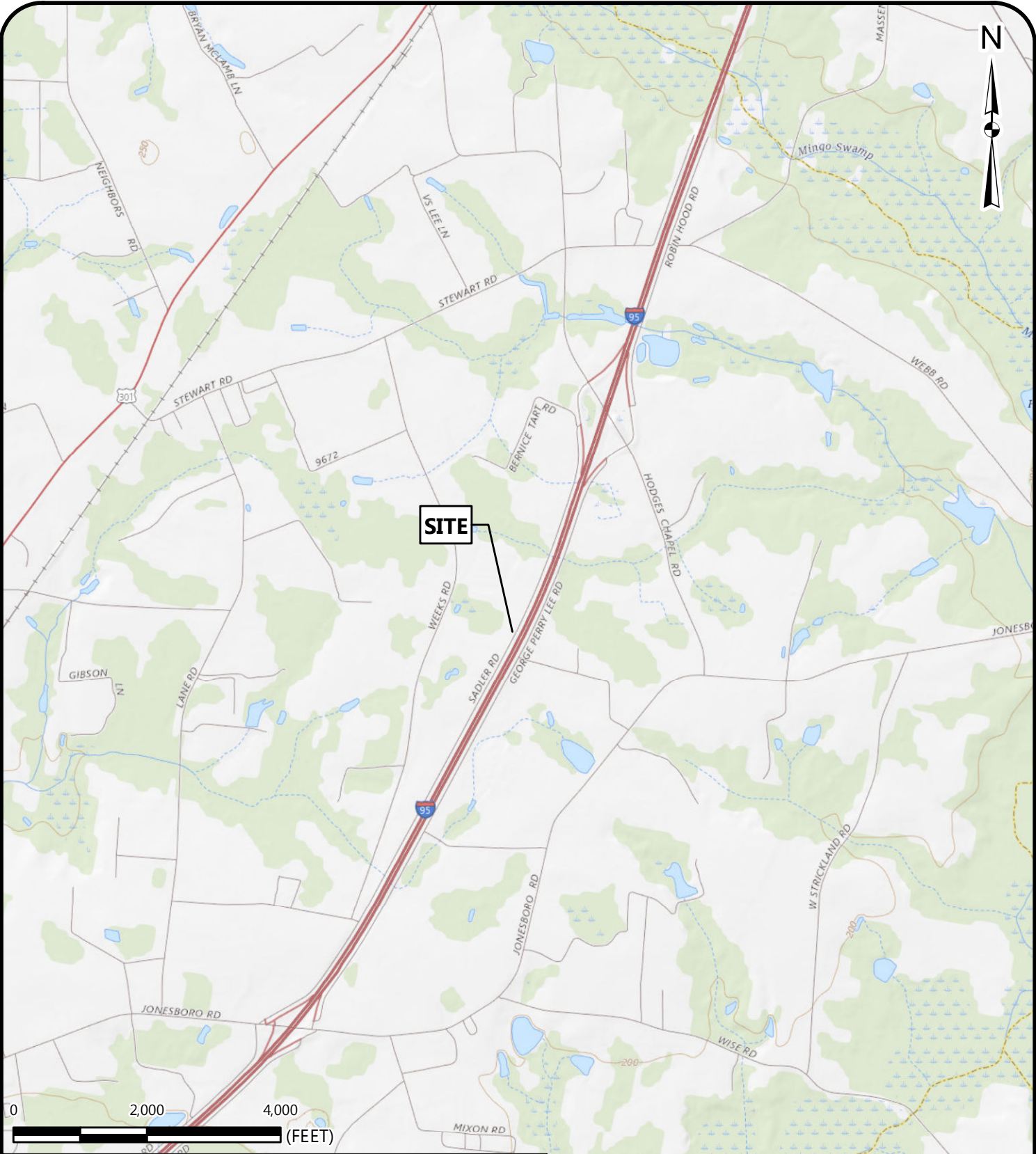
Analytical Method→			Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) by Ultraviolet Fluorescence (UVF) Spectrometry	
Sample ID	Date	Contaminant of Concern→	TPH-GRO	TPH-DRO
		Sample Depth (ft.-bgs)		
B-1	2/19/2019	2 to 4	<0.58	<0.23
		8 to 10	<0.44	<0.17
B-2	2/19/2019	2 to 4	<0.66	<0.27
		8 to 10	<0.6	<0.24
North Carolina TPH Action Levels			50	100

Notes:

1. UVF analysis performed by RED Lab, LLC
2. Concentrations are reported in milligrams per kilogram (mg/Kg).
3. ft.-bgs:- feet below ground surface.
4. Concentrations exceeding the laboratory's reporting limits are shown in **BOLD** fields.
5. Concentrations exceeding the North Carolina TPH Action Levels are shown in Shaded and **BOLD** fields.

Figures

Drawing Path: T:\Projects\2018\ENVV\4305-18-175A_NCDOT\GIS\Parcel 216\VICINITY 216.mxd plotted by aberntz 03-21-2019



SITE

REFERENCE:
 GIS BASE LAYERS WERE OBTAINED FROM THE USGS NATIONAL TOPO MAP VIEWER. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



VICINITY MAP

NCDOT I-5986B
 PARCEL NO. 216 (LUCKY'S STORAGE LOT)
 SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

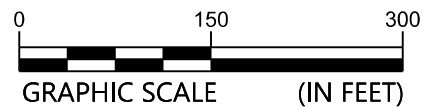
SCALE:
 1" = 2,000'
 DATE:
 3-21-19
 PROJECT NUMBER
 4305-18-175A

FIGURE NO.
1



LEGEND

- Geoenvironmental Boring:
- Underground Storage Tank (UST):
- Map Source: NCDOT Project I-5986B
- Image Source: NC ONEMAP, Dated 2016
- Known Soil Contamination:
- Possible Soil Contamination:
- Existing Contamination Known - Water:

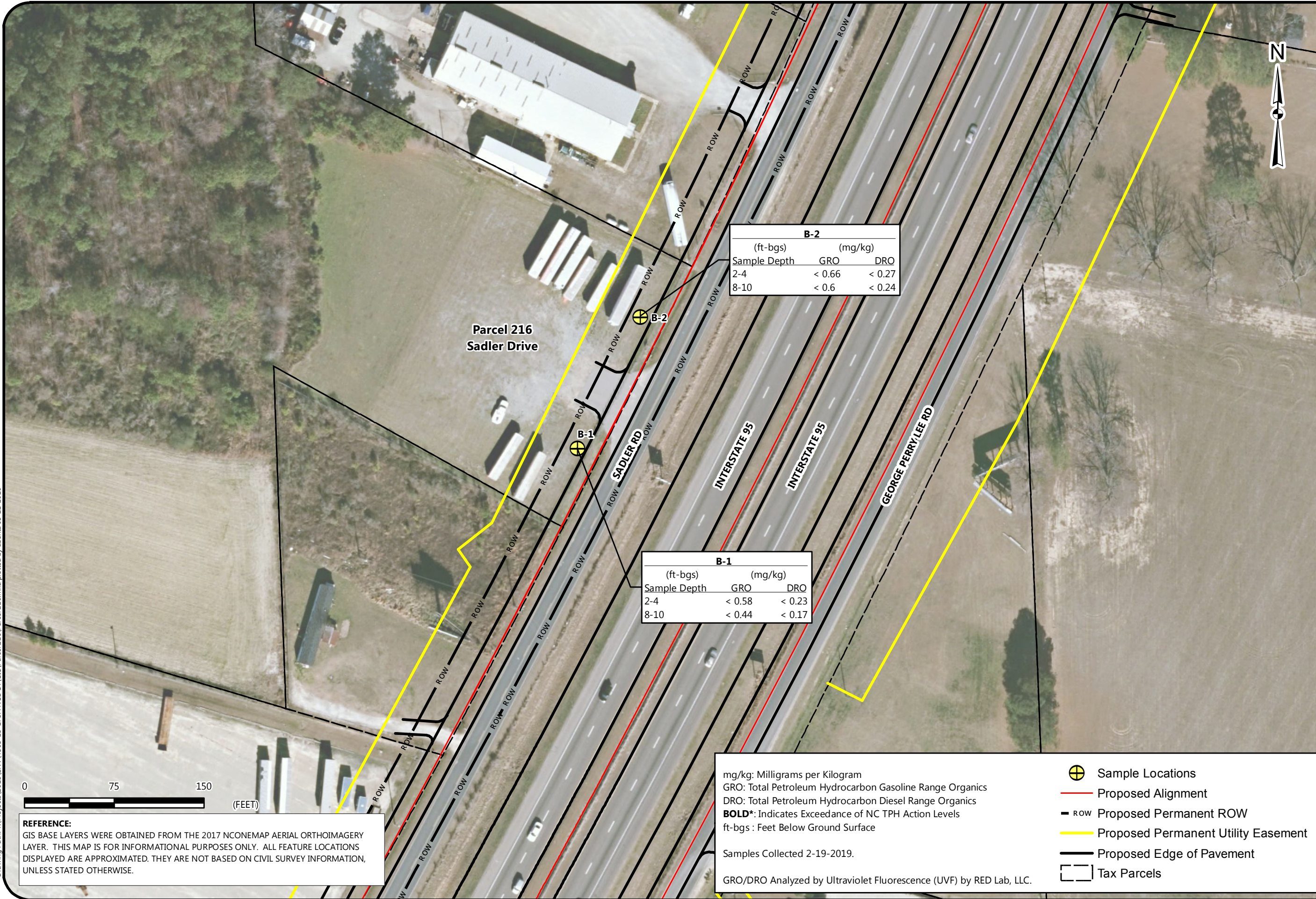


SITE MAP

NCDOT Project: I-5986B
 PARCEL 216 - (LUCKY'S STORAGE LOT)
 Sadler Drive, Dunn, Harnett County, North Carolina

SCALE:	FIGURE NO.
1" = 150'	2
DATE:	
MARCH 2019	
PROJECT NUMBER	
4305-18-175A	

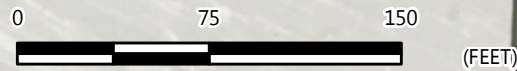
Drawing Path: T:\Projects\2018\ENVV4305-18-175A NCDOT\GIS\Parcel 216.mxd plotted by abentz 03-21-2019



Parcel 216
Sadler Drive

B-2		
(ft-bgs)	(mg/kg)	
Sample Depth	GRO	DRO
2-4	< 0.66	< 0.27
8-10	< 0.6	< 0.24

B-1		
(ft-bgs)	(mg/kg)	
Sample Depth	GRO	DRO
2-4	< 0.58	< 0.23
8-10	< 0.44	< 0.17



REFERENCE:
GIS BASE LAYERS WERE OBTAINED FROM THE 2017 NCONEMAP AERIAL ORTHOIMAGERY LAYER. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

mg/kg: Milligrams per Kilogram
GRO: Total Petroleum Hydrocarbon Gasoline Range Organics
DRO: Total Petroleum Hydrocarbon Diesel Range Organics
BOLD*: Indicates Exceedance of NC TPH Action Levels
ft-bgs : Feet Below Ground Surface

Samples Collected 2-19-2019.

GRO/DRO Analyzed by Ultraviolet Fluorescence (UVF) by RED Lab, LLC.

- Sample Locations
- Proposed Alignment
- Proposed Permanent ROW
- Proposed Permanent Utility Easement
- Proposed Edge of Pavement
- Tax Parcels

SOIL CONSTITUENT MAP

NCDOT I-5986B
PARCEL NO. 216 (LUCKY'S STORAGE LOT)
SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

SCALE:
1" = 75'

DATE:
3-21-19

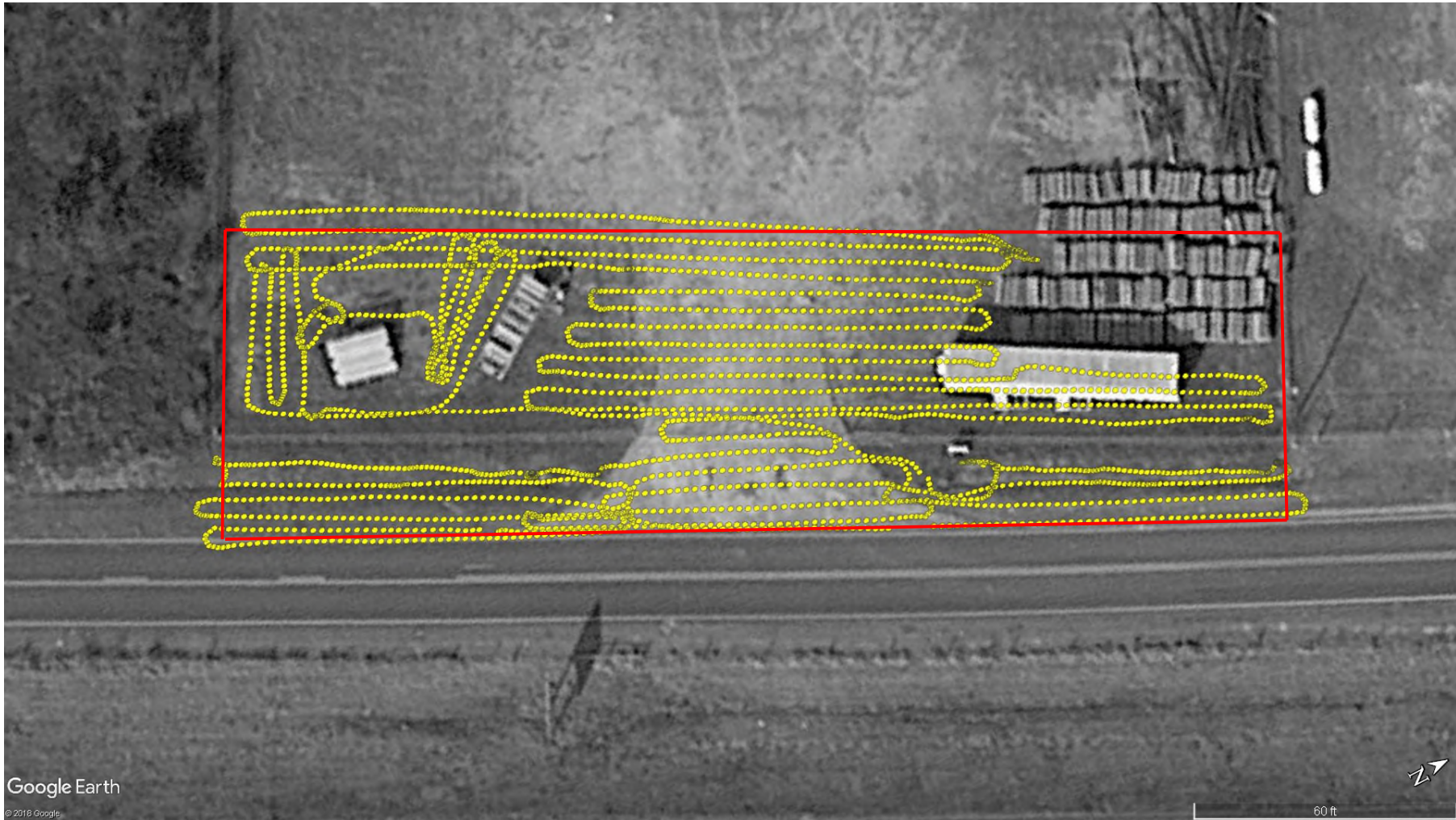
PROJECT NUMBER
4305-18-175

FIGURE NO.

3



REFERENCE:
 (GOOGLE EARTH PRO) AERIAL PHOTOGRAPH
 (DATED, MARCH, 04 2018)



Google Earth
 © 2018 Google

LEGEND

..... Approximate TDEM Path



Approximate Requested Survey Area

TDEM PATH LOCATION PLAN

NC DOT PROJECT: I-5986B
 PARCEL 216 - (LUCKY'S STORAGE LOT)
 SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

SCALE:
 AS SHOWN

DATE:
 3/22/2019

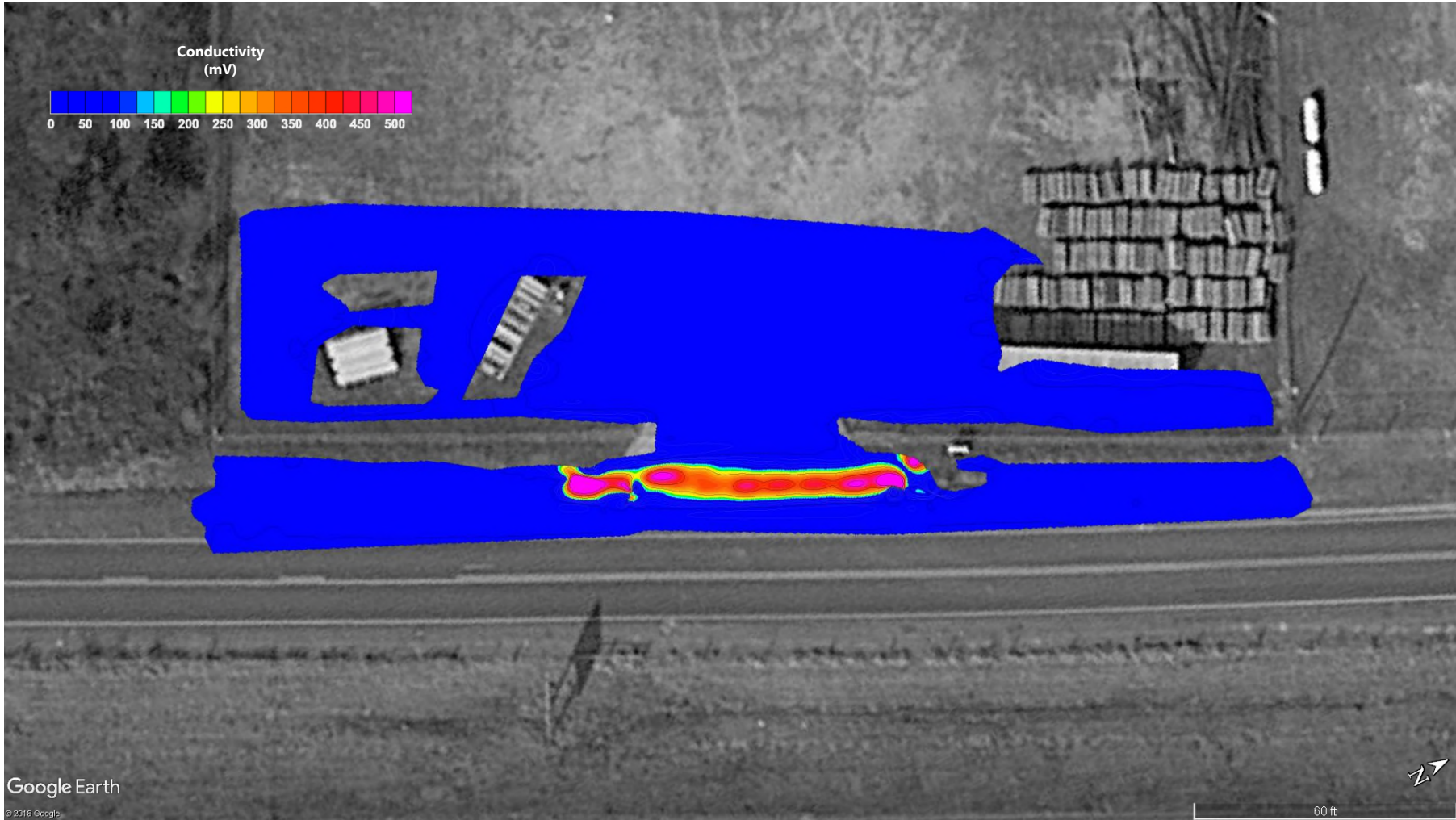
PROJECT NUMBER
 4305-18-175A

FIGURE NO.

4



REFERENCE:
 (GOOGLE EARTH PRO) AERIAL PHOTOGRAPH
 (DATED, MARCH, 04 2018)



Google Earth
 © 2018 Google

TDEM DATA PLOT A

NC DOT PROJECT: I-5986B
 PARCEL 216 - (LUCKY'S STORAGE LOT)
 SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

SCALE:
 AS SHOWN

DATE:
 3/22/2019

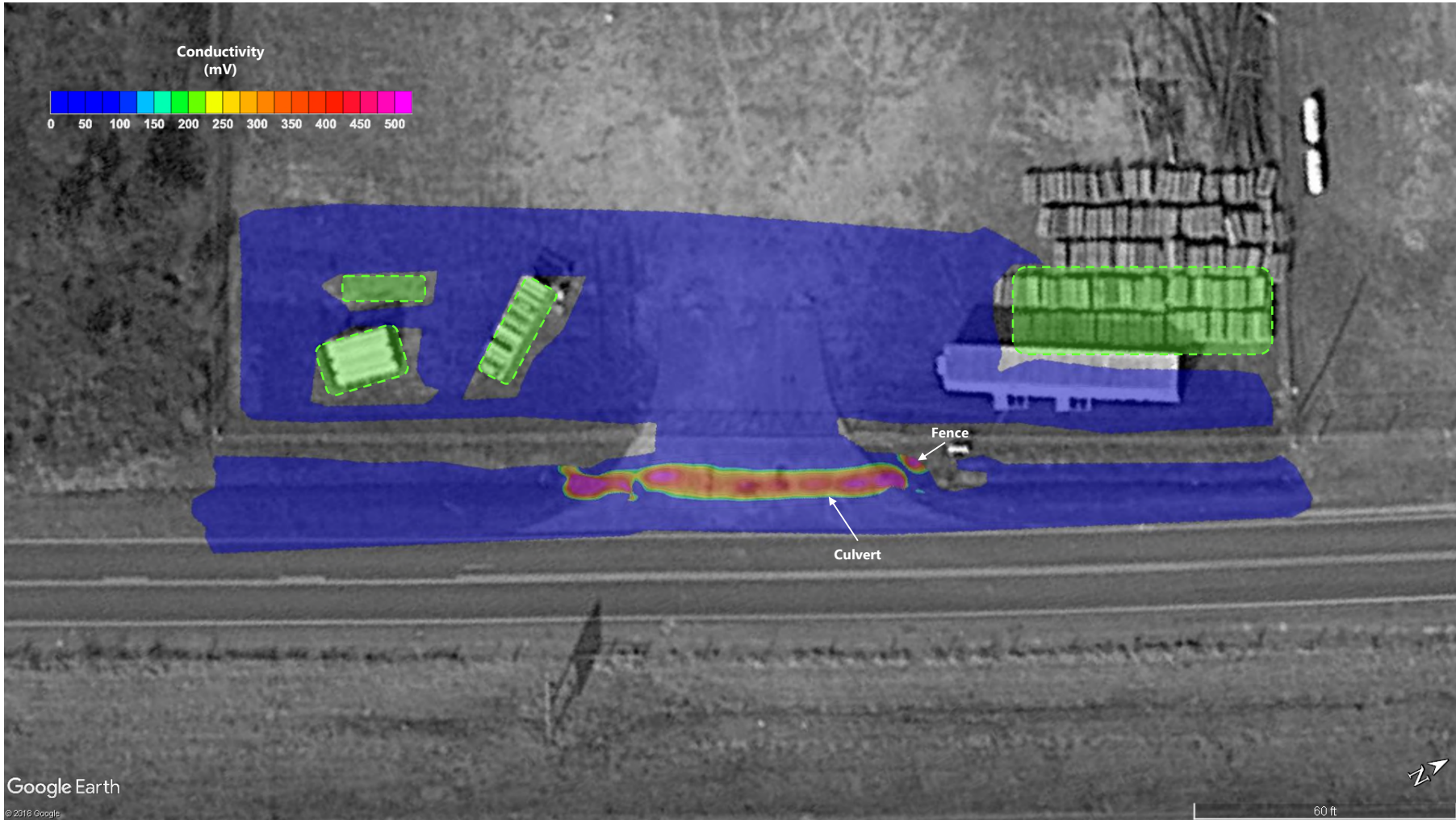
PROJECT NUMBER
 4305-18-175A

FIGURE NO.

5



REFERENCE:
 (GOOGLE EARTH PRO) AERIAL PHOTOGRAPH
 (DATED, MARCH, 04 2018)



LEGEND



Approximate Location of Stored Equipment

TDEM DATA PLOT B

NC DOT PROJECT: I-5986B
 PARCEL 216 - (LUCKY'S STORAGE LOT)
 SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

SCALE:
 AS SHOWN

DATE:
 3/22/2019

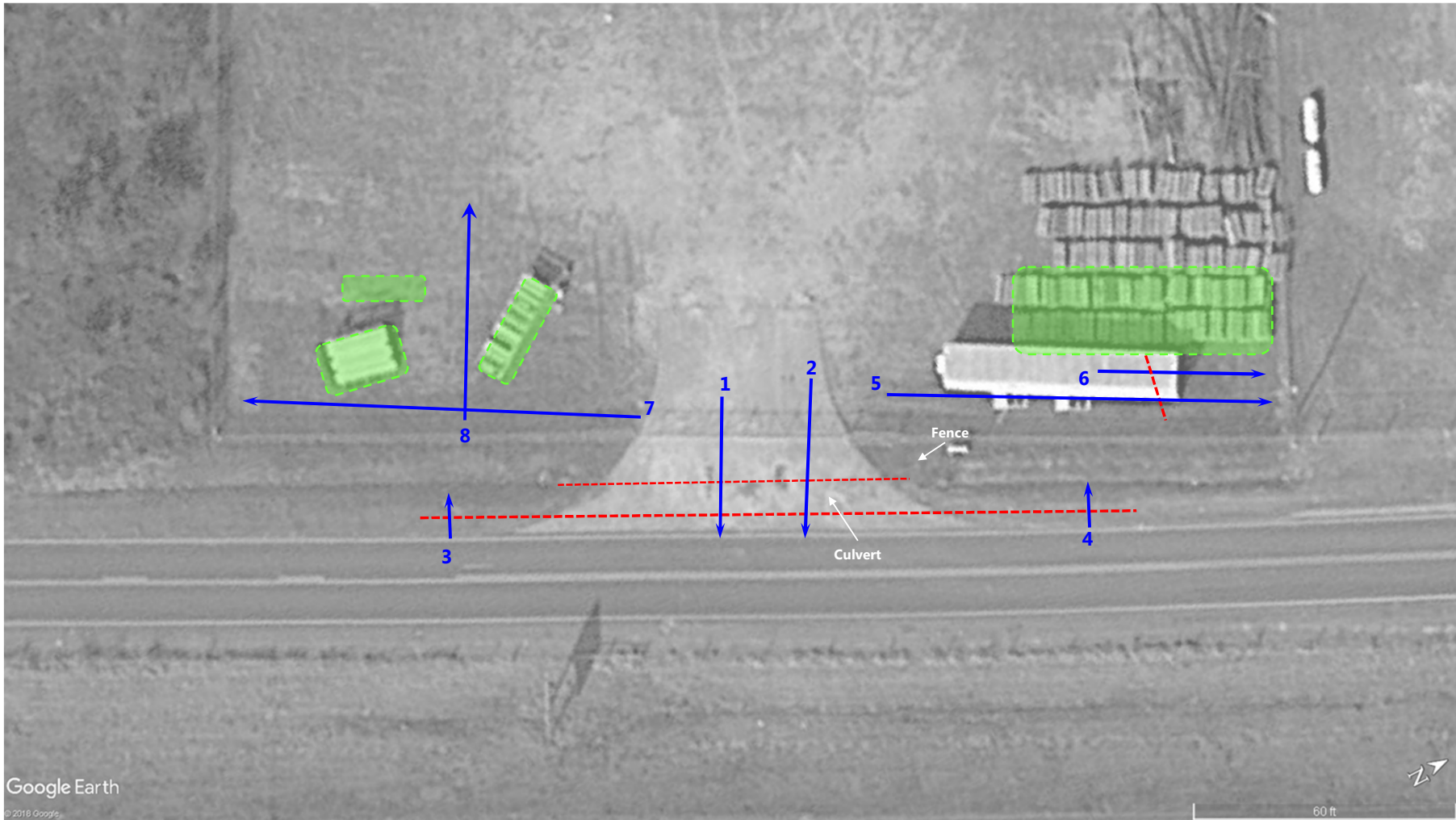
PROJECT NUMBER
 4305-18-175A

FIGURE NO.

6



REFERENCE:
 (GOOGLE EARTH PRO) AERIAL PHOTOGRAPH
 (DATED, MARCH, 04 2018)



Google Earth
 © 2018 Google

LEGEND

- ← Approximate Location of GPR Profile
- Approximate Location of Stored Equipment
- Approximate Location of Possible Utility

GEOPHYSICAL ANOMALY LOCATION PLAN

NC DOT PROJECT: I-59868B
 PARCEL 216 - (LUCKY'S STORAGE LOT)
 SADLER DRIVE, DUNN, HARNETT COUNTY, NORTH CAROLINA

SCALE:
 AS SHOWN

DATE:
 3/22/2019

PROJECT NUMBER
 4305-18-175A

FIGURE NO.

7

Appendix I – Photographs



Preliminary Site Assessment Report
NCDOT Project I-5986B, WBS Element 47532.1.3
Parcel 216- Lucky's Storage Lot
Dunn, Harnett County, North Carolina
S&ME Project No. 4305-18-175A

		Date: 2/19/2019 Photographer: JTH				
1	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Location / Orientation</td> <td>Front view of site looking north-northeast.</td> </tr> <tr> <td>Remarks</td> <td>Note soil boring B-1</td> </tr> </table>	Location / Orientation	Front view of site looking north-northeast.	Remarks	Note soil boring B-1	
Location / Orientation	Front view of site looking north-northeast.					
Remarks	Note soil boring B-1					

Appendix II – Boring Logs

Appendix III – Laboratory Analytical Reports and Chain of Custody



Hydrocarbon Analysis Results

Client: S&ME
 Address:
 Contact: JAMIE HONEYCUTT
 Project: 4305-18-175A ; PARCEL 216

Samples taken Tuesday, February 19, 2019
 Samples extracted Tuesday, February 19, 2019
 Samples analysed Tuesday, February 19, 2019

Operator MAX MOYER

											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	
Soil	B-1 (2-4')	23.2	<0.58	<0.58	<0.23	<0.58	<0.01	<0.01	<0.007	0	0	0	PHC ND,(FCM)
Soil	B-1 (8-10')	17.4	<0.44	<0.44	<0.17	<0.44	<0.009	<0.009	<0.005	0	0	0	PHC ND,(FCM)
Soil	B-2 (2-4')	26.5	<0.66	<0.66	<0.27	<0.66	<0.01	<0.01	<0.008	0	0	0	PHC ND,(FCM)
Soil	B-2 (8-10')	24.1	<0.6	<0.6	<0.24	<0.6	<0.01	<0.01	<0.007	0	0	0	PHC ND,(FCM)
Initial Calibrator QC check			OK			Final FCM QC Check			OK			97.9%	

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

