

# Preliminary Site Assessment

I-95 Interchange Improvement

Parcel 287 PSH 42 - HQ Corporation of Benson, Inc.

903 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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Geotechnical



Materials

# Preliminary Site Assessment

I-95 Interchange Improvement

Parcel 287 PSH 42 - HQ Corporation of Benson, Inc.

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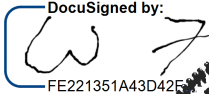
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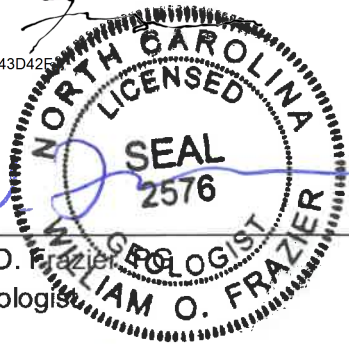
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11/26/2019

William O. Frazier  
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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Appendix B: Soil Boring Logs

Appendix C: Laboratory Analytical Reports and Chain-of-Custody Forms



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 287 PSH 42 - HQ Corporation of Benson, Inc.  
903 East Main Street, Benson, Johnston County, North Carolina  
TIP No. I-5986B  
WBS Element: 47532.1.3

Dear Mr. Pilipchuk:

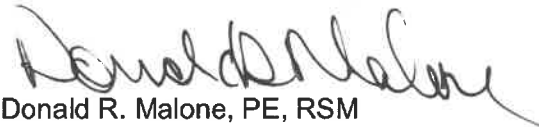
Terracon Consultants, Inc. (Terracon) is pleased to submit a Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P70197584) dated October 1, 2019. This report includes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

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Environmental



Facilities



Geotechnical



Materials

# PRELIMINARY SITE ASSESSMENT

## I-95 INTERCHANGE IMPROVEMENT

TIP NO. I-5986B

WBS ELEMENT: 47532.1.3

PARCEL 287 PSH 42 - HQ CORPORATION OF BENSON, INC.

903 EAST MAIN STREET, BENSON, NORTH CAROLINA

## 1.0 INTRODUCTION

### 1.1 Site Description

<b>Site Name</b>	Parcel 287 PSH 42 – HQ Corporation of Benson, Inc.
<b>Site Location/Address</b>	903 East Main Street, Benson, North Carolina 27532 (Johnston County Tax PIN: 153920-72-8228)
<b>General Site Description</b>	The site consists of an approximate 1.56-acre parcel developed with a one-story commercial building currently operating as convenience store and Citgo 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 903 East Main Street in Benson, Johnston County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site was operating as a Citgo gas station (Facility ID: 00-0-0000033186; UST No. FA-2961). According to the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management UST Section Registered Tank Database, the facility currently operates two 8,000-gallon gasoline USTs, one 4,000-gallon gasoline UST, and one 10,000-gallon gasoline UST that were reportedly installed in 1990.

Available NCDEQ regulatory records indicate that a site check was conducted in 2005 after the automatic tank gauging system and a subsequent tank tightness test for the 10,000-gallon UST indicated a possible release (CEC, 2005). In addition, visible staining on the broken asphalt and concrete ground surface near the diesel dispenser was observed during a compliance evaluation. The site check assessment consisted of two soil borings, from which four soil samples were collected and analyzed for total petroleum hydrocarbons (TPH) and/or Massachusetts Department of Environmental Protection (MADEP) volatile petroleum hydrocarbons (VPH) and

## **Preliminary Site Assessment – I-5986B**

Parcel 287 PSH 42 – HQ Corporation of Benson, Inc.

903 East Main Street, Benson, NC

November 21, 2019 ■ Terracon Project No. 70197584



extractable petroleum hydrocarbons (VPH). TPH Diesel Range Organics (DRO) exceeding the NCDEQ Action Level of 10 parts per million (ppm; note: the NCDEQ Action Level for TPH-DRO has since been raised to 100 ppm) was identified in one of the samples; however, the VPH and EPH concentrations for this sample did not exceed the soil-to-groundwater maximum soil contaminant concentrations (MSCCs). Incident No. 29189 was opened for the release. Groundwater was not encountered during the site check. Based on the results of the site check sampling, NCDEQ issued a No Further Action (NFA) letter to the facility on June 6, 2005.

### **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 were present beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM31-SH metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-4000 unit.

The geophysical investigation did not identify possible or probable metallic UST within the proposed ROW area. 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 (903-SB-01 through 903-SB-05) along the western 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



## Preliminary Site Assessment – I-5986B

Parcel 287 PSH 42 – HQ Corporation of Benson, Inc.  
903 East Main Street, Benson, NC  
November 21, 2019 ■ Terracon Project No. 70197584



collected in order to corroborate laboratory data and assist in selection of sample intervals for laboratory analysis. PID readings from the borings did not exceed the instrument detection limit of 0.1 part per million (ppm). 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 3 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 soil cuttings and 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- to coarse-grained sand to a depth of approximately 2.5 feet bls on average, underlain predominantly by clayey sand to approximately 10 feet bls. Wet to saturated soils were observed at depths below approximately 8 feet bls in the majority of 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<sub>5</sub>-C<sub>10</sub>) (TPH-GRO);
- TPH-diesel range organics (C<sub>10</sub>-C<sub>35</sub>) (TPH-DRO);
- Total petroleum hydrocarbons (C<sub>5</sub>-C<sub>35</sub>) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>);
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Please refer to **Appendix 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 903-SB-01 through 903-SB-05:

- BTEX was not detected above laboratory reporting limits within the soil samples collected;
- TPH-GRO was reported within each sample except for 903-SB-04 at concentrations ranging from 0.97 to 8.3 milligrams per kilogram (mg/kg);
- TPH-DRO was reported within each sample except for 903-SB-04 at concentrations ranging from 0.27 to 5.7 mg/kg;
- TPH was reported within each sample except for 903-SB-04 at concentrations ranging from 3.4 to 11.8 mg/kg;
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>) was reported within each sample except for 903-SB-04 at concentrations ranging from 0.2 to 3.6 mg/kg;
- 16 EPA PAHs was not detected above laboratory reporting limits within the samples collected;
- BaP was not detected above laboratory reporting limits within the samples collected.

The concentrations of TPH-GRO and TPH-DRO detected do not exceed NCDEQ Action Levels (50 mg/kg and 100 mg/kg, respectively).

**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 did not identify possible or probable metallic USTs within the proposed NCDOT ROW.

## **Preliminary Site Assessment – I-5986B**

Parcel 287 PSH 42 – HQ Corporation of Benson, Inc.

903 East Main Street, Benson, NC

November 21, 2019 ■ Terracon Project No. 70197584



- Laboratory analysis reported concentrations of BTEX, TPH-GRO, TPH-DRO, TPH, Total Aromatics, and 16 EPA PAHs in multiple soil borings at the site; however, the concentrations of TPH-GRO and TPH-DRO detected do not exceed NCDEQ Action Levels.
- 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**

CEC, 2005. Site Check Report, Citgo #95 (formerly) Short Stop #28, 903 East Main Street, Benson, NC. Cary Environmental Consultants. Inc. May 27, 2005.

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# 287 PSH 42 - HQ Corporation of Benson, Inc.**  
**903 East Main Street, Benson, Johnston County, North Carolina**  
**Terracon Project No. 70197584**

Boring Depth (feet bls)	903-SB-01	903-SB-02	903-SB-03	903-SB-04	903-SB-05
(0 - 2)	<0.1	<0.1	<0.1	<0.1	<0.1
(2 - 4)	<0.1	<0.1	<0.1	<0.1	<0.1
(4 - 6)	<0.1	<0.1	<0.1	<0.1	<0.1
(6 - 8)	<0.1	<0.1	<0.1	<0.1	<0.1
(8 - 10)	<0.1	<0.1	<0.1	<0.1	<0.1

**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# 287 PSH 42 - HQ Corporation of Benson, Inc.**  
**903 East Main Street, Benson, Johnston County, North Carolina**  
**Terracon Project No. 70197584**

Sample ID:	903-SB-01	903-SB-02	903-SB-03	903-SB-04	903-SB-05	NCDEQ Action Level	MSCC Industrial / Commercial
Sample Depth (ft bls):	9	7	7	7	3		
BTEX (C6 - C9)	<0.27	<0.57	<0.55	<0.55	<0.56	NE	NE
GRO (C5 - C10)	<b>1.7</b>	<b>8.3</b>	<b>0.97</b>	<0.55	<b>1.7</b>	50	NE
DRO (C10 - C35)	<b>0.27</b>	<b>3.5</b>	<b>2.4</b>	<0.55	<b>5.7</b>	100	NE
TPH (C5 - C35)	<b>1.97</b>	<b>11.8</b>	<b>3.4</b>	<0.55	<b>7.4</b>	NE	NE
Total Aromatics (C10-C35)	<b>0.2</b>	<b>1.7</b>	<b>1.4</b>	<0.11	<b>3.6</b>	NE	NE
16 EPA PAHs	<0.09	<0.18	<0.17	<0.18	<0.18	NE	NE
BaP	<0.011	<0.023	<0.022	<0.022	<0.022	NE	<b>0.78</b>

**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.

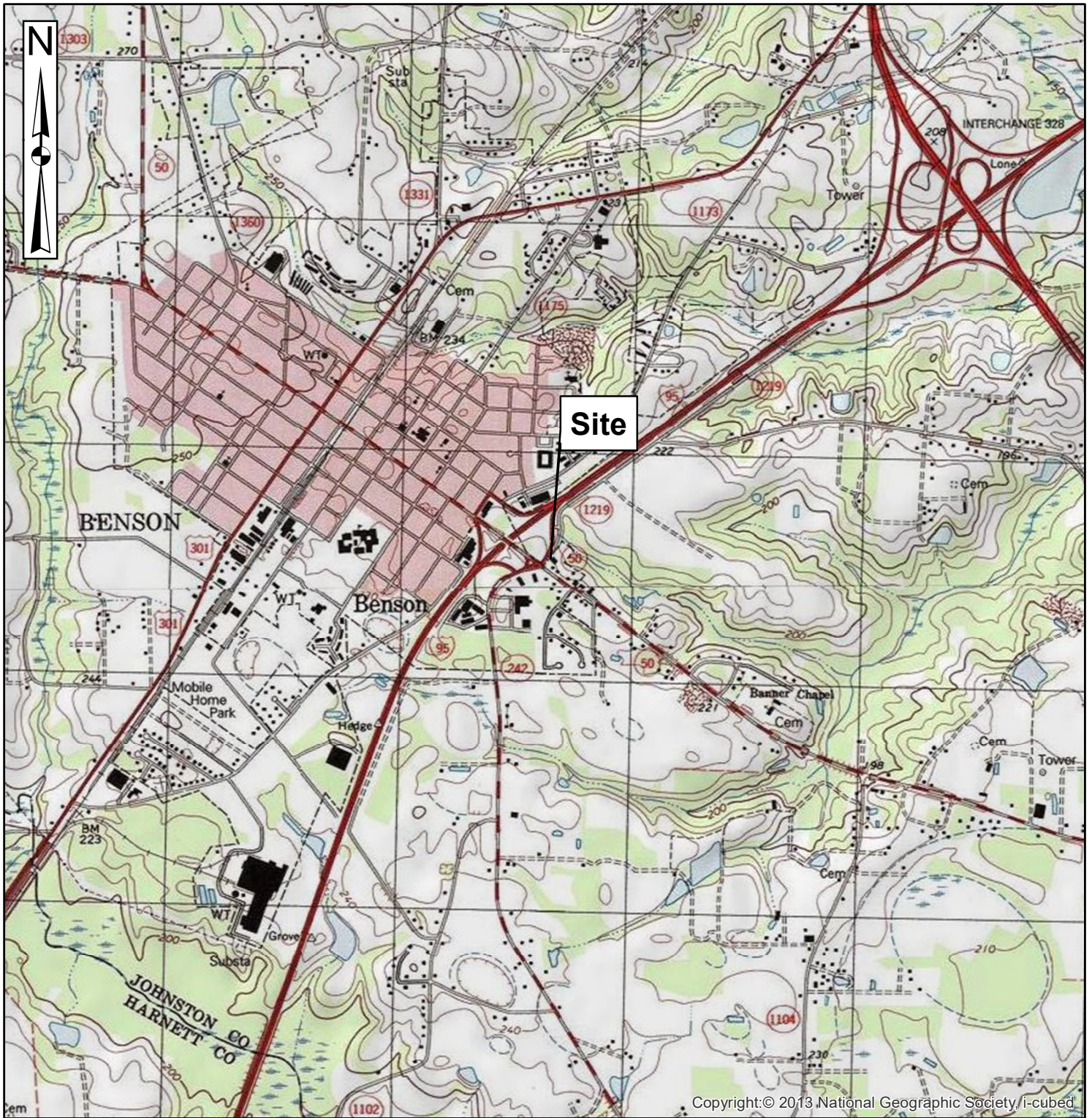
Detections shaded in gray exceed the North Carolina Department of Environmental Quality (NCDEQ) Action Level.

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

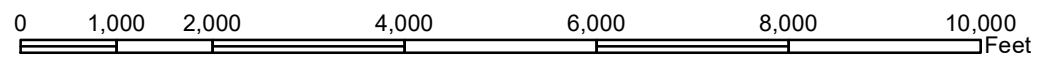
Bold: Constituent concentration reported above the method detection limit.

## **FIGURES**





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

1 inch = 2,000 feet

PM:	WOF
Drawn By:	WOF
Checked By:	MTJ
Approved By:	MTJ

Project No.	70197584
Scale:	1:24,000
Filename:	Exhibit 1 - Topo_903
Date:	Nov. 2019

**Terracon**

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

<b>Topographic Vicinity Map</b>
Preliminary Site Assessment HQ Corporation of Benson, Inc. 903 East Main Street Benson, North Carolina

EXHIBIT NO.
<b>1</b>

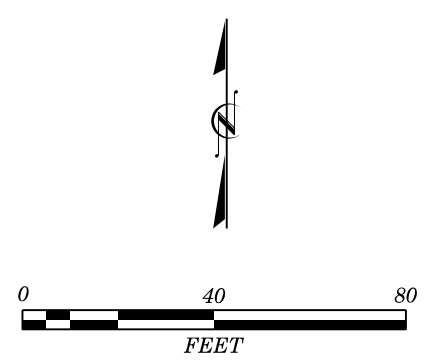


SITE DIAGRAM WITH BORING LOCATIONS

PARCEL 287  
HQ CORPORATION OF BENSON, INC.  
903 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
- ⊕ BORING LOCATION



**SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA**

PARCEL 287  
**HQ CORPORATION OF BENSON, INC.**  
 903 EAST MAIN STREET  
 BENSON, JOHNSTON COUNTY, NC

**LEGEND**

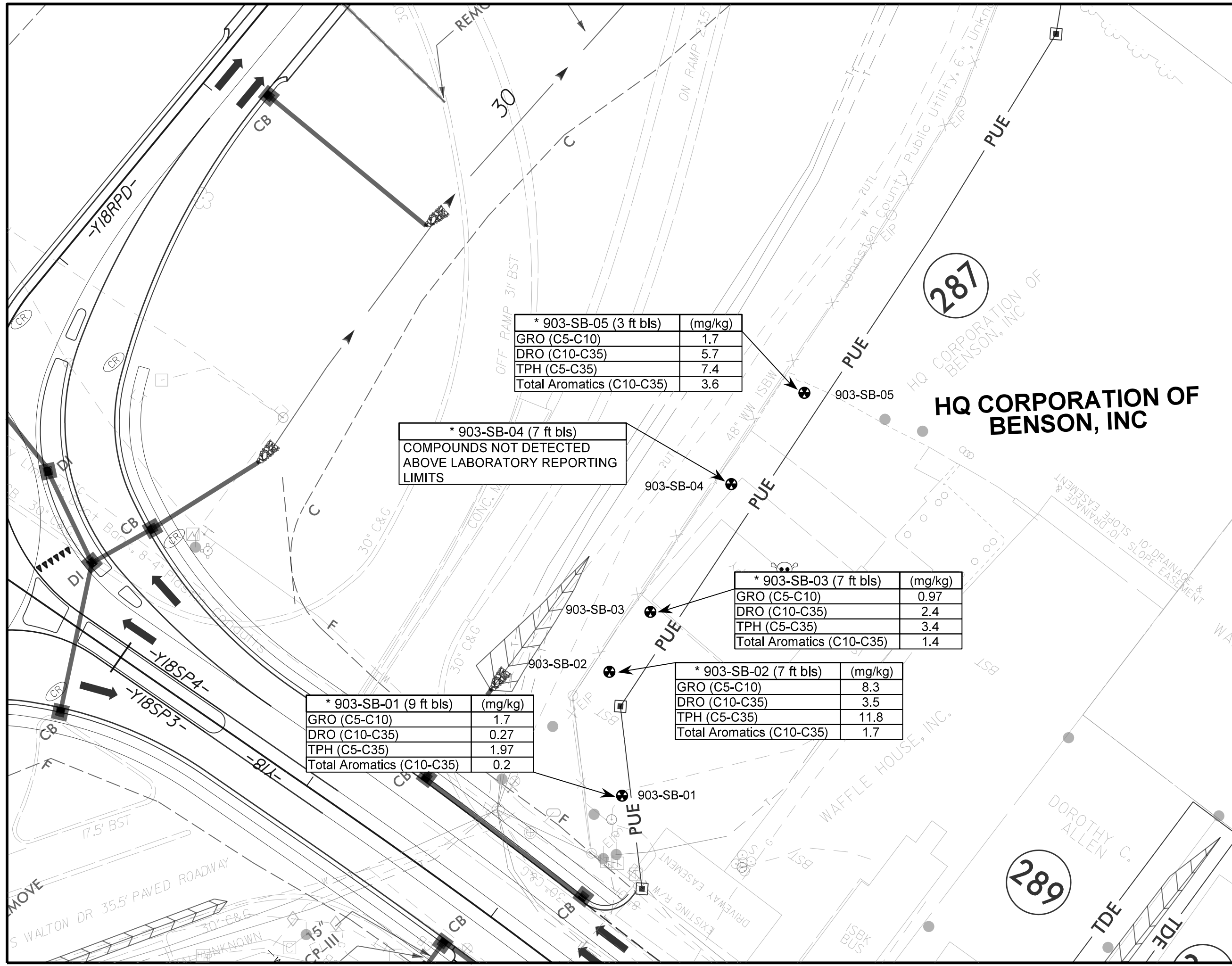
- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- - - EXISTING EDGE OF PAVEMENT
- E- NEW TEMPORARY CONSTRUCTION EASEMENT
- ☠ KNOWN CONTAMINATION SITE
- ⊕ BORING LOCATION

**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



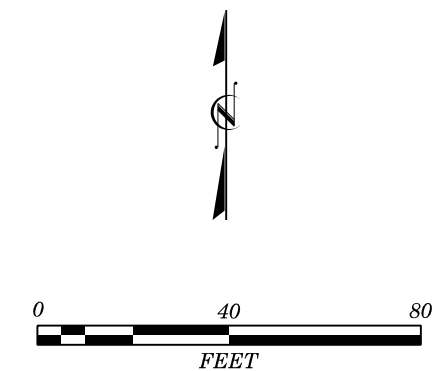
* 903-SB-05 (3 ft bls)	(mg/kg)
GRO (C5-C10)	1.7
DRO (C10-C35)	5.7
TPH (C5-C35)	7.4
Total Aromatics (C10-C35)	3.6

\* 903-SB-04 (7 ft bls)  
 COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

* 903-SB-03 (7 ft bls)	(mg/kg)
GRO (C5-C10)	0.97
DRO (C10-C35)	2.4
TPH (C5-C35)	3.4
Total Aromatics (C10-C35)	1.4

* 903-SB-02 (7 ft bls)	(mg/kg)
GRO (C5-C10)	8.3
DRO (C10-C35)	3.5
TPH (C5-C35)	11.8
Total Aromatics (C10-C35)	1.7

* 903-SB-01 (9 ft bls)	(mg/kg)
GRO (C5-C10)	1.7
DRO (C10-C35)	0.27
TPH (C5-C35)	1.97
Total Aromatics (C10-C35)	0.2



**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  
HQ Corporation of Benson, Inc.  
903 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 HQ Corporation of Benson, Inc. site, located at 903 East Main Street in Benson, North Carolina. The project consisted of the exploration of an approximately 14,400 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).



## Report for GeoEnvironmental Phase II Site Investigations

NCDOT Project I-5986B – HQ Corporation of Benson, Inc. ■ Benson, NC

November 8, 2019 ■ Terracon Project No. 70197584



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. Due to multiple above ground obstructions, data was collected utilizing a free-scan method with data collected with a sub-meter GPS device. 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 interference from multiple buried utilities and above-ground structures, anomalies consistent with USTs could not be isolated from the EM data. In general, soil conductivity measurements between -50 to 50 mS/m and magnetic susceptibility measurements between -5 to 5 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 8-feet below the existing grade, however, the actual depth is not produced from the data collected. Upon review of the GPR data, anomalies consistent with USTs were not identified. 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.



**Report for GeoEnvironmental Phase II Site Investigations**

NCDOT Project I-5986B – HQ Corporation of Benson, Inc. ■ Benson, NC

November 8, 2019 ■ Terracon Project No. 70197584



**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.**

A blue ink signature of Joshua A. Lopez, consisting of a series of fluid, overlapping loops and lines.

Joshua A. Lopez  
Geophysicist

A blue ink signature of James D. Hoskins, III, P.E., featuring a large, prominent circular loop at the beginning, followed by several smaller loops and a long horizontal stroke at the end.

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

Attachments: Appendix A – Geophysical Exploration Results

**SITE LOCATION**

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

**SITE LOCATION DIAGRAM**

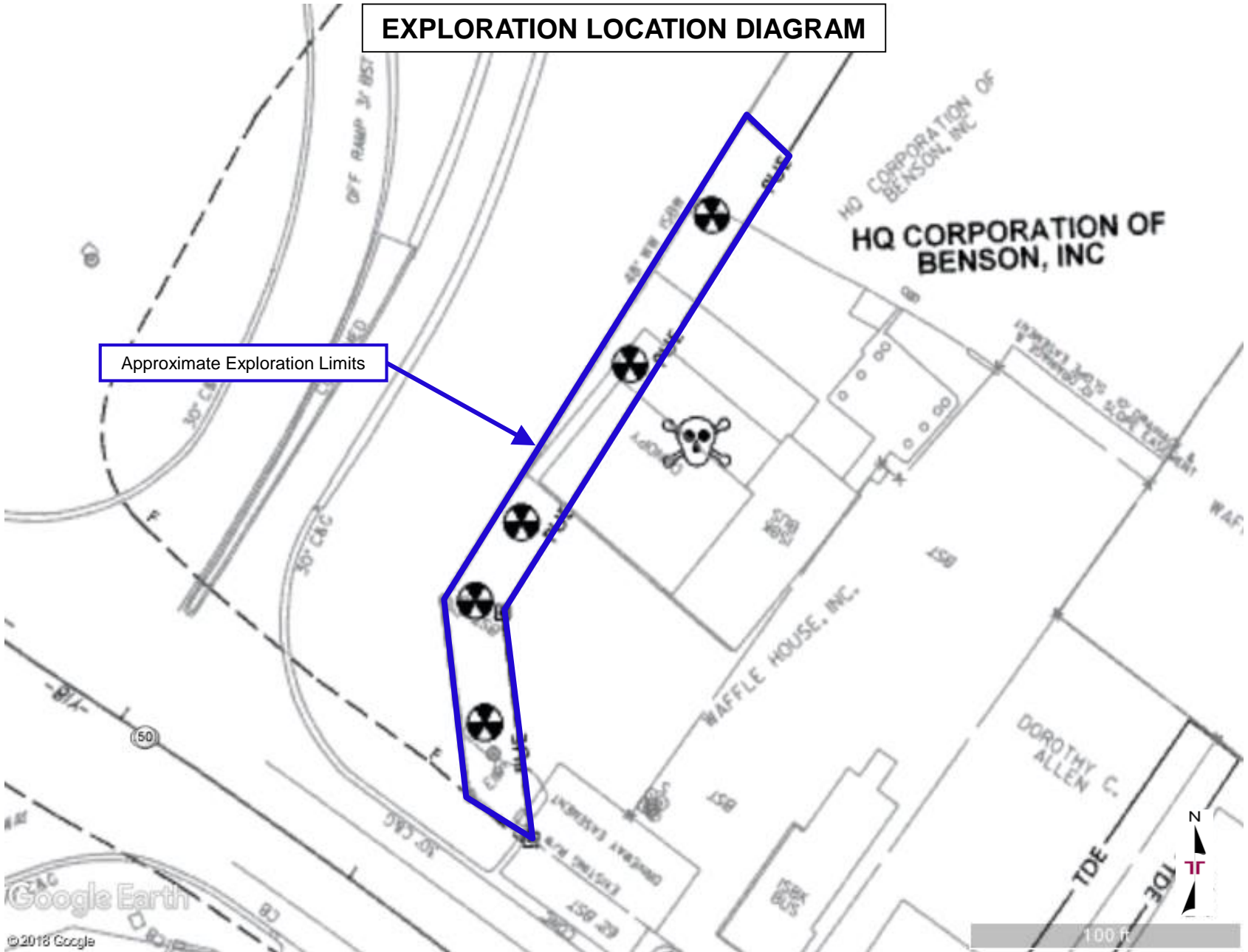




**EXPLORATION LOCATION**

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

**EXPLORATION LOCATION DIAGRAM**

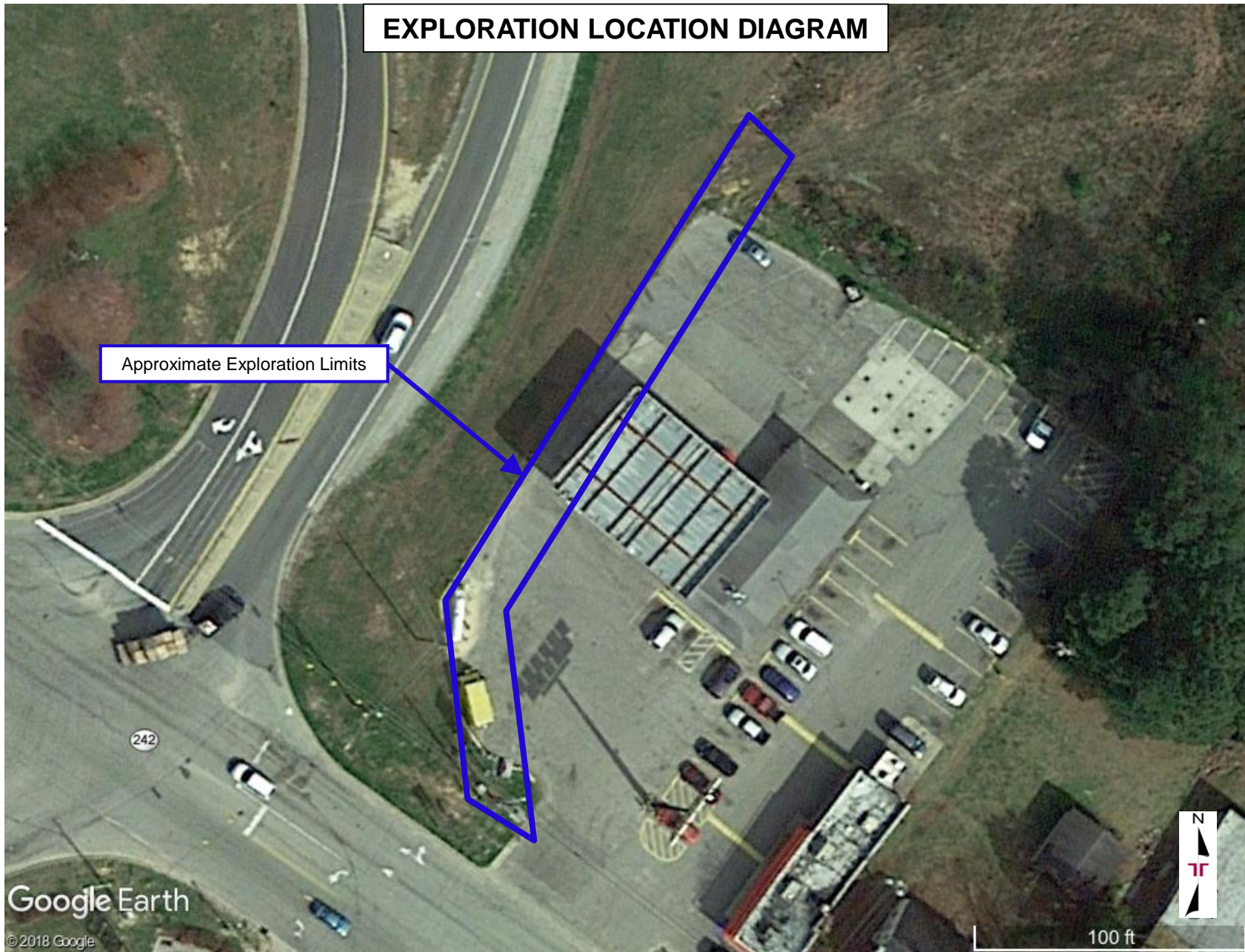


Approximate Exploration Limits

**EXPLORATION LOCATION**

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

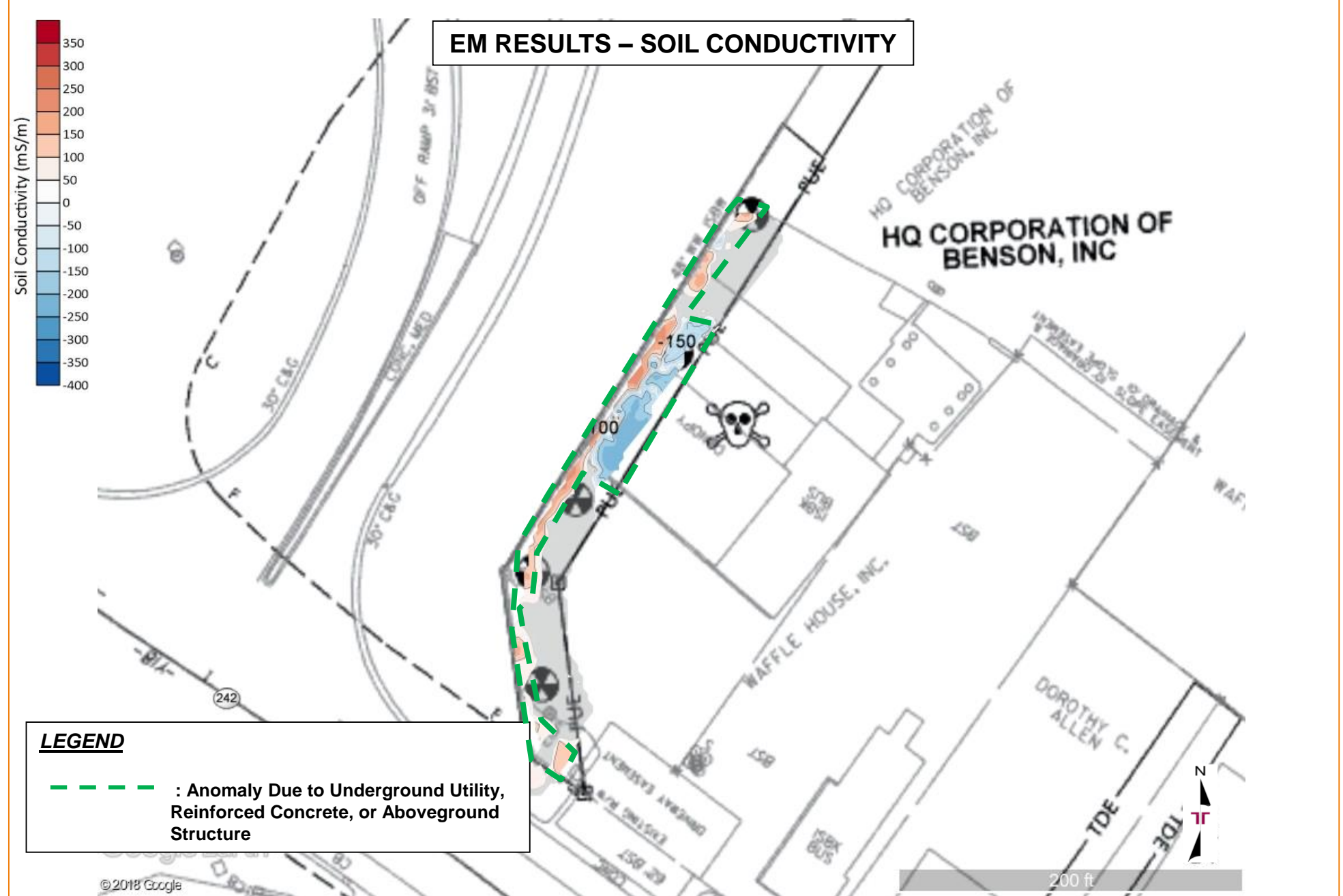
**EXPLORATION LOCATION DIAGRAM**





## EXPLORATION RESULTS

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

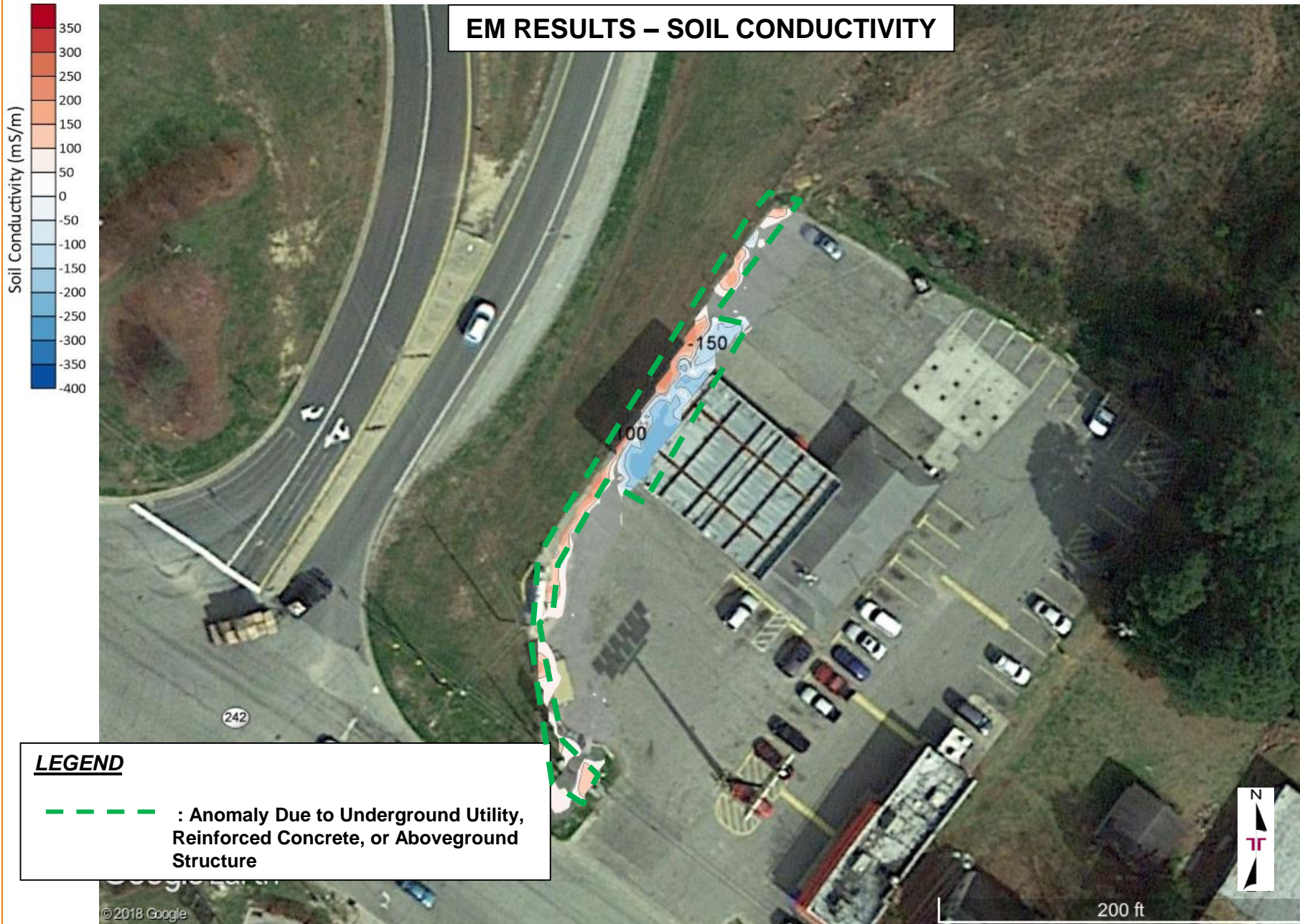


## EXPLORATION RESULTS

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC

November 8, 2019 ■ Terracon Project No. 70197584

### EM RESULTS – SOIL CONDUCTIVITY

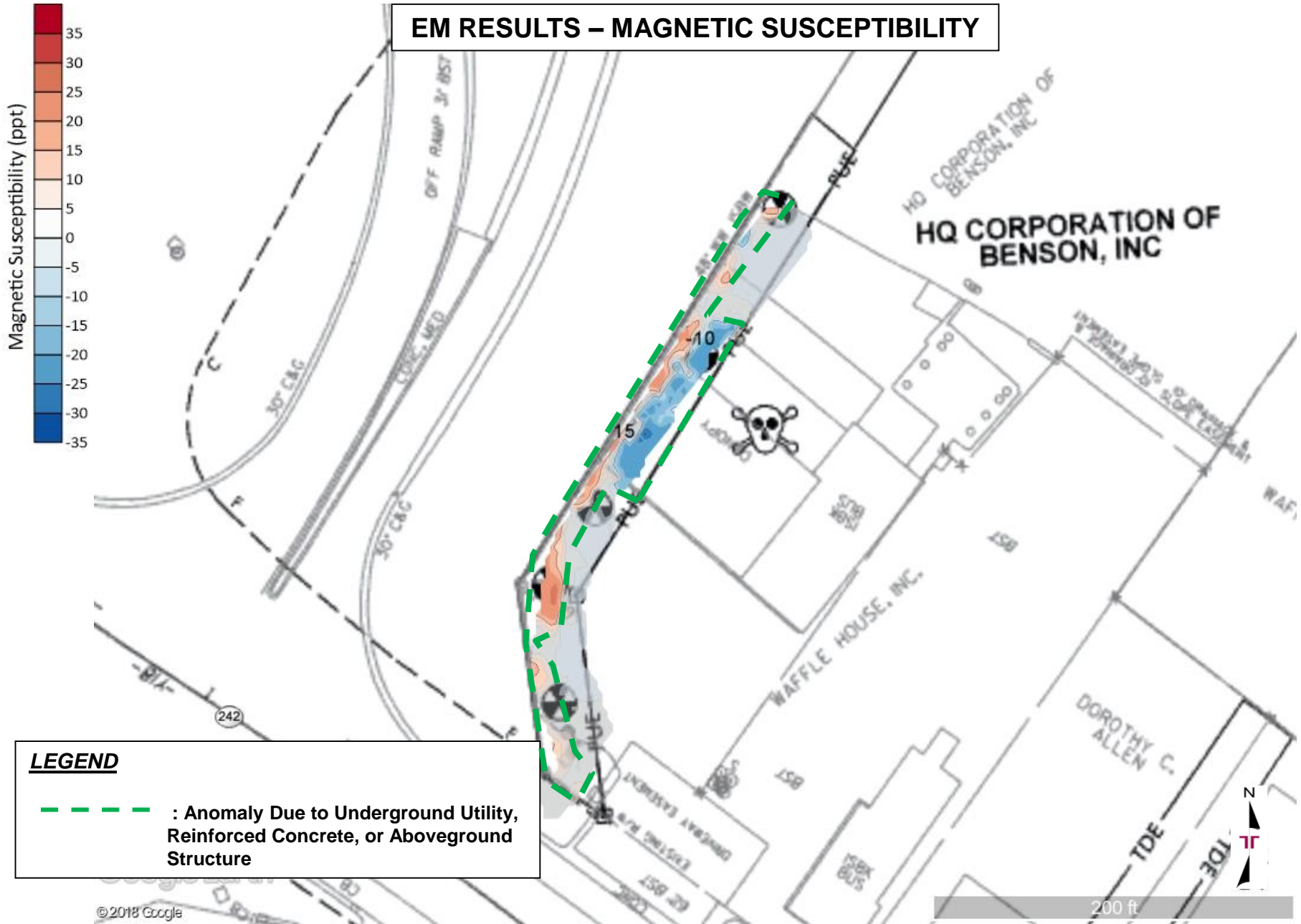




# EXPLORATION RESULTS

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

## EM RESULTS – MAGNETIC SUSCEPTIBILITY



**EXPLORATION RESULTS**

NCDOT Project I-5986B – HQ Corp. of Benson, Inc. ■ Benson, NC  
November 8, 2019 ■ Terracon Project No. 70197584

**EM RESULTS – MAGNETIC SUSCEPTIBILITY**



**APPENDIX B**

**SOIL BORING LOGS**



# BORING LOG NO. 903-SB-01

**PROJECT:** I-95 Interchange Improvement  
Parcel 87 PSH 42 - HQ Corporation of Benson, Inc.

**SITE:** 903 East Main Street  
Benson, Johnston County, North Carolina

**CLIENT:** NCDOT  
Raleigh, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG HQ CORP OF BENSON\_GINT LOGS.GPJ TERRACON DATATEMPLATE.GDT 11/13/19

GRAPHIC LOG	LOCATION See Exhibit 2A	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>AGGREGATE BASE COURSE</b>						
1.5	<b>FINE SAND (SP)</b> , tan, odors not observed, dry					<0.1	
3.0	<b>SILTY CLAY (CL)</b> , light brown and orange, odors not observed, dry				60		
5.0	<b>CLAYEY SAND (SC)</b> , tan and orange, odors not observed, dry to moist					<0.1	
7.0	<b>SANDY LEAN CLAY (CL)</b> , tan and gray with red and orange streaks, odors not observed, dry, medium stiff to stiff				60		903-SB-01 (9 feet) UVF 09:45
10.0	<b>Boring Terminated at 10 Feet</b>					<0.1	

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		Notes: UVF: Ultraviolet fluorescence	
Abandonment Method: Boring backfilled with soil cuttings upon completion.			
<b>WATER LEVEL OBSERVATIONS</b>	<b>Terracon</b>	Boring Started: 10-31-2019	Boring Completed: 10-31-2019
	2401 Brentwood Rd, Ste 107 Raleigh, NC	Drill Rig: GeoProbe 7822DT	Driller: Quantex, Inc.
		Project No.: 70197584	Appendix B

# BORING LOG NO. 903-SB-02

**PROJECT: I-95 Interchange Improvement**  
Parcel 87 PSH 42 - HQ Corporation of Benson, Inc.

**CLIENT: NCDOT**  
Raleigh, North Carolina

**SITE: 903 East Main Street**  
Benson, Johnston County, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG HQ CORP OF BENSON\_GINT LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 11/13/19

GRAPHIC LOG	LOCATION See Exhibit 2A	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>AGGREGATE BASE COURSE</b>						
1.5	<b>FINE SAND (SP)</b> , tan, odors not observed, dry					<0.1	
1.5	<b>CLAYEY SAND (SC)</b> , tan, orange, and brown, odors not observed, moist, medium stiff, (wet below 8 feet)				36	<0.1	
5						<0.1	903-SB-02 (7 feet) UVF 10:00
60		▽			<0.1		
10.0	<b>Boring Terminated at 10 Feet</b>				<0.1		

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 soil cuttings upon completion.

**WATER LEVEL OBSERVATIONS**  
▽ Possible groundwater table encountered at approximately 8 feet bls, based on soil cutting observations.

Notes:  
UVF: Ultraviolet fluorescence



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. 903-SB-03

**PROJECT: I-95 Interchange Improvement**  
Parcel 87 PSH 42 - HQ Corporation of Benson, Inc.

**CLIENT: NCDOT**  
Raleigh, North Carolina

**SITE: 903 East Main Street**  
Benson, Johnston County, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG HQ CORP OF BENSON\_GINT LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 11/13/19

GRAPHIC LOG	LOCATION See Exhibit 2A	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.5	<b>AGGREGATE BASE COURSE</b>						
1.5	<b>FINE SAND (SP)</b> , tan, odors not observed, dry					<0.1	903-SB-03 (7 feet) UVF 10:10
6.0	<b>SANDY LEAN CLAY (CL)</b> , tan and brown with red streaks, odors not observed, dry to moist, medium stiff	5			60	<0.1	
8.0	<b>FINE TO MEDIUM SAND (SP)</b> , tan and orange, odors not observed, moist, (wet to saturated below 8 feet)		▽		60	<0.1	
10.0	<b>Boring Terminated at 10 Feet</b>	10				<0.1	

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		Notes: UVF: Ultraviolet fluorescence	
Abandonment Method: Boring backfilled with soil cuttings upon completion.			
<b>WATER LEVEL OBSERVATIONS</b>	 2401 Brentwood Rd, Ste 107 Raleigh, NC	Boring Started: 10-31-2019	Boring Completed: 10-31-2019
▽ Possible groundwater table encountered at approximately 8 feet bls, based on soil cutting observations.		Drill Rig: GeoProbe 7822DT	Driller: Quantex, Inc.
		Project No.: 70197584	Appendix B

# BORING LOG NO. 903-SB-04

**PROJECT:** I-95 Interchange Improvement  
Parcel 87 PSH 42 - HQ Corporation of Benson, Inc.

**SITE:** 903 East Main Street  
Benson, Johnston County, North Carolina

**CLIENT:** NCDOT  
Raleigh, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG HQ CORP OF BENSON\_GINT LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 11/13/19

GRAPHIC LOG	LOCATION See Exhibit 2A	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.2	<b>AGGREGATE BASE COURSE</b> <b>FINE TO COARSE SAND (SW)</b> , orange, odors not observed, dry					<0.1	903-SB-04 (7 feet) UVF 10:25
5.5	<b>SANDY LEAN CLAY (CL)</b> , tan and orange, odors not observed, moist, medium stiff	5			60	<0.1	
8.0	<b>SILT (ML)</b> , tan and orange, odors not observed, moist				60	<0.1	
9.5	<b>CLAYEY SAND (SC)</b> , orange and brown, odors not observed, wet		▽			<0.1	
10.0	<b>Boring Terminated at 10 Feet</b>	10					

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

Advancement Method: 2-inch DPT	
Abandonment Method: Boring backfilled with soil cuttings upon completion.	
<b>WATER LEVEL OBSERVATIONS</b>	
▽ Possible groundwater table encountered at approximately 9.5 feet bls, based on soil cutting observations.	

	Notes: UVF: Ultraviolet fluorescence	
<b>Terracon</b> 2401 Brentwood Rd, Ste 107 Raleigh, NC	Boring Started: 10-31-2019 Drill Rig: GeoProbe 7822DT Project No.: 70197584	Boring Completed: 10-31-2019 Driller: Quantex, Inc. Appendix B

# BORING LOG NO. 903-SB-05

**PROJECT:** I-95 Interchange Improvement  
Parcel 87 PSH 42 - HQ Corporation of Benson, Inc.

**SITE:** 903 East Main Street  
Benson, Johnston County, North Carolina

**CLIENT:** NCDOT  
Raleigh, North Carolina

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ENVIRONMENTAL SMART LOG HQ CORP OF BENSON\_GINT LOGS.GPJ TERRACON\_DATATEMPLATE.GDT 11/13/19

GRAPHIC LOG	LOCATION See Exhibit 2A	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	OVA/PID (ppm)	SAMPLE SENT TO LAB (ID NUMBER)
	DEPTH MATERIAL DESCRIPTION						
0.3	<b>AGGREGATE BASE COURSE</b>						
	<b>FINE TO COARSE SAND (SW)</b> , trace gravel, orange, odors not observed, dry					<0.1	
2.5	<b>SANDY LEAN CLAY (CL)</b> , dark brown and tan, odors not observed, wet, soft		▽		60	<0.1	903-SB-05 (3 feet) UVF 10:40
		5				<0.1	
7.0	<b>CLAYEY SAND (SC)</b> , tan and gray, odors not observed, moist to wet				60	<0.1	
						<0.1	
10.0	<b>Boring Terminated at 10 Feet</b>	10					

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

Advancement Method: 2-inch DPT		Notes: UVF: Ultraviolet fluorescence	
Abandonment Method: Boring backfilled with soil cuttings upon completion.			
<b>WATER LEVEL OBSERVATIONS</b>	<p>2401 Brentwood Rd, Ste 107 Raleigh, NC</p>	Boring Started: 10-31-2019	Boring Completed: 10-31-2019
▽ Possible groundwater table encountered at approximately 2.5 feet bls, based on soil cutting observations.		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

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

**Contact:** WILL FRAZIER

**Operator** MAX MOYER

**Project:** #70197584

													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 %	

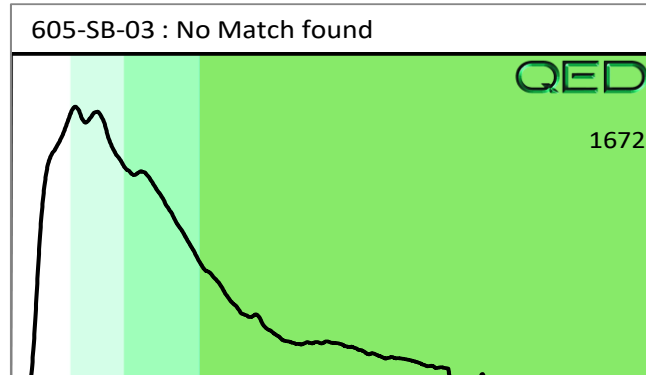
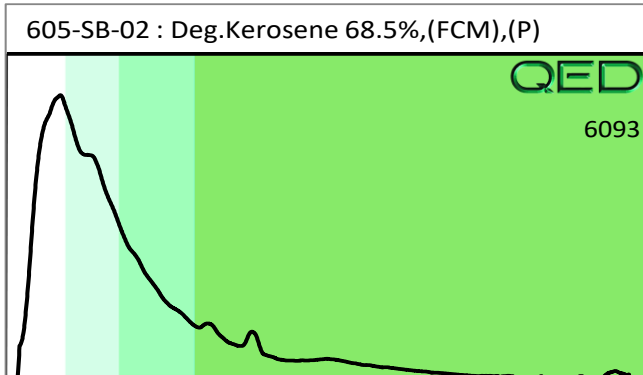
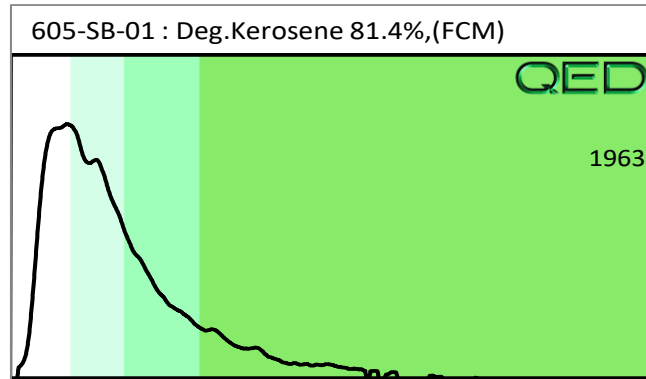
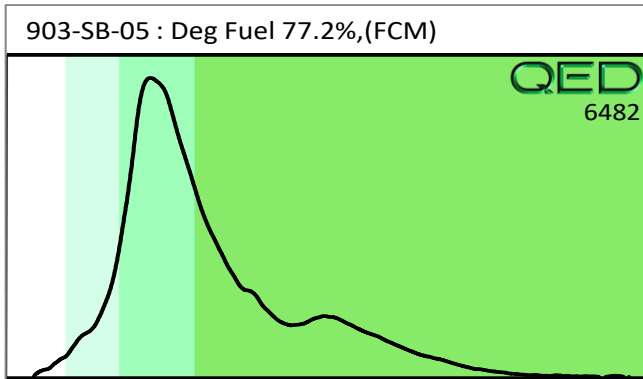
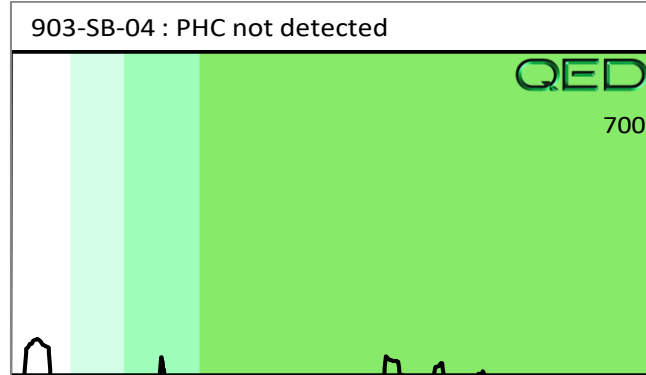
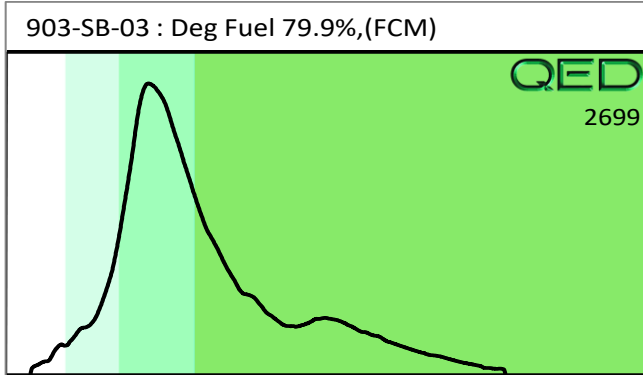
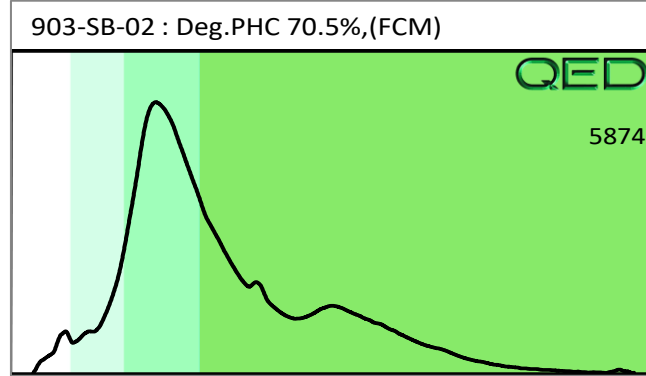
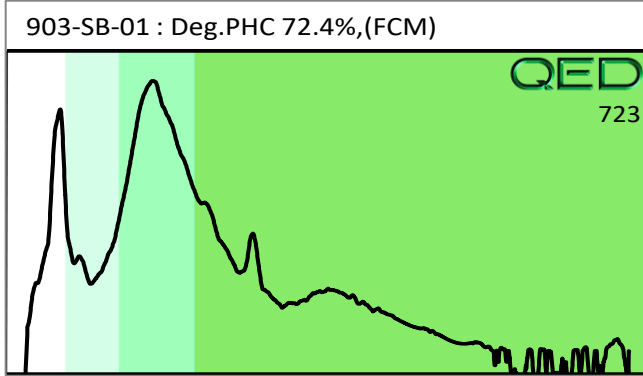
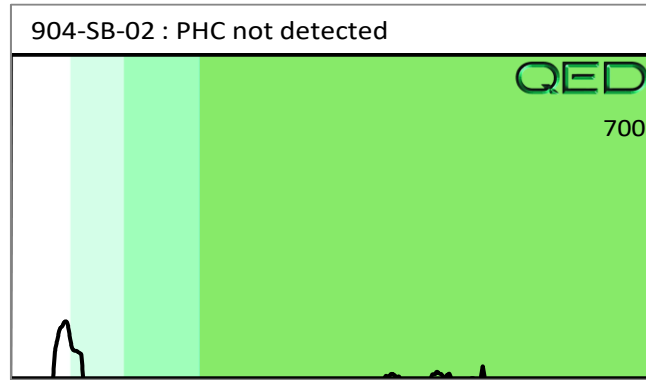
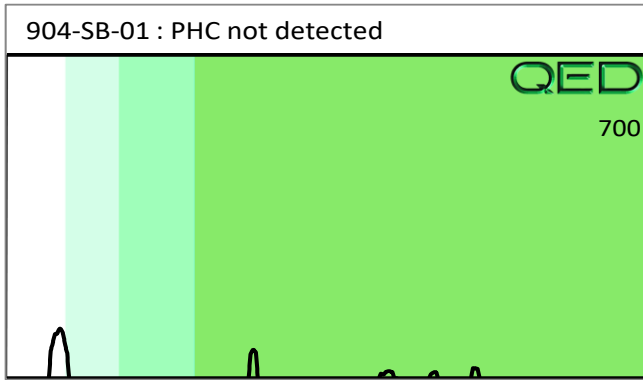
Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

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) = Modified Result.

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







### Hydrocarbon Analysis Results

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

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

**Contact:** WILL FRAZIER

**Operator** MAX MOYER

**Project:** #70197584

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

