

pdf Scanned  
PM Copy

**RECEIVED**

JUL 03 2019

**SITE ASSESSMENT,  
REMEDICATION &  
REVITALIZATION**

# **REMEDIAL INVESTIGATION WORK PLAN ADDENDUM**

## **FORMER BRAMLETTE MGP SITE**

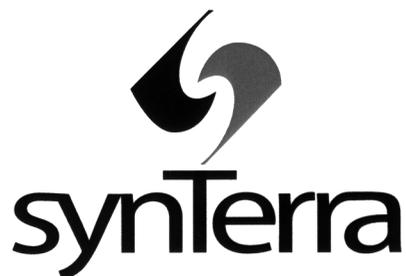
### **JULY 2019**

**PREPARED FOR:**



**DUKE ENERGY CAROLINAS, LLC**

**PREPARED BY:**





# REMEDIAL INVESTIGATION WORK PLAN ADDENDUM

**FORMER BRAMLETTE MGP SITE**

**JULY 2019**

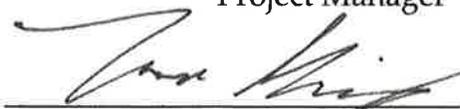
**PREPARED FOR**



**DUKE ENERGY CAROLINAS, LLC**



  
Todd D. Plating, SC PG 2620  
Project Manager

  
Tom King  
Project Geologist

## EXECUTIVE SUMMARY

Duke Energy Carolinas, LLC (Duke Energy) entered a Responsible Party Voluntary Cleanup Contract (VCC 16-5857-RP) with the South Carolina Department of Health and Environmental Control (SCDHEC) on July 26, 2016. The VCC pertains to the former Bramlette manufactured gas plant (MGP) and four contiguous parcels of property. Terms of the contract require a groundwater remedial investigation (RI) to:

- Determine the source, nature, and extent of groundwater impacts resulting from past operation of the MGP
- Submit a baseline risk assessment or other evaluation of human health and the environment
- If requested by SCDHEC, submit a feasibility study (FS) or other evaluation of remedial alternatives

The purpose of this RI Work Plan Addendum (RIWP-A) is to describe additional focused investigation of the Bramlette MGP Site. RI activities at the Bramlette MGP were recently completed in accordance with the RIWP-A (dated April 13, 2018) for improving the Conceptual Site Model (CSM) and identifying areas where focused investigation will achieve requirements of the VCC.

After installation of 48 soil borings and six monitoring wells, the lithologic detail across the CSM is better understood. Non-aqueous phase liquids (NAPL) including oil-like material (OLM) and tar-like material (TLM) were identified, each with distinct mobility characteristics. Recent monitoring of groundwater, surface water, and sediment indicates that constituents in groundwater are not affecting the Reedy River.

Objectives of planned RI addendum activities are to:

- Verify near-surface soil concentrations of constituents of interest (COI) within the MGP operations area (Parcel 1)
- Delineate lateral extent of NAPL at Parcel 1 and Parcel 3 (area east of Vaughn landfill)
- Delineate horizontal extent and vertical extent of COIs in groundwater
- Quantify bedrock characteristics
- Quantify mobility characteristics of NAPL

- Update receptor survey
- Collect sufficient data to support baseline human health and screening level ecological risk assessment (SLERA)
- Complete baseline human health risk assessment in accordance with 2018 RIWP-A

Once complete, data will be evaluated and used to establish Site specific comparison criteria that are protective of human health and the environment. That evaluation will be summarized in an RI report.

## TABLE OF CONTENTS

<b>SECTION</b>	<b>PAGE</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>ES-1</b>
<b>1.0 INTRODUCTION .....</b>	<b>1-1</b>
1.1 Site History.....	1-1
1.2 Background.....	1-2
<b>2.0 UPDATED CONCEPTUAL SITE MODEL.....</b>	<b>2-1</b>
2.1 Hydrogeologic Setting.....	2-1
2.2 Source.....	2-2
2.3 COIs .....	2-4
2.4 Migration Pathways .....	2-4
2.5 Receptors.....	2-5
<b>3.0 REMEDIAL INVESTIGATION WORK COMPLETED – 2018 AND FIRST     QUARTER 2019.....</b>	<b>3-1</b>
3.1 Summary of Findings .....	3-2
3.2 Monitoring Well Installation and Abandonment.....	3-2
3.3 NAPL Assessment .....	3-3
3.4 Water-Level Measurements and Groundwater Flow.....	3-4
3.5 Environmental Media Sampling and Analysis Groundwater Assessment and Results.....	3-5
<b>4.0 PROPOSED ADDITIONAL REMEDIAL INVESTIGATION ACTIVITIES... 4-1</b>	
4.1 Surface Geophysical Survey .....	4-2
4.2 MGP Source Area Soil Screening and Sampling.....	4-4
4.3 Soil Gas .....	4-4
4.4 Test Pits.....	4-5
4.5 Soil Borings .....	4-5
4.6 Monitoring Well Installation .....	4-6
4.7 Bedrock Characterization .....	4-9
4.8 Groundwater Monitoring .....	4-11
4.9 Surface Water and Sediment Sampling .....	4-12
4.9.1 Surface Water Sampling.....	4-12
4.9.2 Sediment Sampling.....	4-13
4.10 IDW Management.....	4-14

4.11 Applicable Regulatory Standards and Screening Levels ..... 4-14  
5.0 RISK ASSESSMENT ..... 5-1  
6.0 SCHEDULE AND REPORTING ..... 6-1  
7.0 REFERENCES ..... 7-1

**LIST OF FIGURES**

**Figure 1-1** USGS Topographic Map  
**Figure 1-2** Site Layout Map  
**Figure 2-1** Updated Conceptual Site Model  
**Figure 3-1** Visually Observed NAPL in Soil  
**Figure 3-2** Water Level Map (May 2019)  
**Figure 3-3** MGP Source Area (Parcel 1) Hydrographs  
**Figure 3-4** Vaughn Landfill Area (Parcel 3) Hydrographs  
**Figure 3-5** Reedy River (Swamp Rabbit Trail) Hydrographs  
**Figure 3-6** Cross Section A-A' Benzene and naphthalene Concentrations in Groundwater  
**Figure 3-7** Cross Section B-B' Benzene and naphthalene Concentrations in Groundwater  
**Figure 4-1** Proposed Work Plan Addendum Activities  
**Figure 4-1A** Proposed Work Plan Addendum Source Area Verification Soil Sampling  
**Figure 4-2** Typical Shallow Well Construction Detail – Stick-Up  
**Figure 4-3** Typical Shallow Well Construction Detail – Flush Mount  
**Figure 4-4** Typical Bedrock Well Construction Detail – Stick-Up  
**Figure 4-5** Typical Bedrock Well Construction Detail – Flush Mount

**LIST OF TABLES**

**Table 3-1** Monitoring Well Construction Details  
**Table 3-2** Slug Test Results  
**Table 3-3** NAPL Results Summary  
**Table 3-4** Analytical Results Summary – Groundwater  
**Table 3-5** Analytical Results Summary – Surface Water  
**Table 3-6** Analytical Results Summary – Sediment  
**Table 3-7** Analytical Results Summary – Soil  
**Table 3-8** Analytical Results Summary – Sheen

## **LIST OF TABLES CONTINUED**

<b>Table 4-1</b>	Proposed Monitoring Well Installation Details
<b>Table 4-2</b>	Applicable Regulatory Standards and Screening Levels

## **LIST OF APPENDICES**

Appendix A	Project Timeline
Appendix B	Monitoring Well and Soil Boring Logs, Construction Forms, and Abandonment Forms
Appendix C	Analytical Laboratory Reports

## LIST OF ACRONYMS

µg/L	micrograms per liter
ASTDR	Agency for Toxic Substances and Disease Registry
bls	below land surface
CFR	Code of Federal Regulations
COI	constituents of interest
CSM	conceptual site model
CSXT	CSXT Transportation, Inc.
DPT	direct push technology
Duke Energy	Duke Energy Carolinas, LLC
EM	electromagnetic
EPA	Environmental Protection Agency
FLASH	flow-log analysis of single holes
FS	Feasibility Study
GPR	ground penetrating radar
GPS	global positioning system
USEPA	U.S.
IDW	investigation derived waste
MCL	maximum contaminant level
MGP	manufactured gas plant
NAPL	non-aqueous phase liquid
OLM	oil-like material
OSHA	Occupational Safety and Health Administration
PIANO	paraffins, isoparaffin, aromatics, naphthenes, and olefins
PID	photoionization detector
PSG	passive soil gas
PVC	polyvinyl chloride
QC	quality control
RFEM	radio frequency electromagnet
RI	remedial investigation
RIWP	Remedial Investigation Work Plan
RIWP-A	Remedial Investigation Work Plan Addendum
RSL	Regional Screening Level
RTK	real time kinematic
SCDHEC	South Carolina Department of Health and Environmental Control
Site	five parcels (Parcel 1, Parcel 2, Parcel 3, Parcel 4, and Parcel 5) owned by CSXT Transportation, Inc.

## LIST OF ACRONYMS CONTINUED

SLERA	Screening Level Ecological Risk Assessment
SVOC	semi-volatile organic compounds
TDEM	time domain electromagnetic
TLM	tar-like material
USGS	United States Geological Survey
VCC	Voluntary Cleanup Contract
VOC	volatile organic compounds

## 1.0 INTRODUCTION

Duke Energy is conducting a remedial investigation (RI) at the site of the former Bramlette manufactured gas plant (MGP) (400 East Bramlette Road) (**Figure 1-1**). The RI is being conducted under a Responsible Party Voluntary Cleanup Contract (VCC 16-5857-RP) with the South Carolina Department of Environmental Control (SCDHEC) dated July 29, 2016. The site is approximately 30 acres and is bounded generally by the CSX Transportation (CSXT) railroad corridor to the north, west, and south and West Washington Street, the Legacy Charter School, and the City of Greenville Sanitation Department to the east. The Reedy River and Swamp Rabbit Trail define the western boundary of the site. The Property is identified by County of Greenville as Tax Map Serial Number:

- 0140000300300 - Parcel 1
- 0140000300200 – Parcel 2
- 0138000100100 – Parcel 3
- 0054000300100 – Parcel 4
- 0054000600100 – Parcel 5

Former MGP operations were conducted on Parcel 1. Active railroad operations are conducted in Parcel 2 and a CSXT field office is located in Parcel 3. An unpermitted landfill (Vaugh Landfill) is contained within Parcel 3. Parcel 1, 4, and 5 are vacant lots. The surrounding area is mixed use including industrial, vacant lots, recreation (Swamp Rabbit Trail), residential, and the elementary school.

### 1.1 Site History

The MGP was constructed in 1917 and operated until 1952. Most of the operational structures were demolished by 1958. However, review of aerial photography indicates gas holders and foundations remained in place through the 1970s. Duke Energy assumed ownership and operation of the MGP in 1939 and sold the property and operations to Piedmont Natural Gas in 1951. Property transactions from 1963 to 1967 transferred ownership of the five parcels to Seaboard Coast Line Railroad Company also known as CSX Transportation, Inc. (CSXT).

Vaughn Construction placed construction and demolition material on Parcel 3 from 1988 to 1993. SCDHEC directed CSXT to evaluate and mitigate damage to wetlands caused by the unpermitted landfill in 1995. During the evaluation of the Vaughn

Landfill, non-aqueous phase liquid (NAPL) was encountered, resulting in Duke Energy's involvement with the assessment and remediation of the Bramlette Road properties. Removal of NAPL impacted soil and material from Parcel 1 was planned and implemented in 2000 and 2001. This effort was completed in 2002 with the removal of 61,088 tons of impacted soil and debris.

Routine groundwater monitoring occurred from 2003 to 2016, when the VCC was signed. A Remedial Investigation Work Plant (RIWP) was developed and implemented in 2016 and 2017. An RI Work Plan Addendum (RWIP-A) was developed and implemented in 2018 and the first quarter of 2019.

A detailed accounting of ownership history, previous investigation, and project reporting is included as **Appendix A**.

## 1.2 Background

The VCC summarizes extensive assessment and remediation activities that have been conducted at the former MGP facility (Parcel 1). The former Vaughn Landfill is unrelated to the former Bramlette MGP facility but was concurrently investigated during previous assessment work. In correspondence dated February 26, 2001, regarding the former Vaughn Landfill parcel, SCDHEC noted that removal of the landfill debris was not recommended and that the only required action was continued groundwater monitoring near the landfill. This determination was supported based on SCDHEC's evaluation of Site risk conditions and recognition of the following facts and conclusions:

- The MGP-related NAPL is viscous and relatively non-mobile
- The areal extent of constituents in groundwater were stable
- Biological assessments of the area demonstrated that the MGP-related constituents were not significantly affecting flora and fauna
- No surface water or downstream/downgradient impacts related to the MGP were observed
- No drinking water wells existed within 0.5 miles of the Site
- In a February 2001 letter to the United States Army Corps of Engineers, SCDHEC recommended CSXT perform off-Site mitigation rather than on-Site mitigation to compensate for wetland impacts attributed to the unpermitted landfill. CSXT was responsible for and completed the recommended mitigation.

Previous remedial actions performed at the Site included removing the primary areas of MGP-related source material. Monitoring data show an overall trend of stable to declining COI concentrations.

Previous investigations have characterized the general extent of the residual NAPL associated with the drainage ditches at the Site. Groundwater monitoring wells, temporary wells, soil borings, and surface water and sediment sampling locations are presented in **Figure 1-2**. Findings from the RIWP-A were incorporated into an improved conceptual site model (CSM) and identified areas where additional focused investigation will achieve requirements of the VCC.

Objectives of planned RI addendum activities are to:

- Verify near-surface soil concentrations of constituents of interest (COIs) within Parcel 1 (MGP source area)
- Delineate lateral extent of NAPL at Parcel 1, Parcel 2, and Parcel 3 (area east of Vaughn Landfill)
- Delineate horizontal and vertical extent of COIs in groundwater
- Quantify bedrock characteristics
- Quantify mobility characteristics of NAPL
- Update receptor survey
- Collect sufficient data to support baseline human health and screening level ecological risk assessment (SLERA)
- Complete a baseline human health and screening level ecological risk assessment

Once complete, data will be evaluated and used to establish Site specific criteria that are protective of human health and the environment.

## 2.0 UPDATED CONCEPTUAL SITE MODEL

Conclusions from the 2018/first quarter 2019 RIWP-A assessment have been used to update the CSM. A plan view representation of the CSM in is included as **Figure 2-1** and components of the CSM are described below.

### 2.1 Hydrogeologic Setting

Topography at the site is relatively wide, flat, and low lying, and includes delineated wetlands. Parcels 2, 3, 4, and 5 are located within the 100-year flood plain of the Reedy River (**Figure 2-1**). The Vaughn landfill (942 feet) and debris piles on Parcel 2 (946 feet) are the points of highest elevation (Parcel 1 elevation ranges from approximately 932 feet to 938 feet). Recent extensive soil coring confirmed the presence of alluvial deposits, including a laterally extensive coarse sand deposit.

Historical drainage ditches provide surface water drainage southward from the floodplain area east of the elevated railroad. Stormwater drainage ditches from the former MGP parcel drain through a culvert southward under Bramlette Road to the historical drainage ditches in the floodplain. From Bramlette Road, the main floodplain drainage ditch extends approximately 2,200 feet south and drains under a railroad trestle near Willard Street to the Reedy River. There are no other known surface water drainage outlets from the Site to the river between Bramlette Road and the railroad trestle near Willard Street.

The groundwater system, consistent with the regolith-fractured rock system, is characterized as an unconfined, interconnected aquifer system indicative of the Piedmont Physiographic Province. A conceptual model of groundwater flow in the Piedmont assumes a regolith and bedrock drainage basin with a perennial stream. Groundwater is recharged by drainage and rainfall infiltration in the upland areas, followed by discharge to the perennial stream.

Flow in the regolith is similar to that of porous media, while flow in bedrock is primarily within secondary porosity features (fractures). Hydrostratigraphic units present at the Site are described in the following table.

Hydrostratigraphic unit		Extent	Hydraulic characteristics (Cm/sec)	Photo
Fill		Laterally extensive in Parcel 2 and Parcel 3 – Vaughn Landfill Fill present from land surface to approximately 8 feet below land surface (bls)	$8.82 \times 10^{-4}$	
Regolith	Alluvium	Laterally extensive (not confirmed in Parcel 1). Lean clay over coarse to fine sand. Alluvium present from approximately 8 feet bls to 19 feet bls.	$1.23 \times 10^{-2}$ – $1.45 \times 10^{-3}$	
	Saprolite	Laterally extensive. Saprolite generally present at 19 feet bls to 20 - 40 feet bls.		
Transition zone	Partially weathered rock	Laterally extensive. Transitions zone present 25 – 50 feet bls.	$2.00 \times 10^{-4}$ – $8.22 \times 10^{-5}$	
	Highly fractured rock			
Bedrock		Laterally extensive. Top of bedrock encountered from 30 – 50 feet bls.	$1.87 \times 10^{-5}$	

## 2.2 Source

The Bramlette Road MGP Site (Parcel 1) is approximately 3.7 acres in size. The MGP operations area contained a retort house, three gas holders, a water gas plant, tar and ammonia washer tanks, purifiers, a tar extractor and holder, and an underground heating oil tank. In 2001 and 2002, near-surface soil impacted by former operations and an underground storage tank was removed. Source material was excavated to a depth of approximately 6 feet bls across 1.4 acres Site and to a depth of 12 feet bls across 2.4 acres. Limited areas in Parcel 2 (drainage ditch and suburban propane area) were also excavated. Excavated soil was thermally treated off-Site and returned to backfill the excavation.

OLM and TLM are two distinct types of NAPL that have been observed at the Site OLM is generally limited in vertical extent to the coarse sand deposit that overlies saprolite. TLM occurs as thin lenses within clay deposits near historical drainage channels. Photographs of OLM (1) and TLM (2) are included below.



(1) NAPL (oil-like, carbureted water gas residuals [coal tar]) present within the coarse sands atop the saprolite unit



- (2) Shallow tar-like material (high viscosity) at the base of the landfill material and associated with relict/former historic land surface (coincident with former drainage traces)

### 2.3 COIs

Benzene and naphthalene are the primary organic constituents of interest. These compounds are included in the list of constituents within the U.S. Environmental Protection Agency (USEPA) VOC Method 8260 and SVOC Method 8270.

### 2.4 Migration Pathways

Groundwater flows to the southwest toward the Reedy River. The water table is encountered between land surface and approximately 13 feet bls, which is consistent with the depth of some former process structures. Locations and areas where groundwater is encountered at greater depth (i.e., depths of 13 feet bls) are generally coincident with areas where fill has been placed over native materials such as the railroad grade along the Swamp Rabbit Trail and the Vaughn landfill.

Surface water includes delineated wetlands (Duke Energy, 2003) and the Reedy River. Historical drainage ditches were present from the MGP operations area through low-lying areas to the Reedy River (**Figure 1-2**).

Near surface soils at the former MGP have been removed, treated, and returned to the Site along with additional fill. NAPL has been observed within the soil matrix along surface water and groundwater flow pathways from the MGP to the southern extent of the Vaughn landfill. TLM is observed within the natural lean clay deposits (relict land surface) immediately beneath and within the fill and debris deposits. OLM is observed deeper beneath the lean clay within a coarse sand deposit that overlies saprolite.

## **2.5 Receptors**

An updated receptor survey will be completed to support the final RI report. A summary of potential receptors was provided in the RIWP-A (ERM, April 2018). Key points include:

- The area is served by public water service; no water supply wells are within a half mile.
- The Swamp Rabbit Trail, a county linear greenway park, is located just west of the CSXT railroad corridor and parallels the Reedy River.
- Potential human health exposure scenarios are limited to current and future Site workers who might disturb soil within the impacted areas and trespassers who might access the property from adjacent public property.
- Previous assessments of potential environmental receptors indicated no adverse effects to flora (1996) or fauna (1999).

### 3.0 REMEDIAL INVESTIGATION WORK COMPLETED – 2018 AND FIRST QUARTER 2019

Implementation of the RIWP-A activities began in October 2018 with the installation of monitoring wells along the Swamp Rabbit Trail. Those activities completed in April 2019 with the NAPL assessment and monitoring well installation and sampling at the Vaughn landfill area. Field methods were conducted in accordance with the Quality Assurance Project Plan (QAPP) prepared by SynTerra (September, 2018). NAPL assessment activities are detailed in the *First Quarter 2019 Quarterly Progress Report* (April 15, 2019). NAPL assessment activities were completed on Parcel 2, 3, and along the Swamp Rabbit Trail and shown on **Figure 1-2**. The following is a summary of the completed RIWP-A activities:

- Installation of monitoring wells MW-29S, MW-29TZ, MW-30S, MW-31S, MW-31TZ, and MW-03BR
- Environmental media sampling for VOC (USEPA Method 8260) and SVOC (USEPA Method 8270)
  - Collection and analysis of 12 surface water samples
  - Collection and analysis of 11 sediment samples
  - Site-wide groundwater monitoring
  - Collection and analysis of 45 soil samples
  - Collection of three sheen samples
- Collection of two NAPL samples (MW-06A and MW-3BR) for chemical analysis by:
  - Paraffins, isoparaffin, aromatics, naphthenes, and olefins (PIANO) VOCs USEPA Method 8260B/5035 High-Resolution sampling and analysis
  - Alkylated PAHs by EPA Method 8270D-SIM
  - Saturated hydrocarbons by EPA Method 8015D-modified
- Collection of one NAPL sample (MW-06A) for physical properties analysis by:
  - Density & Specific Gravity by ASTM D1481
  - Viscosity by ASTM D445

- Collection of three sheen samples for analysis by:
  - PIANO VOCs USEPA Method 8260B High-Resolution
  - Polycyclic aromatic hydrocarbons (PAHs) USEPA Method 8270D
  - Saturated hydrocarbons USEPA 8015D
- Visual observation and field screening of 48 soil cores
- Collection and analysis of 12 samples for geotechnical parameters (ASTM D422, D2216, D2974)
- Abandonment of three monitoring wells
- Installation of three staff gauges

### 3.1 Summary of Findings

Implementation of the RIWP-A activities identified areas where focused investigation will achieve requirements of the VCC. Findings of the investigation include:

- Constituents in groundwater are not present in monitoring wells MW-30S and the MW-31 cluster located between the Site and the Reedy River, indicating COIs are not migrating to the Reedy River.
- No VOCs or SVOCs were detected at concentrations greater than reporting limits within the Reedy River (six near bank surface water samples).
- OLM and TLM are present at the site.
  - OLM, found within and outside of historical drainage ditches, primarily in deeper native coarse sand deposits.
  - TLM, typically found near historical drainage ditches, occurs as thin lenses within the native lean clay deposit and is at the base of fill in some locations.

### 3.2 Monitoring Well Installation and Abandonment

Six monitoring wells were installed during the 2018/first quarter 2019 RIWP-A. Monitoring well installation records are included in **Appendix B**. Monitoring well locations are shown on **Figure 3-1**, and well construction details are summarized in **Table 3-1**.

Newly installed groundwater monitoring wells and findings based on initial monitoring are summarized as follows:

#### MW-03BR

- Primary COIs at MW-03BR were detected at concentrations (Benzene – 1,920 µg/L and naphthalene – 4,060 µg/L) greater than the regulatory standards.

#### MW-29S

- COIs are not detected in the shallow flow system, indicating COIs in shallow groundwater are not migrating to this location from Parcel 1 (MW-7R).

#### MW-29TZ

- Primary COIs at MW-29TZ were detected at concentrations (Benzene - 620 µg/L and naphthalene - 2,910 µg/L) greater than the regulatory standards.

#### MW-30S, MW-31S, and MW-31TZ

- COIs are not detected at concentrations greater than reporting limits, indicating COIs in groundwater are not migrating to the Reedy River.

Monitoring wells MW-3D, MW-6A, and MW-19 were abandoned during the 2018/first quarter 2019 RIWP-A assessment. Access to MW-23 and MW-24 was not possible due to ponded water; therefore, those wells have not been abandoned. Water levels are being monitored and these wells will be abandoned when access improves.

During abandonment of MW-6A, the monitoring well became dislodged and was removed. Approximately 3 feet of TLM was observed within the well screen. A sample of this material was collected and submitted to Alpha Analytical for analysis. The open borehole was grouted by the tremie method in accordance with SCDHEC R.61-71.

Results of slug test analysis are provided in **Table 3-2**. Wells along the Swamp Rabbit Trail are slightly more conductive than wells screened in the same hydrostratigraphic unit at the Site. The transition zone wells are within the range of expected values compared with existing Site wells. Fractured bedrock conductivity measured at MW-03BR is similar to the transition zone and the least conductive hydrostratigraphic unit at the Site.

### 3.3 NAPL Assessment

Soil borings were completed using the rotary sonic drilling technique to collect continuous core samples for field screening, sampling, and visual observation. Boring logs are provided in **Appendix B**, and soil analytical results are summarized in

**Table 3-3.** Observations of NAPL extent are shown on **Figure 3-1** and summarized below:

- The western extent of NAPL is defined by the drainage feature that parallels the western side of the Vaughn Landfill, as supported by observations from transect borings T17, T6, T7, T8, T14, and T15 and boring T13-SB1.
- The southern extent of the NAPL investigation is bounded by RI-SB3, immediately south of MW-21 (and abandoned MW-6A). While NAPL was not observed in cores collected during the installation of well MW-21, an accumulation of NAPL within the well has occurred since its installation.
- NAPL was not observed in transect T3 borings, indicating NAPL is limited to the ditch that parallel (located on the north side of E Bramlette Road) which suggests that NAPL impacts do not extend further south than those observed at the T2 borings (south-central portion of Parcel 2).
- OLM was not observed south of the drainage feature that bisects the central portion of the Vaughn Landfill.
- Thin lenses of TLM were present near historical drainage channels and accumulated within MW-06A.
- OLM was observed along the path of the historic drainage ditch that parallels the north side of E Bramlette Road.
- OLM is limited to the northern portion of the Vaughn Landfill, is present within deeper sand deposits, and is observed outside of historical drainage features.

**Table 3-3** provides the analytical results from chemical fingerprinting analyses conducted on NAPL samples from MW-06A and MW-03BR. In general, the range of hydrocarbons and relative concentrations are indicative of typical MGP-related carbureted water gas tars derived from coal-based feedstocks and oil-based feedstocks. The NAPL recovered from MW-06A was heavily weathered (based upon visual inspection) and subjected to physical properties testing (PTS Labs). The specific gravity was measured at approximately 1.17 and the viscosity was measured at 42,500 centistokes (at 70 °F); the viscosity of this material is consistent with that of ketchup.

### **3.4 Water-Level Measurements and Groundwater Flow**

Installation of six additional monitoring wells, three staff gauges, and three Reedy River water measuring stations has increased resolution of water level elevation data across the site. Groundwater flow is generally toward the southwest from the MGP parcel toward the Reedy River as indicated on **Figure 3-2**.

In addition to manual water level gauging, six data logging pressure transducers are installed at three monitoring well clusters across the site. Hydrographs showing water level data are included for the MGP parcel (**Figure 3-3**), the Vaughn landfill (**Figure 3-4**), and adjacent to the Reedy River (**Figure 3-5**). To date, observations from data collected include:

- Groundwater elevation correlates to precipitation events and the Reedy River stage level.
- Vertical gradients within the MW-31S/TZ well cluster are minimal and vary from upward to downward.
- Vertical gradient information suggests the Reedy River can act as a gaining stream or a losing stream based on precipitation and ground saturation.

### **3.5 Environmental Media Sampling and Analysis Groundwater Assessment and Results**

A site-wide groundwater monitoring event was completed from March 20 to March 22, 2019. After installation, a groundwater samples was collected from MW-03BR on April 10, 2019. Groundwater samples were analyzed for VOCs (USEPA Method 8260B) and SVOCs (USEPA Method 8270D). Analytical results are summarized in **Table 3-4**. Primary COI concentrations for benzene and naphthalene are presented in plan view in **Figure 2-1**. Cross-sections, including benzene and naphthalene concentrations, are presented in **Figure 3-6** and **Figure 3-7**.

#### **Surface Water Assessment and Results**

Surface water samples were collected from the Reedy River on December 19, 2018, and from the Vaughn Landfill parcel on March 19, 2019. Analytical results are summarized in **Table 3-5**. Surface water sample locations are shown in **Figure 1-2**. Results are summarized as follows:

- VOC and SVOC concentrations in surface water samples collected from the Reedy River were less than reporting limits.
- VOC and SVOC concentrations from surface water sample locations SW-1 through SW-6 are less than regulatory standards.
- Chloromethane was detected at SW-02, SW-04, and SW-06. Chloromethane is a naturally occurring compound with an estimated 99 percent of chloromethane in the environment derived from natural sources such as rotting wood (ASTDR, 1998).

### **Sediment Assessment and Results**

Sediment samples were collected from the Reedy River on December 19, 2018, and from the Vaughn Landfill parcel on March 19, 2019. Analytical results are summarized in **Table 3-6**. Sediment samples were collected close to the location where surface water samples were collected (**Figure 1-2**). Results are summarized as follows:

- Concentrations of VOCs and SVOCs in Reedy River sediments are less than USEPA RSLs for industrial soil.
- Concentrations of VOCs and SVOCs detected in SW-01-SED through SW-06-SED are less than the USEPA RSLs for industrial soil.

### **Soil Assessment and Results**

Soil samples were collected at depths ranging from 10 feet bls to 22 feet bls. Analytical results are summarized in **Table 3-7**, and sample locations are depicted in **Figure 1-2**. Results are summarized as follows:

- Concentrations of VOCs and SVOCs identified in soil are less than USEPA regional screening levels (RSLs) for industrial soil with the exception of the northeast area of the Vaughn Landfill near T9-SB-19 (benzo(a)pyrene, 3,530 µg/L).

### **Sheen Assessment and Results**

Three sheens observed at the site were sampled on April 24, 2018. Locations sampled included standing water along the southern end of Parcel 2, a ponded area east of the Vaughn Landfill, and the drainage ditch west of the Vaughn Landfill. Sheens were collected using Teflon nets and analyzed by the following methods:

- PIANO VOCs by USEPA Method 8260 High Resolution
- PAHs by USEPA Method 8270D
- Saturated hydrocarbons by USEPA Method 8015D

Results from all three sheens sampled indicate the presence of hydrocarbons. Sample results are summarized in **Table 3-8**. Sheen locations that were sampled are shown in **Figure 1-2**.

Analytical laboratory reports for all media are included in **Appendix C**.

## 4.0 PROPOSED ADDITIONAL REMEDIAL INVESTIGATION ACTIVITIES

Interpretation of data collected during the 2018/first quarter 2019 RIWP-A assessment activities identified areas where additional focused assessments are necessary to fulfill requirements of the VCC. Information from the proposed activities will be used to determine:

- Current soil concentrations of constituents of interest (COI) within the MGP operations area of Parcel 1
- Extent of NAPL at Parcel 1 and Parcel 3 (area east of Vaughn landfill)
- Horizontal extent and vertical extent of COIs in groundwater north and west of MW-29TZ and within bedrock across the Site
- Mobility characteristics of NAPL
- Human health and ecological risk

Investigation procedures, document management, sample nomenclature, and data quality are described in detail within the QAPP. Assessment proposed in this addendum will be conducted in accordance with the QAPP. Proposed assessment activities (in order of implementation) include:

- Parcel 1 surface geophysical survey
- Parcel 1 near-surface soil sampling at
- Parcel 1 passive soil gas survey
- Parcel 2 test pits
- Parcel 1 and Parcel 2 soil borings
- Off-Site soil borings (east of Parcel 3)
- Groundwater monitoring well installation
- Bedrock characterization including borehole geophysics
- Site wide Groundwater monitoring
- Parcel 3 and 4 Surface water and sediment monitoring

#### **4.1 Surface Geophysical Survey**

Surface geophysical survey methods for clearing areas of utilities prior to subsurface investigation and defining structures that remain in place at Parcel 1 and Parcel 2 are proposed (**Figure 4-1** and **Figure 4-1A**). Survey information will be evaluated to identify MGP operational structures that remain in place. Surface geophysics data will be correlated with other screening tools to target placement of soil borings and monitoring wells. Targeted placement of borings and monitoring wells will be used to delineate the presence of NAPL and monitor concentrations of COIs in soil and groundwater.

#### **Ground Penetrating Radar (GPR)**

GPR is an electromagnetic method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of: an antenna, which houses a transmitter and receiver; a profiling recorder, which processes the received signal and produces a graphic display of the data; and a video display unit, which processes and transmits the GPR signal to a color video display and recording device.

Depth of investigation of the GPR signal is highly Site-specific, and is limited by signal attenuation (absorption) of the subsurface materials. Signal attenuation is dependent on the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities such as clays and brackish groundwater, and lowest in relatively low conductivity materials such as unsaturated sand or rock. Depth of investigation is also dependent on antenna frequency and generally increases with decreasing frequency; however, the ability to identify smaller subsurface features is diminished with decreasing frequency.

#### **EM-61**

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

The Geonics EM-61 system used in this investigation operates within these principles. However, the EM-61 TDEM system can discriminate between moderately conductive earth materials and very conductive metallic targets. The EM-61 consists of a portable coincident loop time domain transmitter and receiver with a 1.0-meter x 0.5-meter coil system. The EM-61 generates 150 pulses per second and measures the response from the ground after transmission or between pulses. The secondary EM responses from

metallic targets are of longer duration than those created by conductive earth materials. By recording the later time EM arrivals, only the response from metallic targets is measured, rather than the field generated by the earth material.

### **Radio Frequency EM Utility Locating Equipment**

Radio Frequency Electromagnetic (RFEM) utility locating equipment consists of a transmitter and a dual-function receiver. The receiver can be operated in a “passive” mode or in an “active” mode. The two modes of operation provide various levels of detection capabilities depending on the specific target or application.

The EM system is operated in the “active” mode by either inducting or conducting a signal into the underground utility to be traced. A transmitter is placed over and in line with a suspected buried utility. The transmitter induces a signal, which propagates along the buried utility. As the receiver is moved back and forth across the suspected path of the utility, the trace signal induces a signal into the receivers coil sensor. A visual and audio response indicates when the receiver is directly over the buried utility.

Another means of detecting in the active mode utilizes a method to “conduct” a signal within the buried utility. To accomplish this, a cable from the transmitter is clamped onto an exposed section of the buried utility and a signal propagates along the buried line. This technique minimizes any interference caused by parasitic emissions from adjacent cables in congested areas. When the system is used in the passive mode, the receiver is responding to a current that is 60 hertz (Hz) cycle and energized by underground utilities.

Interference can and might occur when buried utilities intersect or are adjacent. This “bleed-off” effect might provide a false response to the identification of the tracked utility. “Bleed-off” is caused by utilities that might be energized in the “active” or “passive” mode.

### **Field Procedures**

Buried pipes and cables will be located using a combination of GPR and RFEM pipe and cable locating equipment. The RFEM equipment will be used in active mode by connecting a RFEM transmitter to an above-ground utility feature and inducing signals from the ground surface, and in passive mode by scanning the site for radio and 60 Hz signals from subsurface utilities. Identified buried pipes and cables will be marked on the ground surface using marking paint and/or flags. We anticipate investigating relevant portions of Parcel 1, Parcel 2, and Parcel 3 and areas of the Swamp Rabbit Trail for underground utilities. Both active and abandoned utilities will be mapped during

this phase of the investigation. Detected utilities will be surveyed using a real-time kinematic/global positioning system (RTK/GPS) or total station.

GPR and EM-61 data will be collected throughout the site using an appropriate profile spacing determined by the geophysics professional in the field. Positioning control will be accomplished by integrating a RTK/GPS system. After completion of the fieldwork, the geophysical data will be digitally processed to aid in interpretation. Location of notable anomalies will be added to the data to facilitate the interpretation. Geophysical anomalies will be marked in the data and exported to Microsoft Excel and AutoCAD format.

A final report — including descriptions of the geophysical systems and procedures, analysis and interpretation of the geophysical data, and maps — will be prepared.

#### **4.2 MGP Source Area Soil Screening and Sampling**

Near-surface soil sampling will be conducted within the bounds of the 2000-2001 excavation area to verify near-surface soil concentrations of COIs are within applicable regulatory standards or site specific target levels for intended property use. Prior to subsurface investigation, each boring location will be surveyed for utilities as described in **Section 4.1**. A certified South Carolina well drilling contractor will be retained to drill approximately 1-inch diameter soil borings to six feet bls using direct push technology (DPT). An unbiased grid with 60 foot spacing will be established across the study area plotting 47 to 50 near surface soil borings (**Figure 4-1A**).

A photo ionization detector (PID) will be used to screen soils during the investigation, and measurements will be recorded in the field logbook. Two soil samples will be collected from each boring for laboratory analyses for VOCs (USEPA Method 8260) and SVOCs (USEPA Method 8270). A shallow sample will be collected from 0.5 to 1 foot bls and a deeper sample from 5.5 to 6 feet bls.

#### **4.3 Soil Gas**

A passive soil gas (PSG) survey using adsorbent sampling devices will be conducted within the bounds of the 2000-2001 excavation area. PSG data will be used to define potential “hot spots” in order to target specific locations for soil coring, test pits, and monitoring well installation. All field methods will be conducted in accordance with methods described in ASTM D7758-17 Passive Soil Gas Sampling in the Vadose Zone for Source Identification, Spatial Variability Assessment, Monitoring, and Vapor Intrusion Evaluations. Soil gas sampling devices will be placed collocated with the surface soil sampling grid (**Figure 4-1A**).

Once surface soil sampling is complete, an adsorbent PSG sampler will be suspended upside down approximately 4 to 6 inches bls and capped with an aluminum foil plug and a soil cover to prevent ingress of ambient air. Drilling equipment will be decontaminated in between each location to avoid cross-contamination. The location of each sampling device will be marked in the field and on a handheld GPS device for ease of recovery. Proper field documentation of ambient conditions will be collected for each location.

All sampling devices will be deployed for seven days. After the exposure period, samplers will be retrieved and shipped without preservatives to the Beacon Environmental laboratory for analysis following USEPA Method 8260C procedures. Field quality control (QC) samples and duplicate samples using replicate sorbents will be collected in accordance with ASTM D7758-17. All samples will be managed under chain-of-custody protocol. After interpretation of analytical results, deeper borings can be evaluated for completion in areas of highest concentrations as described in **Section 4.2**.

#### **4.4 Test Pits**

Shallow test pits or soil borings are proposed in the area indicated in **Figure 4-1A** to verify adequate removal of near-surface soils impacted by the MGP. The extent of excavation in 2001 and 2002 might have been limited by debris piles on Parcel 2 west of the MGP. Reconnaissance of the debris on-site and results of surface geophysics and PSG screening will be used to complete the test pit investigation design. Test pits will not exceed a depth of four feet bls. If shallow test pits indicate potential NAPL presence greater than four feet bls, soil boring will be used to define vertical extent.

#### **4.5 Soil Borings**

One objective of this work plan and the overall RI is to delineate the extent of NAPL impacts. As such, additional soil borings within Parcel 1 and to the east of Parcel 3 (Vaughn Landfill) are warranted. The soil cores will be visually inspected and logged for lithology and evidence of visible MGP-related impacts. Field screening will include headspace measurements using a PID in accordance with procedures described in Section 4.2 and the QAPP. Additional "step-out" borings may be necessary based upon the observed extent (if any) of NAPL impacts.

Borings will be abandoned upon completion to terminal depth. Borings greater than 5 feet in depth shall be completely filled from the bottom of the borehole to the land surface with bentonite-cement, neat cement, or 20 percent high solids sodium bentonite grout. The boring shall be abandoned by forced injection of grout or pouring through a

tremie pipe starting at the bottom of the borehole and proceeding to the surface in one continuous operation.

### **Parcel 1**

Soil borings within the potential source area (Parcel 1) will provide additional lithologic detail and assess NAPL presence, thickness, and extent near the former MGP process area and beneath the extent of previously excavated material. Up to six borings are anticipated and will be advanced to approximately 40 feet bls or top of bedrock. This depth is selected based upon the current understanding of subsurface lithology shown on **Figure 3-6**. Number of borings and their exact locations will be determined based on evaluation of the surface geophysical survey and PSG survey. The general area where borings are planned is shown in **Figure 4-1A**.

### **Off-Site Soil Borings (Adjacent to Parcel 3)**

As indicated on **Figure 3-1**, the soil borings completed during March 2019 along transect T-9 included visible NAPL observations located primarily within the coarse sand unit immediately above the saprolite. These visible NAPL impacts were observed at various discrete depth intervals between approximately 8 to 17 feet bls. Observations included tar blebs, NAPL-coated grains and/or thin (i.e., several inches or less) lenses of NAPL-saturated matrix. The boring logs are included in **Appendix B**.

**Figure 4-1** presents the proposed areas for additional environmental media investigations. One area is located to the east of Parcel 3 and adjacent to existing monitoring well MW-25R (the proposed sampling area is shown as a yellow rectangle on **Figure 4-1**) where the area is currently inundated by standing water. It is proposed that the beaver dam be removed from the Site such that the standing water can drain from the area. At that point additional reconnaissance can be completed to evaluate the ability to drill four sonic borings within this area for purposes of NAPL extent delineation. The exact locations will be determined based on field conditions and drilling rig accessibility and property owner access agreement (to be executed). The borings will be drilled to a minimum depth of 24 feet bls. This depth is selected based upon the depths of observed NAPL residuals at the T-9 and T-10 transects (northeastern Parcel 3).

## **4.6 Monitoring Well Installation**

The existing monitoring well network will be expanded to completely delineate the horizontal and vertical extent of COIs in groundwater. Proposed groundwater monitoring well details are summarized in **Table 4-1**.

Thirteen (13) locations are proposed based on existing information. The installation of well clusters (including wells in the shallow, transition, and bedrock flow zones) are proposed for locations where there are no existing monitoring wells and hydrostratigraphic units are sufficiently thick to maintain a minimum of 15 feet of separation between adjacent well screens. Screening level data and field observations will be incorporated in the decision making process for final well count and placement.

Conceptual locations for monitoring wells and monitoring well clusters are shown in **Figure 4-1**.

### **Field Methods**

Sonic drilling methods are recommended for this scope of work. Sonic drilling uses high frequency rotation vibration aided by down pressure and rotation to advance drilling tools through the subsurface. Sonic drilling reduces the amount of drill cuttings and recovers continuous core samples for lithologic description, field analysis, and laboratory testing.

Previous site investigation has identified the presence of NAPL beneath the former MGP structures and within clay and coarse sand deposits at Parcel 3. Sonic drilling is an appropriate method for minimizing potential drawdown of constituents deeper into the subsurface. The following drilling sequence is in general accordance with ASTM D6914/D6914M-16 and can reduce cross-contamination and protect the integrity of core samples and monitoring well installation:

1. Sample barrel insertion
2. Sample barrel extraction
3. Sample recovery
4. Repeat sampling process and drill with casing as necessary to prevent caving or slough
5. NAPL encountered or increased annulus for permanent surface casing installation is determined to be necessary
6. Insertion of a larger diameter casing (commonly referred to as an override casing)
7. Advance override casing to target depth. If NAPL was encountered, clean (decontaminated) tooling will be used on subsequent runs
8. Continue advancing sample barrel and casing to target borehole depth

## Monitoring Well Design

Monitoring wells will be pre-approved prior to installation in accordance with SCDHEC regulation R.61-71 H. All wells will be drilled, constructed, and abandoned by a South Carolina certified well driller per S.C. Code Section 40-23-10 et seq. Typical shallow well construction details for stick-up and flush mount completion are shown in **Figure 4-2** and **Figure 4-3**. Typical bedrock well construction details for stick-up and flush mount completion are shown in **Figure 4-4** and **Figure 4-5**. Stick-up well completions are preferable, however flush mount wells are necessary at monitoring wells proposed along the Swamp Rabbit Trail.

Each well will consist of Schedule 40 flush-joint-threaded polyvinyl chloride (PVC) pipe fitted to standard well screens. Screens shall have 0.010-inch wide slots with a No. 2 (or equivalent) filter pack. Permanent surface casings are used to prevent cross communication between isolated flow zones or prevent introduction of overlying material deeper into the subsurface. Permanent Schedule 80 PVC surface casing will be installed where the presence of NAPL is known and at bedrock well locations.

Well centralizers are not likely to be employed during monitoring well installation. In saturated conditions, centralizers often inhibit the placement of bentonite seal and result in the bridging of bentonite within the borehole. Hanging the well (suspending from a lift ring) helps avoid well deflection while the well is constructed. The well will be hung approximately 1 foot off the bottom of the boring (to allow filter material below the well screen and to limit potential well deflection).

The diameter of the drilled hole shall be large enough to allow for a minimum of 1.5 inches of annular space on all sides of the casing for forced injection of grout through a tremie pipe.

All grouting shall be accomplished using forced injection to emplace the grout. A grout shoe is the preferred method of grouting. When emplacing the grouting material, the tremie pipe shall be lowered to the bottom of the zone to be grouted. The tremie pipe shall be kept full continuously from start to finish of the grouting procedure, with the discharge end of the tremie pipe being continuously submerged in the grout until the zone to be grouted is completely filled.

A cement or aggregate reinforced concrete pad at the ground surface that extends 6 inches beyond the borehole diameter and 6 inches below ground surface is required. The pad shall be capable of preventing infiltration between the surface casing and the borehole to the subsurface.

Monitoring wells will be completed with above-ground steel or aluminum protective casings with locking caps.

### Monitoring Well Identification

Standard well tag information is defined in SCDHEC regulation R.61-71.H.2.c . Well tags will be aluminum, permanently affixed to the protective cover, and completed with a stencil set.

Monitoring wells installed on CSXT property will include the following required information on well identification tags:

CSXT Railroad Agreement Number: CSXT812078  
Railroad phone number: 1-800-232-0144

### 4.7 Bedrock Characterization

Additional characterization of bedrock will be used to further develop the CSM and provide vertical delineation of COIs in groundwater. Methods and objectives of bedrock characterization include:

Method	Objective
Lineament survey	Identify predominant geologic structural control on groundwater flow
Water level monitoring	Evaluate interconnectivity of bedrock fractures
Groundwater monitoring well installation and sampling	Delineate vertical occurrence of COIs in groundwater
Groundwater monitoring well installation	Quantify nature and occurrence of bedrock fractures including fracture orientation, spacing, hydraulic aperture, and transmissivity
Borehole geophysics	
FLASH analysis	

#### Lineament survey

A lineament survey in the vicinity of the site and surrounding area can identify linear features at ground surface that might have resulted from underlying bedrock fractures, fracture zones, faults or other geologic structures. Areas near the MGP will be visually reviewed to identify linear features. The selected aerial photograph and topographic map will be evaluated separately and independently to provide verification of features through agreement. Aerial imagery and topographic survey information used for the lineament evaluation will meet the following criteria:

- Selected images and topographic maps will be produced prior to and during MGP operation (1917 - 1958).
- The scale and resolution are sufficiently detailed to identify apparent linear features not caused by anthropogenic activity.

Linear features may represent the approximate vicinity of preferential groundwater flow zones in bedrock. The following list developed by the U.S. Geological Survey (USGS) (Clark et. al., 1996) summarizes types of features that can be used to identify lineaments in this evaluation:

- Linear topographic features
- Straight stream segments
- Aligned gaps in ridges
- Vegetation

Lineaments will be summarized and presented on a site layout map, including a rose diagram lineament summary.

### **Water level monitoring**

Monitoring hydraulic head pressure in nearby monitoring wells during drilling and well development activities can provide evidence of interconnected bedrock fractures. Understanding how bedrock fractures are connected can increase understanding of preferential groundwater flow pathways through the subsurface and provide insight into local heterogeneity.

Up to six data logging pressure transducers will be placed adjacent to well installation and development activities. Transducers will be programmed to record water levels at a frequency of one measurement per minute to allow correlation to field drilling logs. To improve correlation of water levels with field activities, the oversight geologist will synchronize data logger date and time with field note timekeeping.

### **Borehole geophysics and analysis**

After completion of the boreholes to target depth, a series of borehole geophysical logs will be conducted along the entire open bore length (bedrock) of seven proposed drilling locations. These locations include : MW-03BRL, MW-21BR, MW-29BR, MW-35BR, MW-36BR, MW-37BR, and MW-40BR, as shown on **Figure 4-1**.

Borehole geophysical logs will be conducted to determine appropriate discrete screen intervals within the fractured bedrock flow system. Logs will include fluid

temperature/resistivity/3-arm caliper/SPR, optical and/or acoustic televiewer, and heat pulse flowmeter under ambient and pumping conditions.

A report documenting the findings of the geophysical survey will include logs, interpretations, and results. Using optical televiewer data, the dip, azimuth and aperture for detected fractures will be calculated, and the results will be presented in tadpole and stereographic plots.

Heat pulse flow data will be used for the analysis of borehole vertical flow logs using the Flow-Log Analysis of Single Holes (FLASH) computer program. Vertical flow logs in conjunction with the geophysical logs and well construction details will be used to:

- Create vertical flow profile of hydraulic conductivity with depth
- Calculate hydraulic aperture of fractures
- Quantify fracture spacing (vertical)

During the heat pulse flowmeter logging, care will be taken by the geophysics contractor to measure, record, and provide documentation of water level measurements from a data logging pressure transducer. Pumping flow rates will be measured to the nearest 0.1 gallon per minute. It is anticipated that pumping rates of approximately 1 gallon per minute can be sustained during the logging. Water level measurements and pumping flow rates are necessary to verify flowmeter data quality.

#### **4.8 Groundwater Monitoring**

A site-wide groundwater monitoring event including newly installed and existing monitoring wells is planned after installation and development of the proposed wells (**Figure 4-2**). Due to access constraints, existing well MW-18 will be replaced by the proposed MW-31 cluster in the sampling program. Site wells will be gauged for water levels prior to sampling.

Monitoring wells will be purged using low-flow methods and groundwater quality parameters (e.g., pH, conductivity, temperature, and oxidation-reduction potential) will be stabilized prior to sample collection. Field personnel will utilize a peristaltic pump or submersible pump with dedicated downhole tubing to retrieve groundwater samples. Groundwater samples will not be collected from monitoring wells where measurable (0.01 feet) NAPL is encountered.

Samples from each location will be properly preserved and shipped to a South Carolina certified laboratory for analysis of VOCs (USEPA Method 8260) and SVOCs (USEPA

Method 8270). All samples will be placed in coolers containing ice and managed under chain-of-custody protocol.

#### **4.9 Surface Water and Sediment Sampling**

Surface water and sediment samples will be collected to provide additional input for the SLERA, to assess current sediment quality in the ponded areas between the landfill parcel and the Reedy River, and to verify NAPL extent. Samples will be collected in accordance with the QAPP at locations within the ponded areas south of the Vaughn Landfill. Up to four samples will be collected from each area (**Figure 4-1**).

##### **4.9.1 Surface Water Sampling**

Surface water samples will be collected at each location prior to collecting sediment samples. Prior to surface water sample collection, field parameters will be measured by submerging a caged probe into the water. Field parameters will include the following:

- pH (standard units; s.u.)
- Temperature (degrees Celsius; °C)
- Specific conductance [SC] (micromhos,  $\mu\text{mho}$ )
- Dissolved oxygen [DO] (milligrams per liter; mg/L)
- Oxidation/Reduction Potential [ORP] (millivolts; mV)
- Turbidity (nephelometric turbidity units, NTU)
- Color
- Odor

Surface water sample collection will commence after field parameters stabilize.

Surface water samples will be collected at the midpoint of the water column. Samples may be collected by directly filling submerged bottleware or by pumping surface water into the bottleware using a peristaltic pump, HDPE tubing, and silicon tubing. If a peristaltic pump is used, HDPE tubing will be held in place with a weight or a float as needed. Samples for VOC analysis will not be pumped through silicone tubing; a backpumping method will be employed to fill these bottles. Effort will be made to avoid entraining air in the samples. A stainless-steel strainer may be added to the tubing to avoid clogging the tubing.

All equipment will be inspected by the field program on-Site supervisor and calibrated daily, as applicable, prior to use in the field according

Samples will be properly preserved and submitted to a South Carolina certified laboratory for analysis of VOCs (USEPA Method 8260) and SVOCs (USEPA Method 8270).

#### **4.9.2 Sediment Sampling**

Where feasible, sediment cores will be collected in each location to a maximum depth of 5 feet below ground surface. Cores will be collected using manual push coring methods or mechanical methods, depending on Site access conditions. Cores will be sub-sectioned into discrete samples corresponding to depths of 0.0- to 0.5-foot depth, and 0.5-foot to 1-foot, 1-foot to 2-foot, 2-foot to 3-foot, 3-foot to 4-foot, and 4-foot to 5-foot. Coring depth may be limited by refusal of hand-held equipment where mechanical access is not possible. Following collection, cores will be maintained in an upright position as much as possible. Any superficial water collected during the coring will be drained from the sampling device (e.g., if using a hard liner, by drilling a small hole a few inches above the sediment surface and allowing the water to drain). The core will be sub-sectioned using a handheld saw or similar device. Care will be taken to prevent material from flowing out of the hard liner during sectioning. Core sections will be emptied into stainless-steel bowls for homogenizing.

Field personnel will make three attempts to collect sediment cores per location. If the initial location does not provide sample recovery, coring will be attempted three additional times within a 20-foot radius of the original location. If cores cannot be retrieved after three attempts, shallow sediment samples will be collected in place of cores. Shallow samples, if applicable, will be collected using a hard liner or petite ponar (or similar) to a depth of approximately 6 inches.

Samples will be collected in accordance with the QAPP. After sampling, each sample will be homogenized using a stainless-steel spoon to mix the sediment in the bowl prior to filling the sample containers. Sediment will be transferred into sampling containers using a stainless-steel spoon or other appropriate device. Any foreign materials present (e.g., gravel, vegetation) in the sediment will be avoided when filling sample bottles. The sediment samples will be placed in iced coolers and managed under chain-of-custody protocols for submittal to a South Carolina certified laboratory for analysis of VOCs (USEPA using EPA Method 8260 and SVOCs (USEPA to include low level parent and alkylated PAHs) using

either EPA Method 8270 or EPA Method 8270 SIM. A maximum of three Method 8270 SIM analyses will be performed per sample location (e.g., a sample from the midpoint of the core, and the deepest sample).

#### **4.10 IDW Management**

Solid and liquid IDW will be generated during collection of soil cores, monitoring well installation, and environmental media sampling. Solids and liquids will be contained as appropriate in 55-gallon barrels or lined roll off containers and transported to an approved disposal facility in a timely manner. IDW containing free product should be segregated. All reusable equipment will be decontaminated using Liquinox (or similar) and water between sampling locations. Decontamination fluids will be collected and disposed of with IDW.

#### **4.11 Applicable Regulatory Standards and Screening Levels**

The data collected during proposed RI activities will continue to be compared to regulatory standards and criteria presented in the RIWP-A (ERM, April 13, 2018). Applicable criteria and screening levels are presented in **Table 4-2** and also listed below:

##### Groundwater

- SCDHEC R. 61-58 State Primary Drinking Water Standards, effective October, 2014, Appendix B maximum contaminant level (MCL) based on the USEPA National Recommended Water Quality Criteria, dated 2006
- SCDHEC regulation document R.61-68, Water Classifications & Standards, effective June 27, 2014, groundwater classification as GB, Human Health MCLs provided in the Appendix of R.61-68
- SCDHEC Quality Assurance Program Plan UST Management Division, effective February 2016, Appendix D

##### Surface water

- SCDHEC R.61-68, Water Classifications & Standards, surface water classification as FW, Human Health MCLs provided in the Appendix of R.61-68

##### Sediment/soil

- USEPA RSLs for industrial soil

## 5.0 RISK ASSESSMENT

Risk assessments will be performed to evaluate potential risks associated with exposure to environmental media at the site. A Baseline Human Health Risk Assessment of groundwater will be performed using selected historical data along with the collection of new groundwater data collected during the RI.

A phased screening level approach will be taken to assess potential human health risk from exposure to surface water and soil/sediment. In addition, a SLERA will be performed to assess potential ecological impacts.

An overview of the methodology and procedures that will be used to estimate potential human health and screening level ecological risks posed by constituents detected at the site are presented in the approved RIWP-A (ERM, April 13, 2018).

## 6.0 SCHEDULE AND REPORTING

After completion of the RIWP-A activities described above, a RI report will be prepared. The report will summarize the compiled results of remedial investigations conducted under the VCC. The RI report will include a description of activities undertaken at the site, results of the sample analysis, and an updated CSM. The report will include laboratory data sheets, data tables summarizing results of the assessment, and figures illustrating assessment activities and results of the sampling activities.

The following preliminary schedule is proposed, which is dependent on SCDHEC's written approval of the RIWP-A and obtaining the necessary property access agreements. Upon approval of the RIWP-A by SCDHEC, an updated project schedule will be developed.

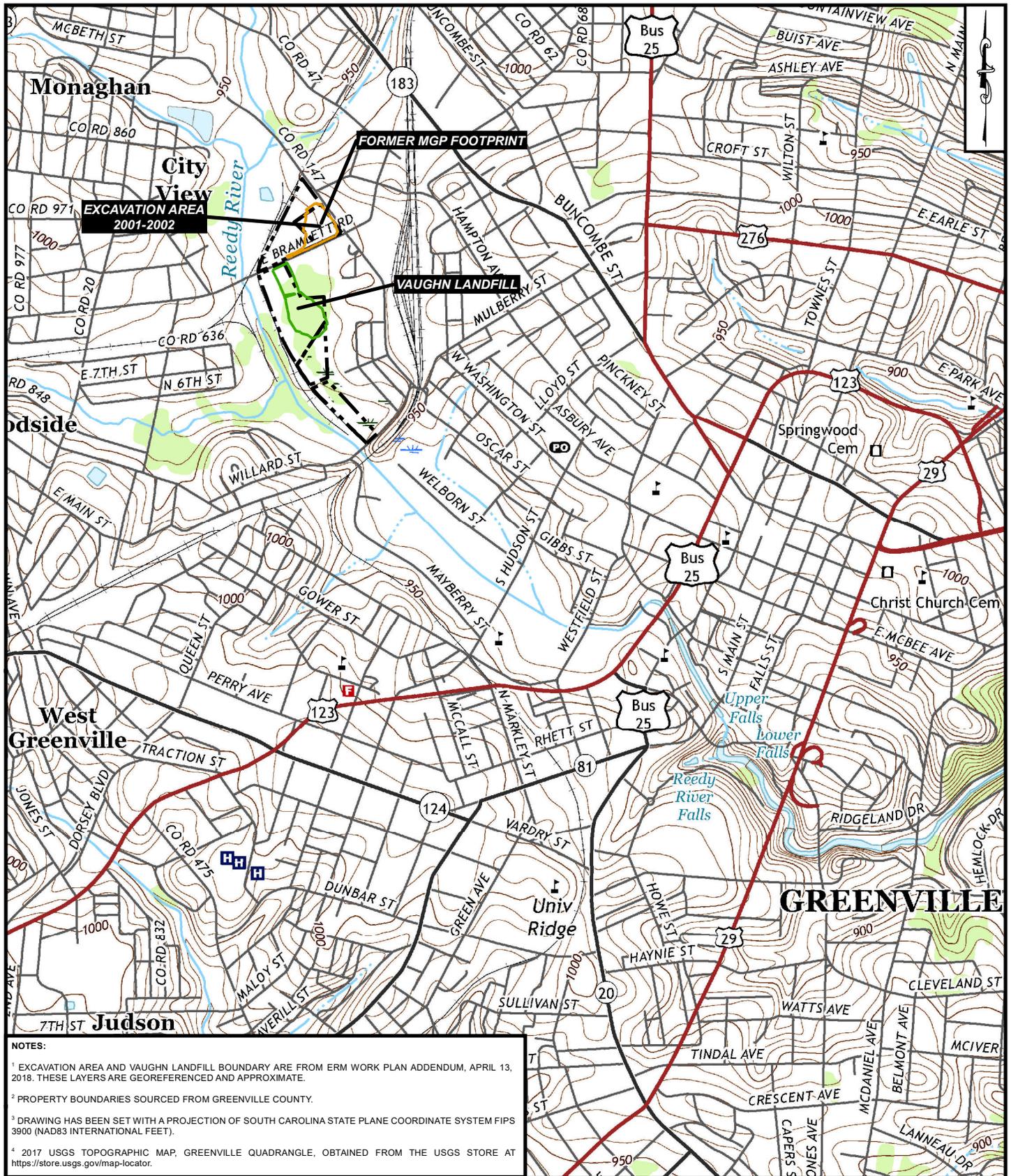
RIWP-A submittal to SCDHEC	July 3, 2019
Q2 2019 Progress Report submittal to SCDHEC	July 15, 2019
SCDHEC approval of 2019 RIWP-A	August 16, 2019
Q3 2019 Progress Report submittal to SCDHEC	October 15, 2019
Execute access agreements	90 days from RIWP-A approval
Q4 2019 Progress Report submittal to SCDHEC	January 15, 2020
Complete 2019 RIWP-A assessment	First Quarter 2020
Q1 2020 Progress Report	April 15, 2020
Submit RI Report	Second Quarter 2020

## 7.0 REFERENCES

- Agency for Toxic Substances and Disease Registry (ASTDR) U.S. Department of Health and Human Services. "Toxicological Profile for Chloromethane." December 1998. 288 p.
- ASTM International. "Standard Practice for Passive Soil Gas Sampling in the Vadose Zone for Source Identification, Spatial Variability Assessment, Monitoring, and Vapor Intrusion Evaluations."
- Beacon Environmental Services, Inc. "Passive Soil Gas Testing: Standard for Site Characterization."
- Clark, Jr., Stewart, Richard Bridge Moore, Eric W. Ferguson, and M. Zoe Picard. "Criteria and Methods for Fracture-Trace Analysis of the New Hampshire Bedrock Aquifer." *U.S. Geological Survey*.
- Duke Energy Site Remediation Services Group. 2000. "Phase III Investigation and Site Assessment Report: CSXT/Vaughn Landfill and Bramlette Road MGP Sites."
- Duke Energy Site Remediation Services Group. 2003. "Remedial Action Plan Final Report: CSXT/Vaughn Landfill and Bramlette Road MGP Sites."
- ERM NC, Inc. 2018. "Groundwater Remedial Investigation Work Plan Addendum: Bramlette MGP Site."
- O'Neill, Harry, Joseph E. Odenrantz, Wes Bratton, and Kenneth Moser. 2010. "Innovative, Non-Intrusive Passive Soil Gas Collection device Maps Large Carbon Tetrachloride Plume at the DOE Hanford Site." *WM2010 Conference*.
- South Carolina Department of Health and Environmental Control. 2016. "Regulation 61-71 Well Standards."
- South Carolina Department of Health and Environmental Control. 2016. "Voluntary Cleanup Contract in the Matter of CSXTF Bramlette Road Site, Greenville County and Duke Energy Carolinas, LLC."
- SynTerra Corporation. 2018. "Quality Assurance Project Plan (QAPP): Former Bramlette MGP Site."

US EPA. 2014. "Passive Samplers for Investigations of Air Quality: Method Description, Implementation, and Comparison to Alternative Sampling Methods."

## Figures



**NOTES:**

<sup>1</sup> EXCAVATION AREA AND VAUGHN LANDFILL BOUNDARY ARE FROM ERM WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND APPROXIMATE.

<sup>2</sup> PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.

<sup>3</sup> DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).

<sup>4</sup> 2017 USGS TOPOGRAPHIC MAP, GREENVILLE QUADRANGLE, OBTAINED FROM THE USGS STORE AT <https://store.usgs.gov/map-locator>.

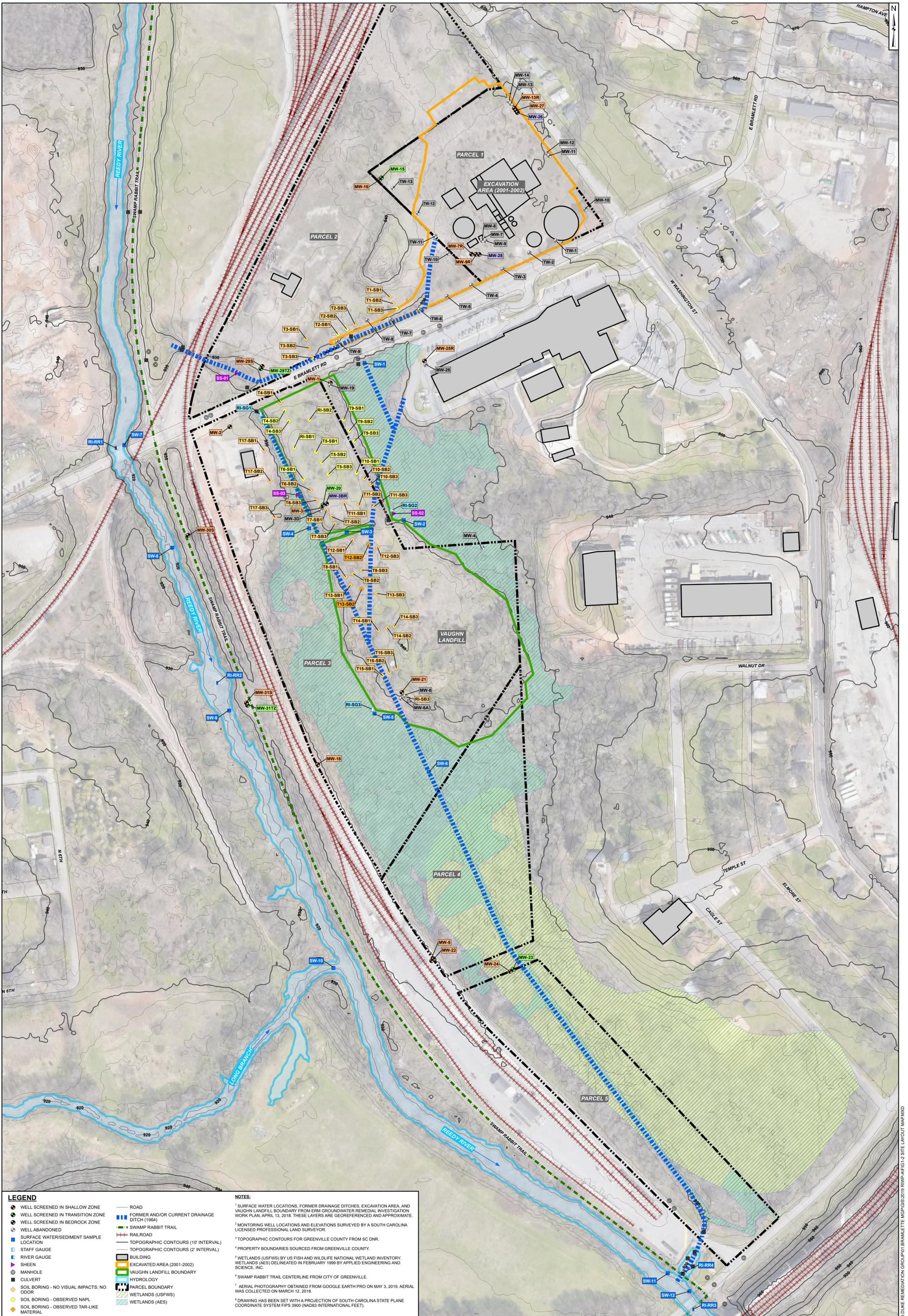


**FIGURE 1-1**  
**USGS TOPOGRAPHIC MAP**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

DRAWN BY: T. KING  
 PROJECT MANAGER: T. PLATING  
 CHECKED BY: T. PLATING

DATE: 6/4/2019





**LEGEND**

- WELL SCREENED IN SHALLOW ZONE
- WELL SCREENED IN TRANSITION ZONE
- WELL SCREENED IN BEDROCK ZONE
- WELL ABANDONED
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- STAFF GAUGE
- RIVER GAUGE
- SHEEN
- MANHOLE
- CULVERT
- SOIL BORING - NO VISUAL IMPACTS; NO ODOUR
- SOIL BORING - OBSERVED NAPL
- SOIL BORING - OBSERVED TAR-LIKE MATERIAL

— ROAD  
 ■ FORMER AND/OR CURRENT DRAINAGE DITCH (1964)  
 ■ SWAMP RABBIT TRAIL  
 ■ RAILROAD  
 — TOPOGRAPHIC CONTOURS (10' INTERVAL)  
 — TOPOGRAPHIC CONTOURS (2' INTERVAL)

■ BUILDING  
 ■ EXCAVATED AREA (2001-2002)  
 ■ VAUGHN LANDFILL BOUNDARY  
 ■ HYDROLOGY  
 ■ PARCEL BOUNDARY  
 ■ WETLANDS (USFWS)  
 ■ WETLANDS (AES)

**NOTES:**

- SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN, APRIL 13, 2018. THESE LAYERS ARE SECUREFERENCED AND APPROXIMATE.
- MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
- TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR.
- PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
- WETLANDS (USFWS) BY US FISH AND WILDLIFE NATIONAL WETLAND INVENTORY. WETLANDS (AES) DELINEATED IN FEBRUARY 1999 BY APPLIED ENGINEERING AND SCIENCE, INC.
- SWAMP RABBIT TRAIL CENTERLINE FROM CITY OF GREENVILLE.
- AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
- DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).



148 RIVER STREET,  
 SUITE 220  
 GREENVILLE, SC 29601  
 804-421-9999  
 www.synterracorp.com

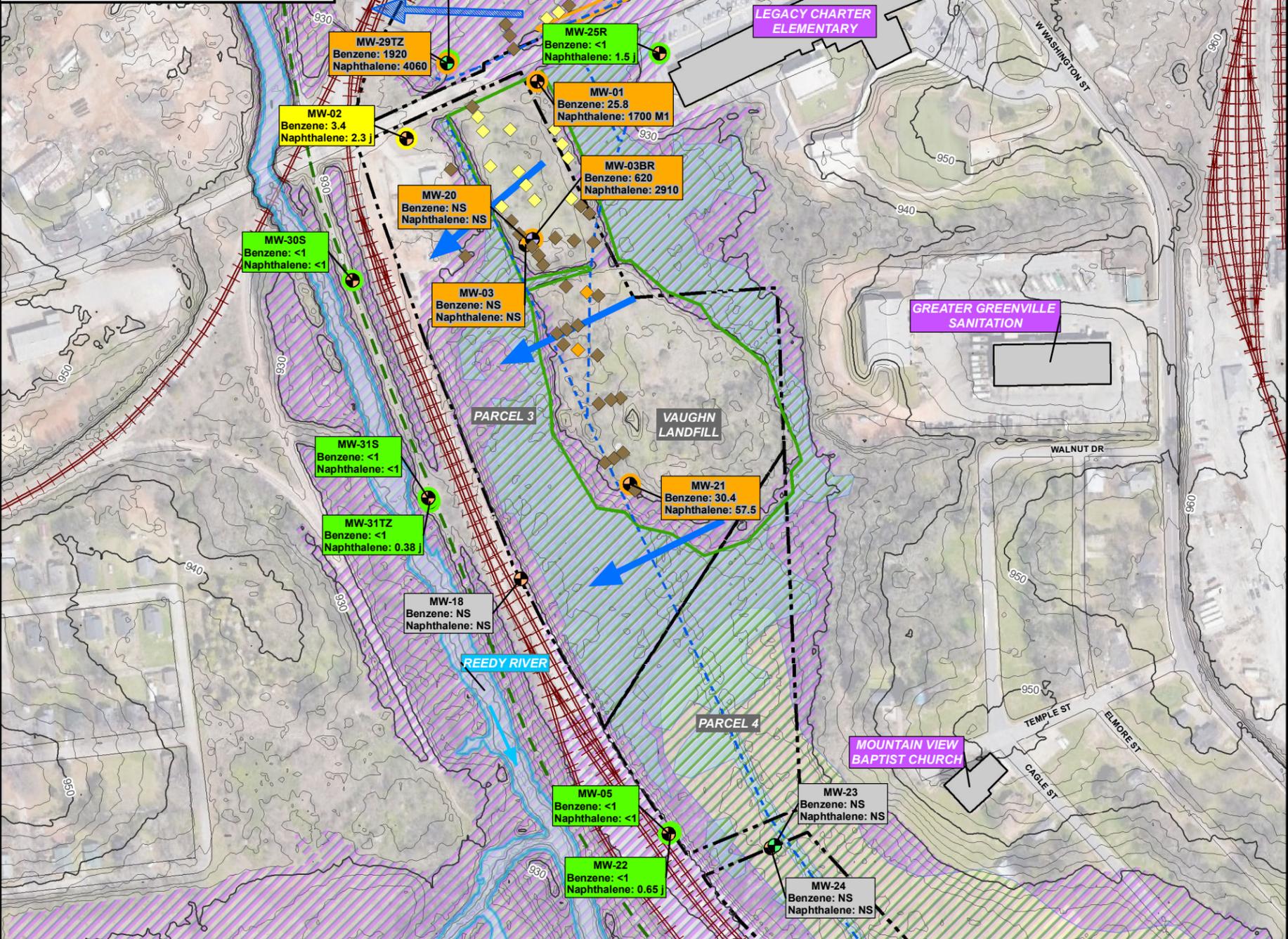
526 S. CHURCH ST.  
 CHARLOTTE, NC 28202  
 www.dukeenergy.com

DRAWN BY: A. FEIGL/T. KING/B. YOUNG
CHECKED BY: M. MASTBAUM
PROJECT MANAGER: T. PLATING
CREATED DATE: 05/03/2019
REVISED DATE: 06/09/2019

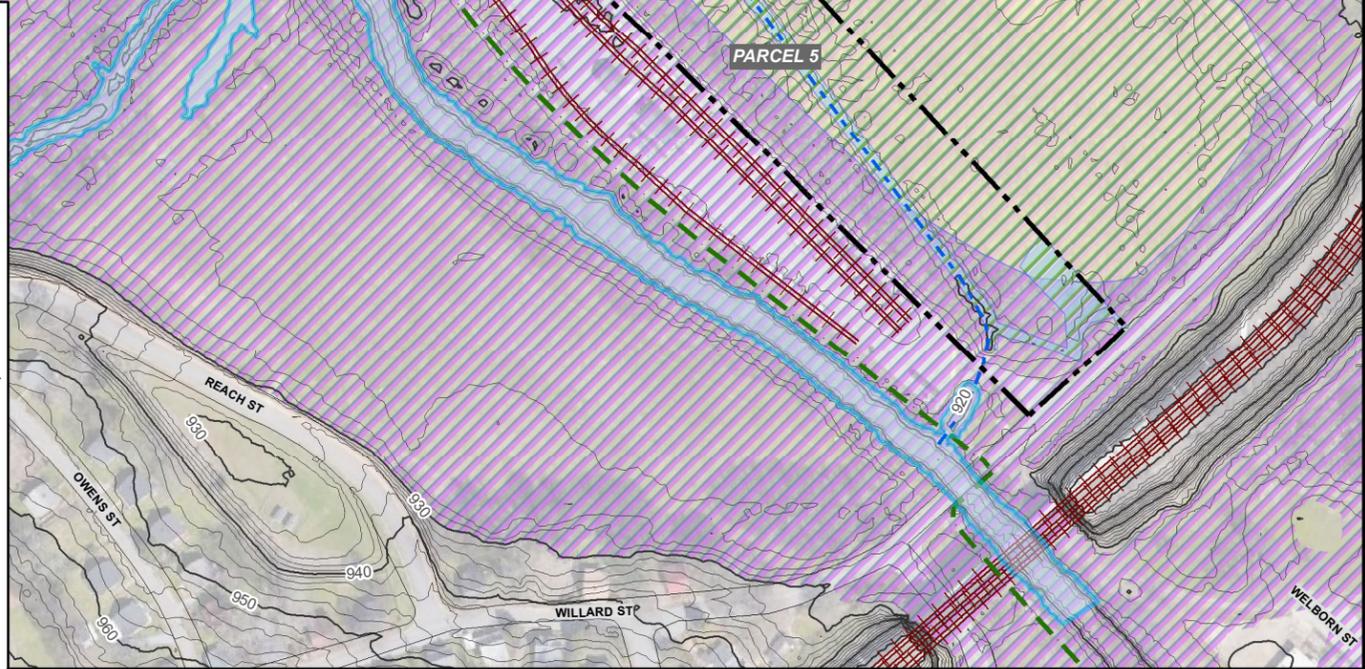
**FIGURE 1-2**  
**SITE LAYOUT MAP**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

**NOTES:**

- ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 88 (NAVD 88).
- SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND APPROXIMATE.
- MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
- TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR (2013).
- PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
- WETLANDS (USFWS) BY US FISH AND WILDLIFE NATIONAL WETLAND INVENTORY. WETLANDS (AES) DELINEATED BY APPLIED ENGINEERING AND SCIENCE, INC. IN 1999.
- SWAMP RABBIT TRAIL CENTERLINE FROM CITY OF GREENVILLE.
- AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
- DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).
- WELLS HIGHLIGHTED IN GREY TEXT INDICATE HYDROCARBON ODOR OR FREE PRODUCT VISUALLY OBSERVED DURING DRILLING OR GROUNDWATER SAMPLING ACTIVITIES.
- SOIL SAMPLES COLLECTED FROM BORINGS COMPLETED 3/12/19 THROUGH 3/29/19. GROUNDWATER SAMPLES COLLECTED FROM 3/20/19 THROUGH 3/22/19.



- LEGEND**
- WELL IN SHALLOW ZONE
  - WELL IN TRANSITION ZONE
  - WELL IN BEDROCK ZONE
  - BENZENE NOT DETECTED
  - BENZENE DETECTED LESS THAN MCL
  - BENZENE ABOVE MCL
  - SOIL BORING - NO VISUAL IMPACTS; NO ODOR
  - SOIL BORING - OBSERVED NAPL
  - SOIL BORING - OBSERVED TAR-LIKE MATERIAL
  - TOPOGRAPHIC CONTOUR (10' INTERVAL)
  - TOPOGRAPHIC CONTOUR (2' INTERVAL)
  - FLOW DIRECTION
  - INFERRED FLOW DIRECTION
  - FORMER DRAINAGE DITCH (1964)
  - ROAD
  - SWAMP RABBIT TRAIL
  - RAILROAD
  - BUILDING
  - EXCAVATED AREA (2001-2002)
  - VAUGHN LANDFILL BOUNDARY
  - HYDROLOGY
  - PARCEL BOUNDARY
  - WETLANDS (AES)
  - WETLANDS (USFWS)
  - 100-YEAR FLOODPLAIN



125 0 125 250  
GRAPHIC SCALE IN FEET

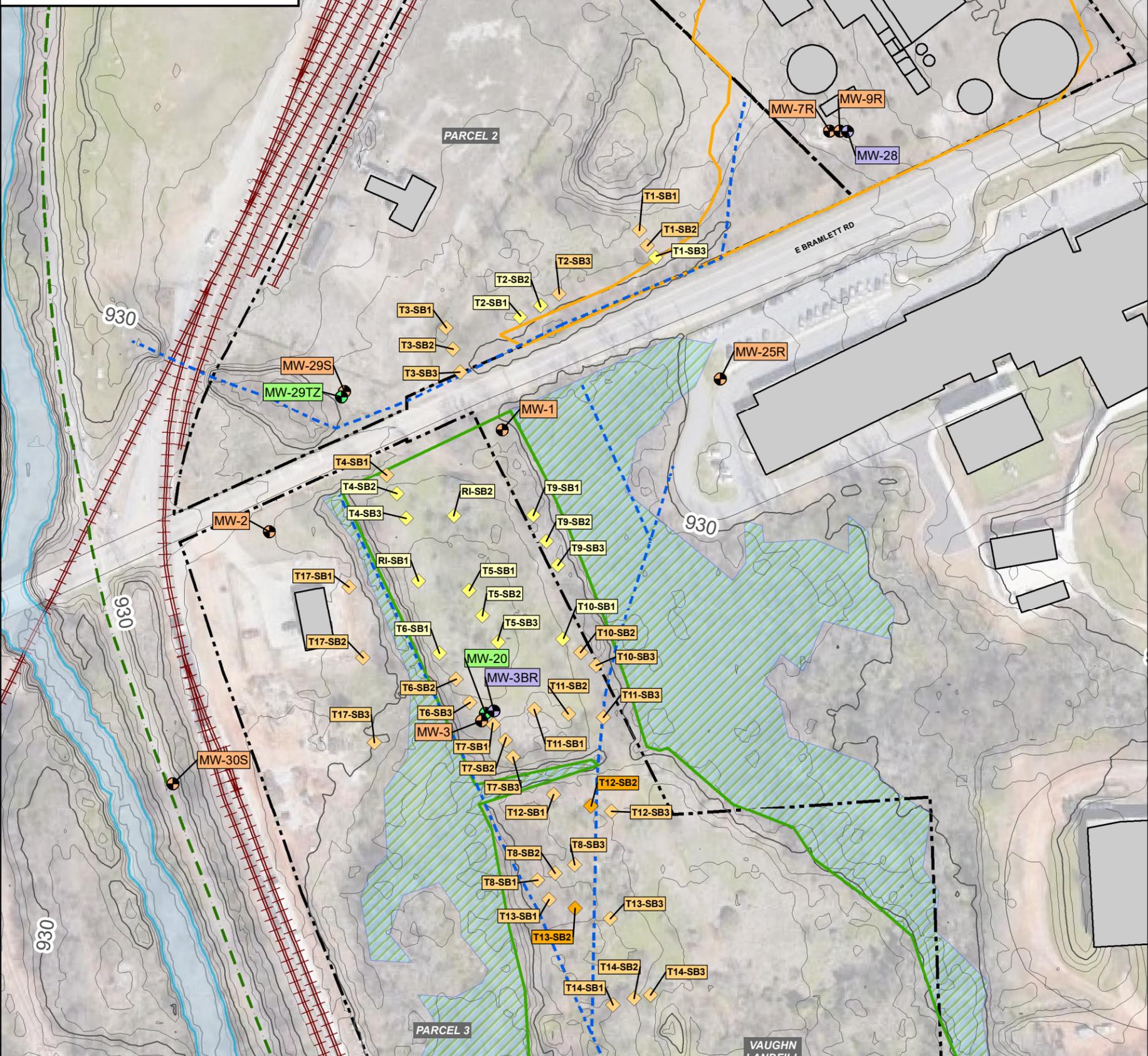
148 RIVER STREET, SUITE 220  
GREENVILLE, SOUTH CAROLINA 29601  
PHONE 864-421-9999  
www.synterracorp.com

DRAWN BY: T. KING DATE: 06/21/2019  
PROJECT MANAGER: T. PLATING  
CHECKED BY: T. PLATING

**FIGURE 2-1**  
**UPDATED CONCEPTUAL SITE MODEL**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

P:\Duke Energy Carolinas\800 Duke Remediation Group\01 Bramlette MGPIGIS2019 RIWP-A\Fig2-1 Updated CSM.mxd

- NOTES:**
- ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 88 (NAVD 88).
  - SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND APPROXIMATE.
  - MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
  - TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR (2013).
  - PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
  - WETLANDS (USFWS) BY US FISH AND WILDLIFE NATIONAL WETLAND INVENTORY. WETLANDS (AES) DELINEATED BY APPLIED ENGINEERING AND SCIENCE, INC. IN 1999.
  - SWAMP RABBIT TRAIL CENTERLINE FROM CITY OF GREENVILLE.
  - AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
  - DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).



- LEGEND**
- WELL IN SHALLOW ZONE
  - WELL IN TRANSITION ZONE
  - WELL IN BEDROCK ZONE
  - ◆ SOIL BORING - NO VISUAL IMPACTS; NO ODOR
  - ◆ SOIL BORING - OBSERVED NAPL
  - ◆ SOIL BORING - OBSERVED TAR-LIKE MATERIAL
  - TOPOGRAPHIC CONTOUR (10' INTERVAL)
  - TOPOGRAPHIC CONTOUR (2' INTERVAL)
  - FORMER DRAINAGE DITCH (1964)
  - ROAD
  - SWAMP RABBIT TRAIL
  - RAILROAD
  - ▭ BUILDING
  - ▭ EXCAVATED AREA (2001-2002)
  - ▭ VAUGHN LANDFILL BOUNDARY
  - ▭ HYDROLOGY
  - ▭ PARCEL BOUNDARY
  - ▭ WETLANDS (AES)
  - ▭ WETLANDS (USFWS)

60 0 60 120

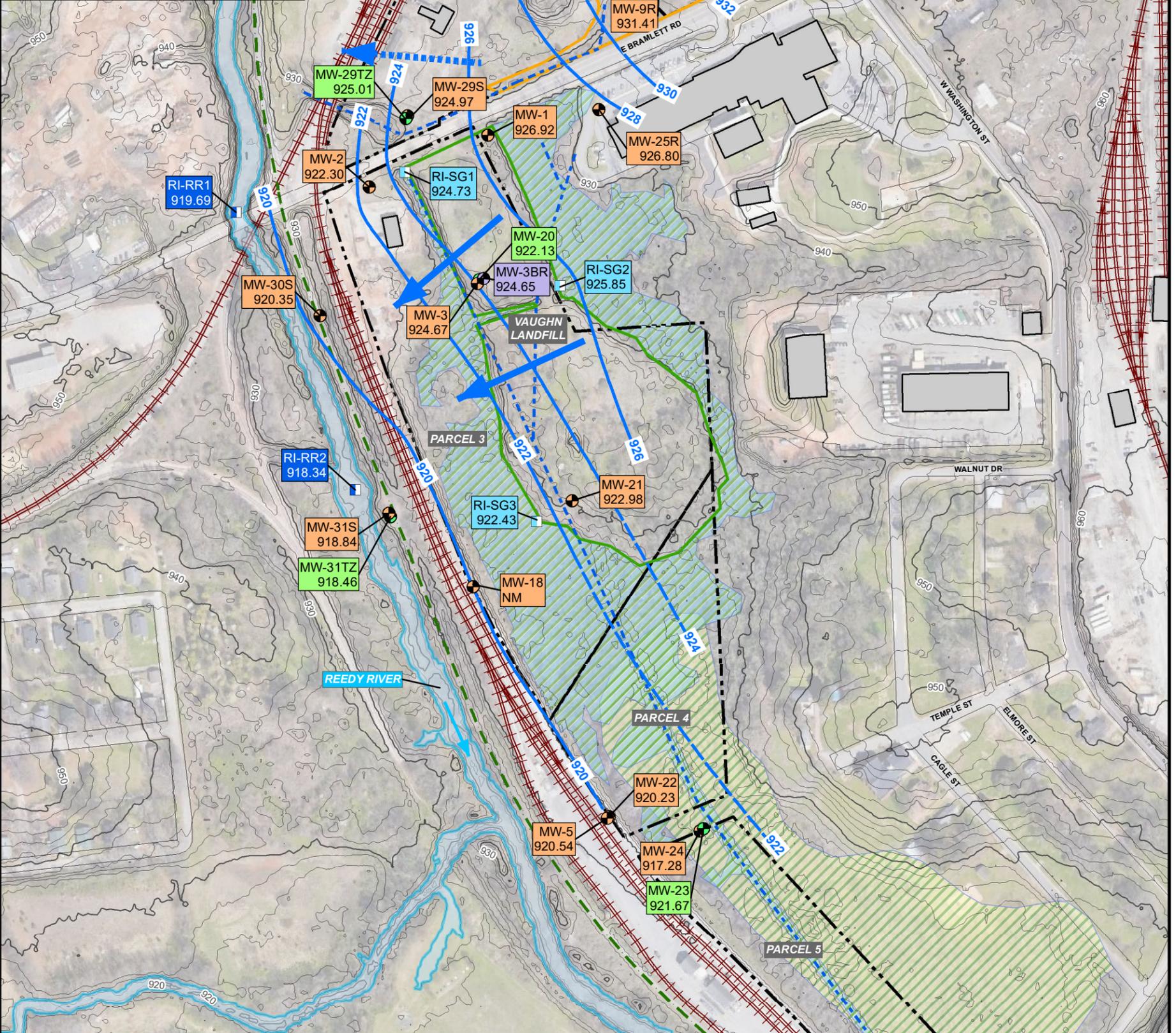
GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220  
GREENVILLE, SOUTH CAROLINA 29601  
PHONE 864-421-9999  
www.synterracorp.com

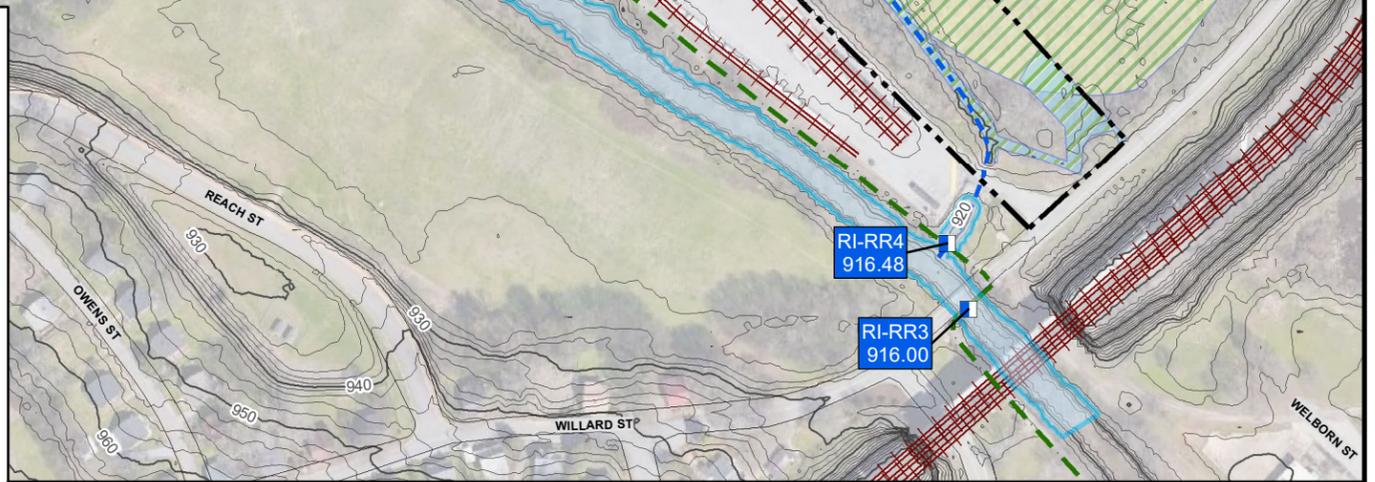
DRAWN BY: T. KING DATE: 07/02/2019  
PROJECT MANAGER: T. PLATING  
CHECKED BY: T. PLATING

**FIGURE 3-1**  
**VISUALLY OBSERVED NAPL IN SOIL**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

- NOTES:**
- 1 WATER LEVELS WERE COLLECTED ON MAY 2, 2019.
  - 2 ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 88 (NAVD 88).
  - 3 SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND APPROXIMATE.
  - 4 MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
  - 5 TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR (2013).
  - 6 PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
  - 7 WETLANDS (USFWS) BY US FISH AND WILDLIFE NATIONAL WETLAND INVENTORY. WETLANDS (AES) DELINEATED BY APPLIED ENGINEERING AND SCIENCE, INC. IN 1999.
  - 8 SWAMP RABBIT TRAIL CENTERLINE FROM CITY OF GREENVILLE.
  - 9 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
  - 10 DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).



- LEGEND**
- WELL IN SHALLOW ZONE
  - WELL IN TRANSITION ZONE
  - WELL IN BEDROCK ZONE
  - STAFF GAUGE
  - RIVER GAUGE
  - WATER ELEVATION CONTOUR (NAVD 88)
  - INFERRED WATER ELEVATION CONTOUR (NAVD 88)
  - TOPOGRAPHIC CONTOUR (10' INTERVAL)
  - TOPOGRAPHIC CONTOUR (2' INTERVAL)
  - FORMER DRAINAGE DITCH (1964)
  - ROAD
  - SWAMP RABBIT TRAIL
  - RAILROAD
  - BUILDING
  - EXCAVATED AREA (2001-2002)
  - VAUGHN LANDFILL BOUNDARY
  - HYDROLOGY
  - PARCEL BOUNDARY
  - WETLANDS (AES)
  - WETLANDS (USFWS)



125 0 125 250

GRAPHIC SCALE IN FEET

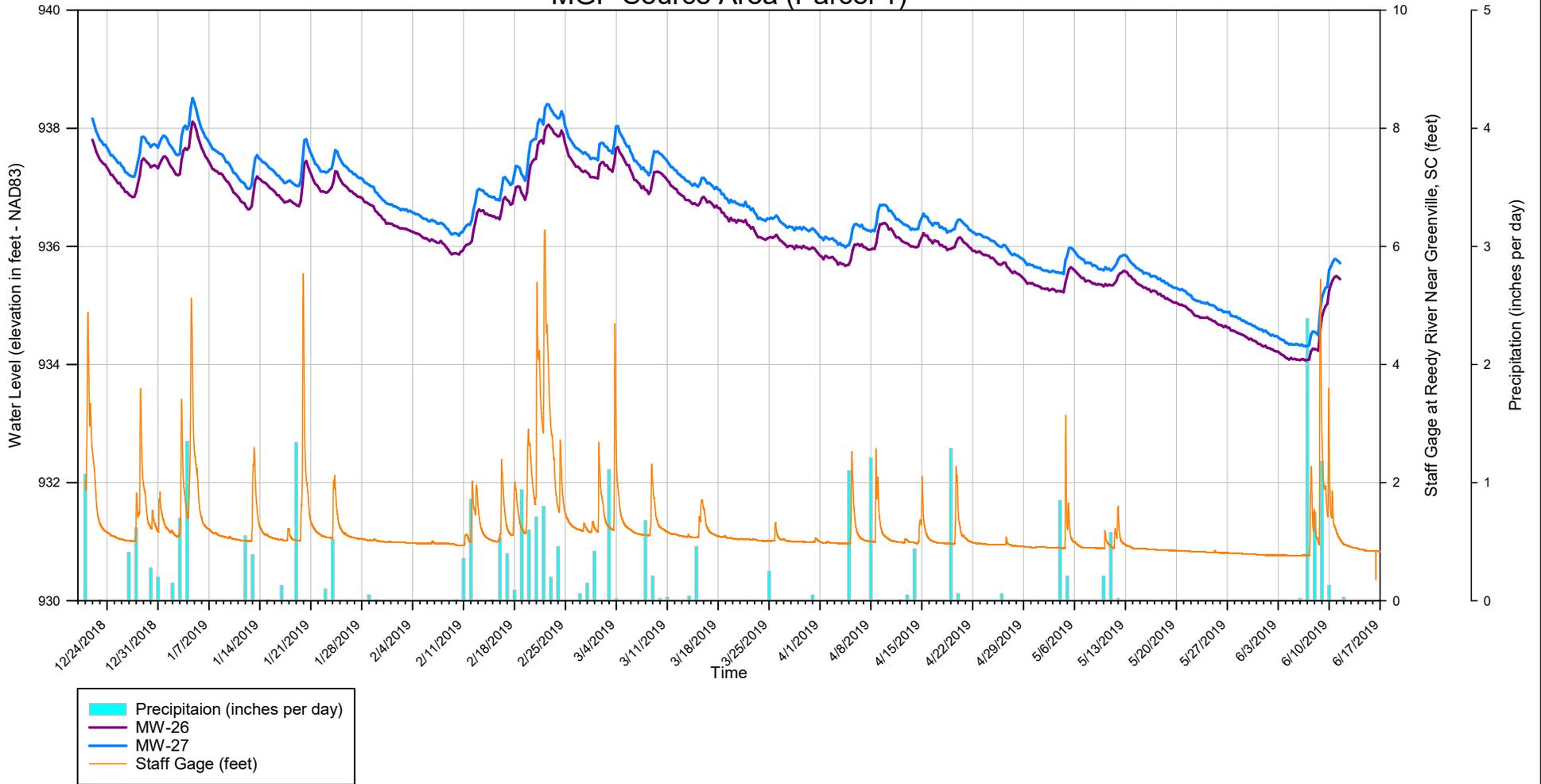
148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com

DRAWN BY: B. YOUNG      DATE: 06/03/2019  
 PROJECT MANAGER: T. PLATING  
 CHECKED BY: T. KING

P:\Duke Energy Carolinas\800 Duke Remediation Group\01 Bramlette MG\GIS\2019 RIWP-A\Fig3-2 WaterLevel\_May.mxd

**FIGURE 3-2**  
**WATER LEVEL MAP (MAY 2019)**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

### MGP Source Area (Parcel 1)



■ Precipitation (inches per day)  
— MW-26  
— MW-27  
— Staff Gage (feet)

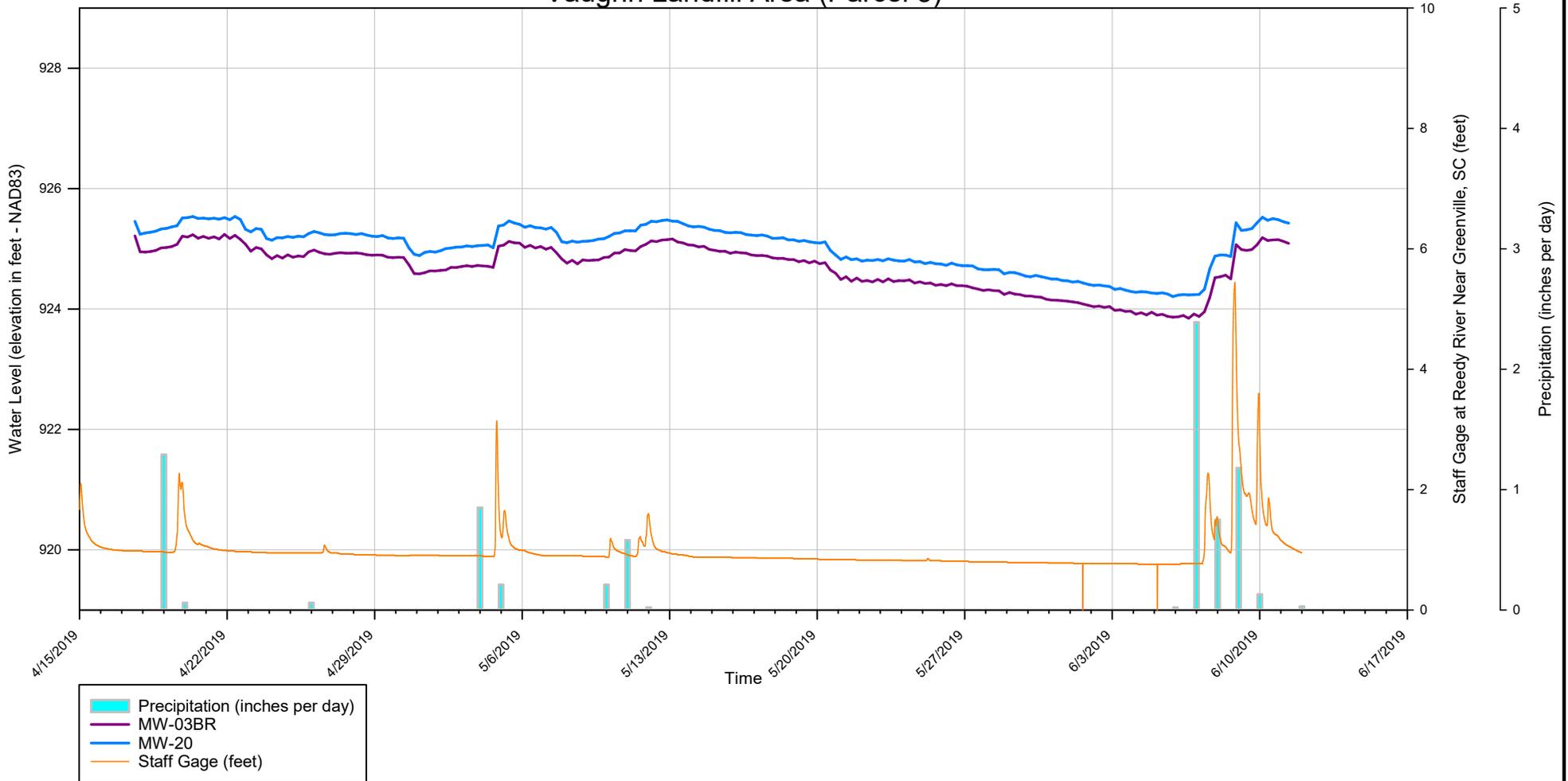


148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com  
 DRAWN BY: T KING DATE: APRIL 2019  
 PROJECT MANAGER: T PLATING  
 LAYOUT:

**FIGURE 3-3**  
**MGP SOURCE AREA (PARCEL 1) HYDROGRAPHS**  
**FORMER BRAMLETTE MGP SITE**  
**DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

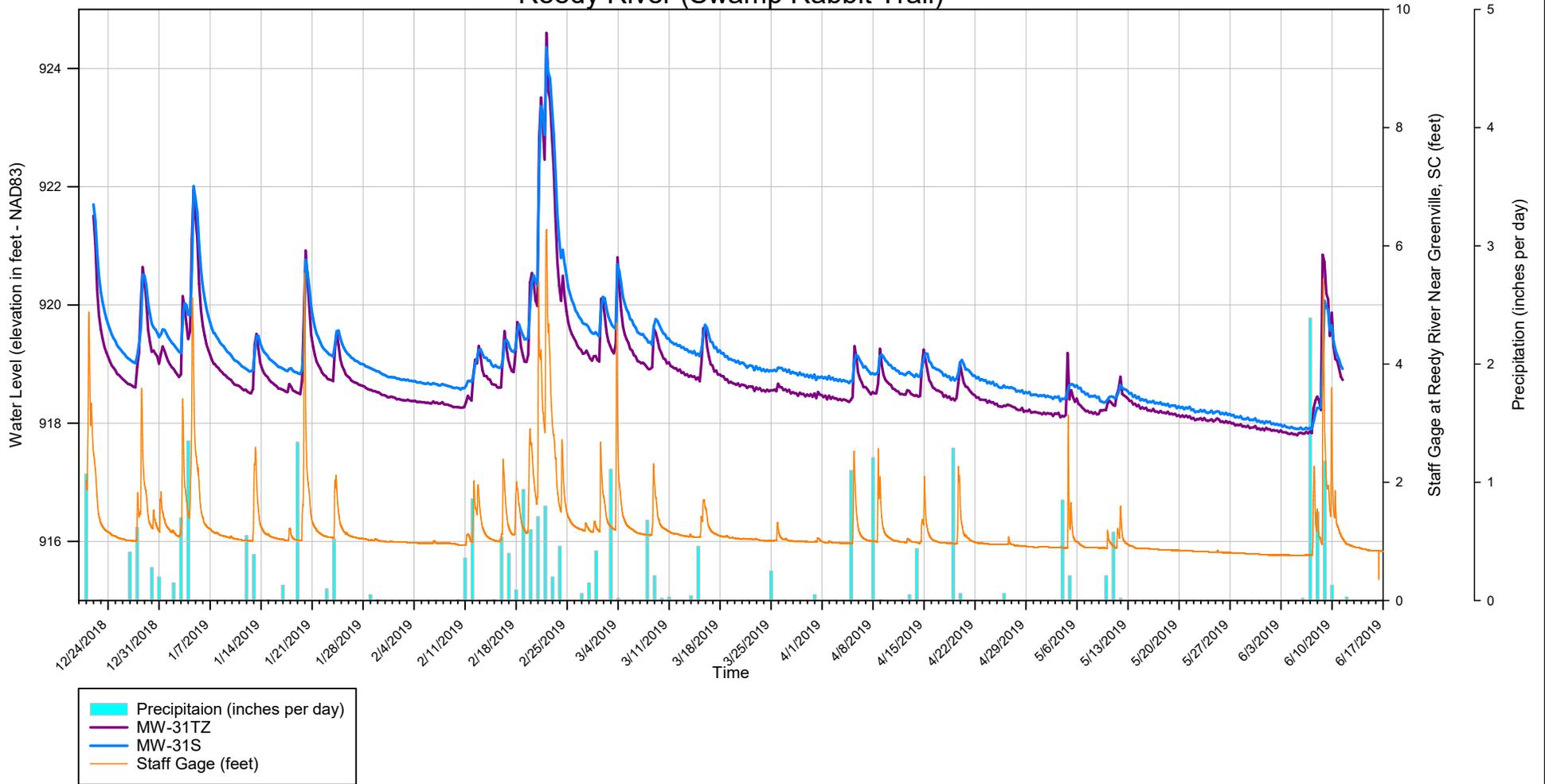
P:\Duke Energy Progress\1026102\_Ashville Ash Basin GW Assessment\Plan\50.EHS IAP Monitoring & Reporting\April 2018 Annual Report\Figures

### Vaughn Landfill Area (Parcel 3)



	148 RIVER STREET, SUITE 220 GREENVILLE, SOUTH CAROLINA 29601 PHONE 864-421-9999 www.synTerraCorp.com	<b>FIGURE 3-4</b> <b>VAUGHN LANDFILL AREA (PARCEL 3) HYDROGRAPHS</b> <b>FORMER BRAMLETTE MGP SITE</b> <b>DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC</b>
	DRAWN BY: T KING PROJECT MANAGER: T PLATING LAYOUT:	
<small>P:\Duke Energy Progress\1026102_Ashville Ash Basin GW Assessment\Plan\50.EHS IAP Monitoring &amp; Reporting\April 2018 Annual Report\Figures</small>		

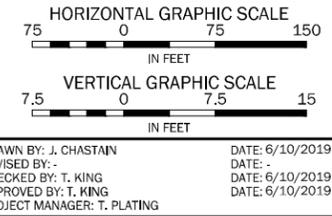
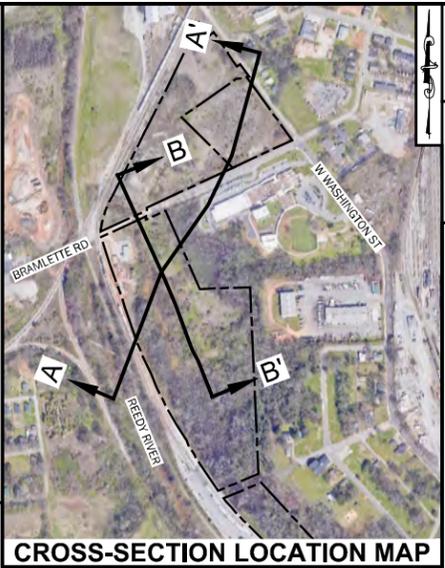
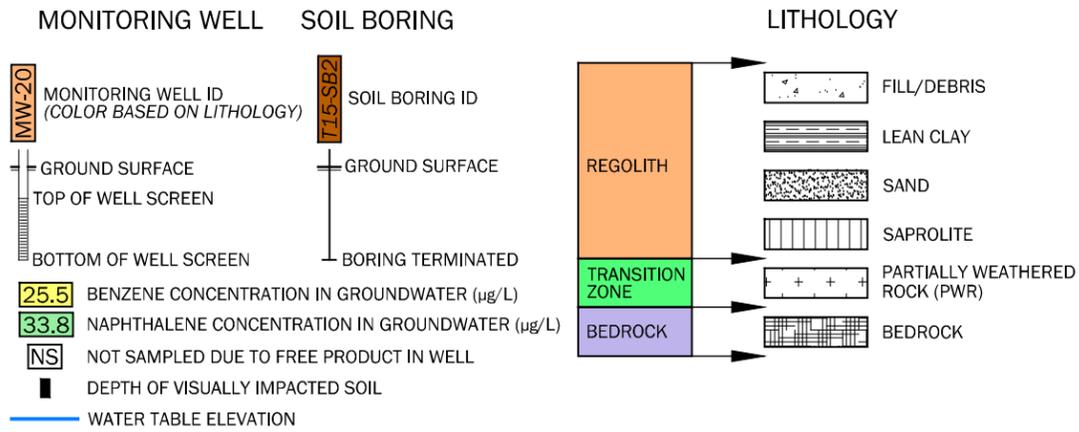
### Reedy River (Swamp Rabbit Trail)



■ Precipitation (inches per day)  
— MW-31TZ  
— MW-31S  
— Staff Gage (feet)

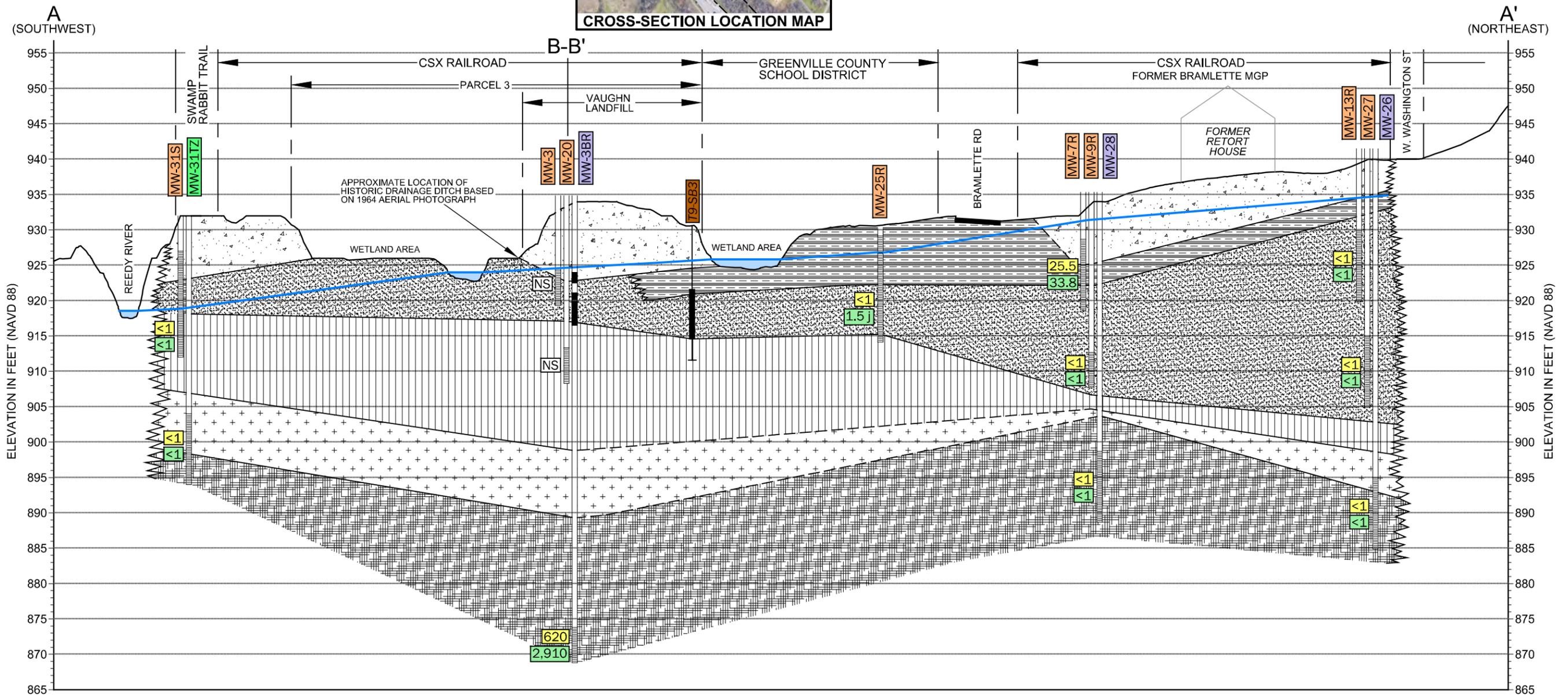
	148 RIVER STREET, SUITE 220 GREENVILLE, SOUTH CAROLINA 29601 PHONE 864-421-9999 www.synterracorp.com	<b>FIGURE 3-5</b> <b>REEDY RIVER (SWAMP RABBIT TRAIL) HYDROGRAPHS</b> <b>FORMER BRAMLETTE MGP SITE</b> <b>DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC</b>
	DRAWN BY: T KING PROJECT MANAGER: T PLATING LAYOUT:	
<small>P:\Duke Energy Progress\1026102_Ashville Ash Basin GW Assessment Plan\50.EHS IAP Monitoring &amp; Reporting\April 2018 Annual Report\Figures</small>		

**LEGEND**



**FIGURE 3-6**  
**BENZENE AND NAPHTHALENE**  
**CONCENTRATIONS IN GROUNDWATER**  
**CROSS-SECTION A-A'**  
**BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

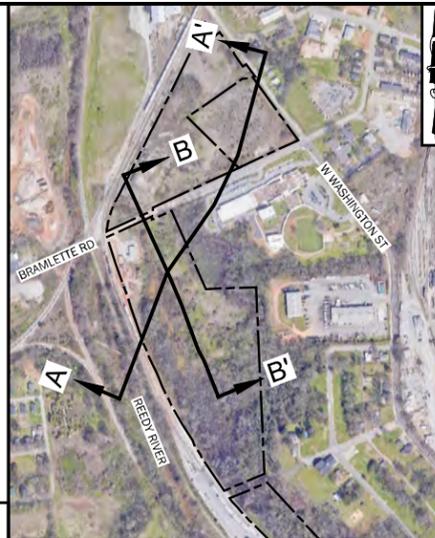
**NOTES:**  
TOPOGRAPHY BASED ON 2013 LIDAR DATA OBTAINED FROM SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (SC DNR) AT <http://www.dnr.sc.gov/GIS/lidarstatus.html>.  
MONITORING WELL AND SOIL BORINGS LOCATIONS AND ELEVATIONS WERE SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.  
PROPERTY BOUNDARIES ARE APPROXIMATE AND BASED ON GREENVILLE COUNTY GIS.  
GROUNDWATER LEVELS COLLECTED MAY 2, 2019.  
J - ESTIMATED CONCENTRATION ABOVE THE ADJUSTED METHOD DETECTION LIMIT AND BELOW THE ADJUSTED REPORTING LIMIT.  
<1 - CONCENTRATION NOT DETECTED AT OR ABOVE THE ADJUSTED REPORTING LIMIT.



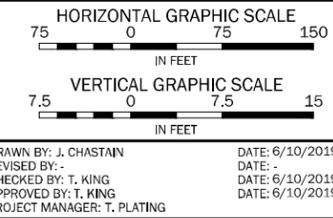
**LEGEND**

- MONITORING WELL**
- MW-20** MONITORING WELL ID (COLOR BASED ON LITHOLOGY)
  - GROUND SURFACE
  - TOP OF WELL SCREEN
  - BOTTOM OF WELL SCREEN
  - 30.4** BENZENE CONCENTRATION IN GROUNDWATER (µg/L)
  - 57.5** NAPHTHALENE CONCENTRATION IN GROUNDWATER (µg/L)
  - NS** NOT SAMPLED DUE TO FREE PRODUCT IN WELL
  - DEPTH OF VISUALLY IMPACTED SOIL
  - WATER TABLE ELEVATION
- SOIL BORING**
- T15-SB2** SOIL BORING ID
  - GROUND SURFACE
  - BORING TERMINATED

- LITHOLOGY**
- REGOLITH
  - TRANSITION ZONE
  - BEDROCK
  - FILL/DEBRIS
  - LEAN CLAY
  - SAND
  - SAPROLITE
  - PARTIALLY WEATHERED ROCK (PWR)
  - BEDROCK

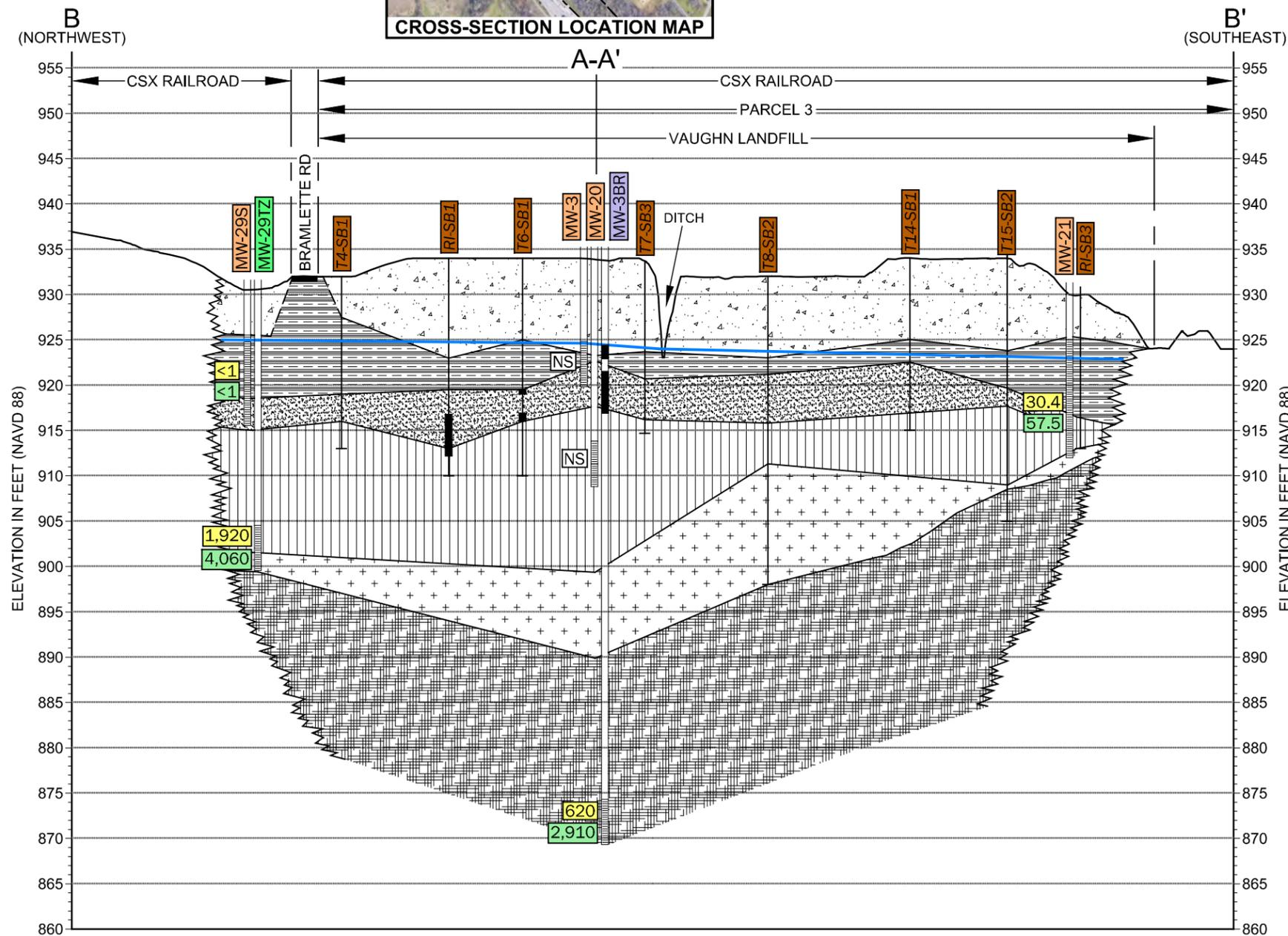


**CROSS-SECTION LOCATION MAP**



**FIGURE 3-7  
BENZENE AND NAPHTHALENE  
CONCENTRATIONS IN GROUNDWATER  
CROSS-SECTION B-B'  
BRAMLETTE MGP SITE  
EAST BRAMLETTE ROAD  
GREENVILLE, SOUTH CAROLINA**

**NOTES:**  
TOPOGRAPHY BASED ON 2013 LIDAR DATA OBTAINED FROM SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (SC DNR) AT <http://www.dnr.sc.gov/GIS/lidarstatus.html>.  
MONITORING WELL AND SOIL BORINGS LOCATIONS AND ELEVATIONS WERE SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.  
PROPERTY BOUNDARIES ARE APPROXIMATE AND BASED ON GREENVILLE COUNTY GIS.  
GROUNDWATER LEVELS COLLECTED MAY 2, 2019.  
J - ESTIMATED CONCENTRATION ABOVE THE ADJUSTED METHOD DETECTION LIMIT AND BELOW THE ADJUSTED REPORTING LIMIT.  
<1 - CONCENTRATION NOT DETECTED AT OR ABOVE THE ADJUSTED REPORTING LIMIT.



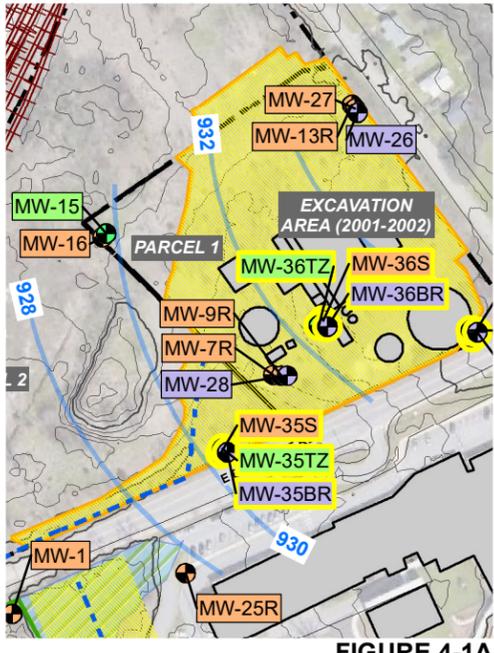
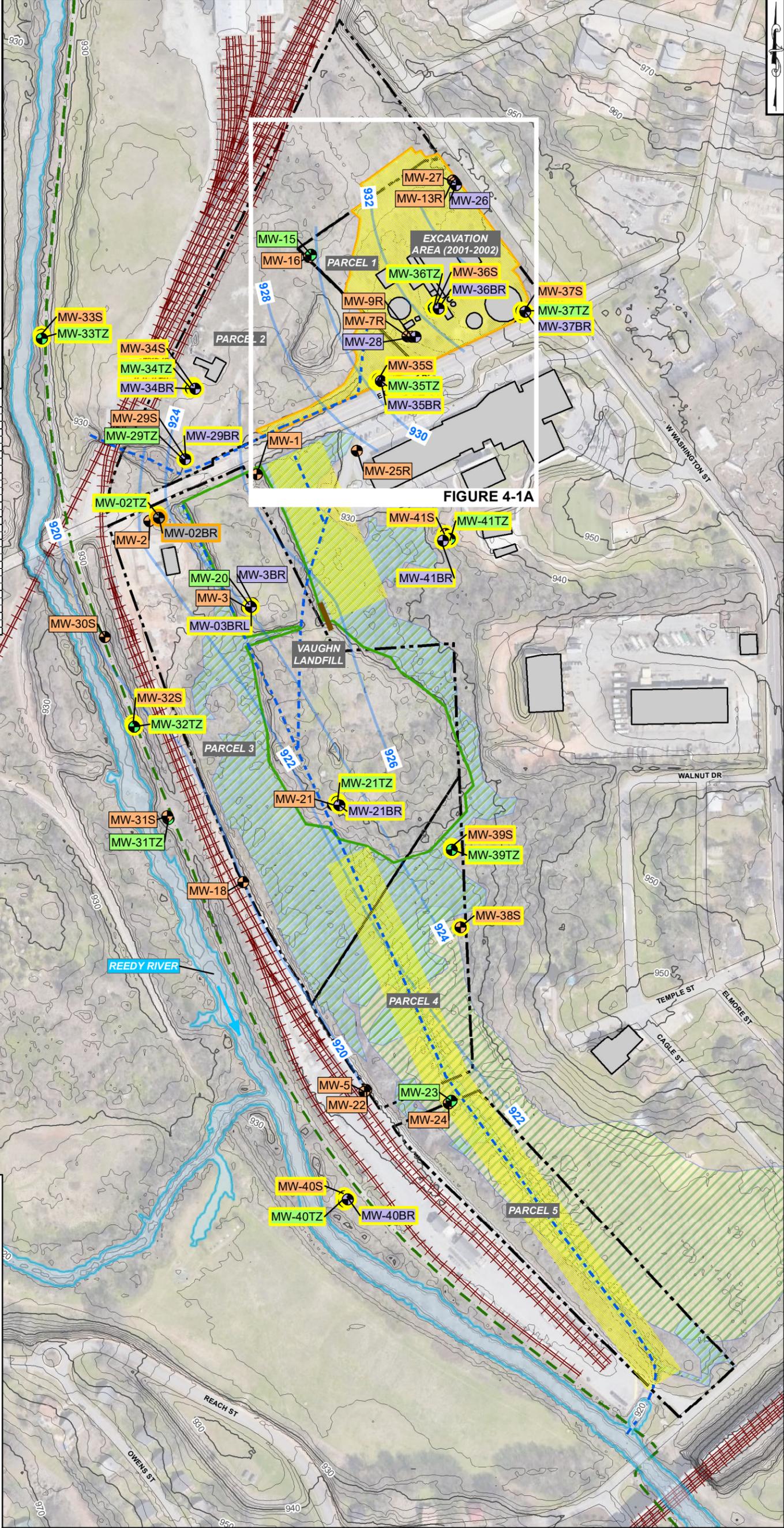
- NOTES:**
- 1 WATER LEVELS USED FOR CONTOURING WERE COLLECTED ON MAY 2, 2019.
  - 2 ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 88 (NAVD 88).
  - 3 SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND APPROXIMATE.
  - 4 MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
  - 5 PROPOSED MONITORING WELL LOCATIONS ARE APPROXIMATE. WELL LOCATIONS ARE SUBJECT TO CHANGE FOLLOWING SITE WALK OR UTILITY LOCATING.
  - 6 INSTALLATION OF SELECT BEDROCK WELLS ARE CONTINGENT ON ANALYTICAL RESULTS FROM CORRESPONDING TRANSITION ZONE WELLS.
  - 7 BEDROCK WELLS WILL BE OVERDRILLED 50-100 FEET TO FACILITATE BOREHOLE GEOPHYSICAL METHODS.
  - 8 TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR (2013).
  - 9 PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
  - 10 WETLANDS (USFWS) BY US FISH AND WILDLIFE NATIONAL WETLAND INVENTORY. WETLANDS (AES) DELINEATED BY APPLIED ENGINEERING AND SCIENCE, INC. IN 1999.
  - 11 SWAMP RABBIT TRAIL CENTERLINE FROM CITY OF GREENVILLE.
  - 12 AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
  - 13 DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL FEET).

Well ID	Approximate Surface Casing Depth (feet bbl)	Approximate Total Depth of Well (screened interval - feet bbl)	Approximate Total Depth of Boring to Facilitate Geophysics (feet bbl)
MW-37S	--	20	--
MW-37TZ	--	40	45
MW-37BR	50	60	65
MW-36S	--	10	25
MW-36TZ	--	35	40
MW-36BR	45	55	60
MW-35S	--	5	20
MW-35TZ	--	30	35
MW-35BR	40	50	55
MW-29BR	40	50	55
MW-34S	--	5	20
MW-34TZ	--	35	40
MW-34BR	45	55	60
MW-29TZ	--	25	30
MW-29BR	35	45	50
MW-02TZ	70	80	85
MW-02BR	--	20	25
MW-21BR	30	40	45
MW-33S	--	5	20
MW-33TZ	--	35	40
MW-40S	--	5	20
MW-40TZ	--	40	45
MW-40BR	50	60	65
MW-38S	--	5	20
MW-38TZ	--	35	40
MW-41S	--	5	20
MW-41TZ	--	30	35
MW-41BR	40	50	55



**LEGEND**

- WELL IN SHALLOW ZONE
- WELL IN TRANSITION ZONE
- WELL IN BEDROCK ZONE
- PROPOSED WELL IN SHALLOW ZONE
- PROPOSED WELL IN TRANSITION ZONE
- PROPOSED WELL IN BEDROCK ZONE
- PROPOSED CONTINGENCY WELL IN BEDROCK ZONE<sup>6</sup>
- AREA OF ADDITIONAL ENVIRONMENTAL MEDIA INVESTIGATIONS (SCOPE OF SAMPLING TO BE DETERMINED AT A LATER DATE)
- PROPOSED BEAVER DAM EXCAVATION
- WATER ELEVATION CONTOUR (NAVD 88)
- INFERRED WATER ELEVATION CONTOUR (NAVD 88)
- TOPOGRAPHIC CONTOUR (10' INTERVAL)
- TOPOGRAPHIC CONTOUR (2' INTERVAL)
- FORMER DRAINAGE DITCH (1964)
- ROAD
- SWAMP RABBIT TRAIL
- RAILROAD
- BUILDING
- EXCAVATED AREA (2001-2002)
- VAUGHN LANDFILL BOUNDARY
- HYDROLOGY
- PARCEL BOUNDARY
- WETLANDS (AES)
- WETLANDS (USFWS)



**synterra**

**DUKE ENERGY CAROLINAS**

125 0 125 250  
GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220  
GREENVILLE, SOUTH CAROLINA 29601  
PHONE 864-421-9999  
www.synterracorp.com

DRAWN BY: T. KING DATE: 07/01/2019  
PROJECT MANAGER: T. PLATING  
CHECKED BY: T. PLATING

**FIGURE 4-1**  
**PROPOSED WORK PLAN ADDENDUM ACTIVITIES**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**

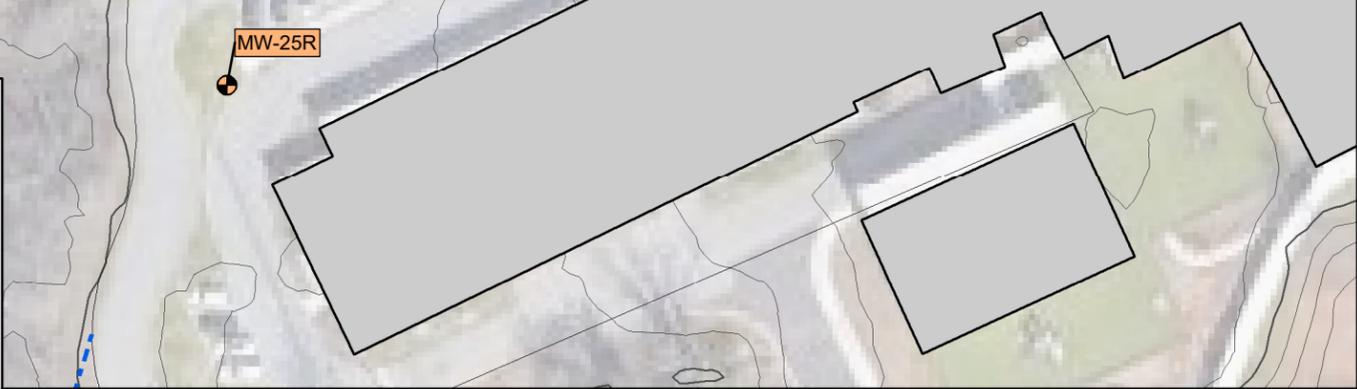
**NOTES:**

- PROPOSED SOIL BORING LOCATIONS ARE APPROXIMATE. SOIL BORING LOCATIONS ARE SUBJECT TO CHANGE FOLLOWING SITE WALK OR UTILITY CLEARING.
- FOLLOWING SOIL GAS ANALYSIS FROM THE INITIAL 47 BORINGS, 6-8 DEEPER BORINGS WILL BE PROPOSED TO VERTICALLY DELINEATE SOURCE AREA.
- SURFACE WATER LOCATIONS, FORMER DRAINAGE DITCHES, EXCAVATION AREA, AND VAUGHN LANDFILL BOUNDARY FROM ERM GROUNDWATER REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, APRIL 13, 2018. THESE LAYERS ARE GEOREFERENCED AND ARE APPROXIMATE.
- MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY A SOUTH CAROLINA LICENSED PROFESSIONAL LAND SURVEYOR.
- TOPOGRAPHIC CONTOURS FOR GREENVILLE COUNTY FROM SC DNR (2013).
- PROPERTY BOUNDARIES SOURCED FROM GREENVILLE COUNTY.
- AERIAL PHOTOGRAPHY OBTAINED FROM GOOGLE EARTH PRO ON MAY 3, 2019. AERIAL WAS COLLECTED ON MARCH 12, 2018.
- DRAWING HAS BEEN SET WITH A PROJECTION OF SOUTH CAROLINA STATE PLANE COORDINATE SYSTEM FIPS 3900 (NAD83 INTERNATIONAL).



**LEGEND**

- ◆ PROPOSED SOIL BORINGS
- WELL IN SHALLOW ZONE
- WELL IN TRANSITION ZONE
- WELL IN BEDROCK ZONE
- AREA OF ADDITIONAL ENVIRONMENTAL MEDIA INVESTIGATIONS<sup>2</sup>
- AREA OF TEST PIT INVESTIGATION
- TOPOGRAPHIC CONTOUR (10' INTERVAL)
- TOPOGRAPHIC CONTOUR (2' INTERVAL)
- - - FORMER AND/OR CURRENT DRAINAGE DITCH (1964)
- ROAD
- RAILROAD
- BUILDING
- EXCAVATED AREA (2001-2002)
- PARCEL BOUNDARY



**synterra**

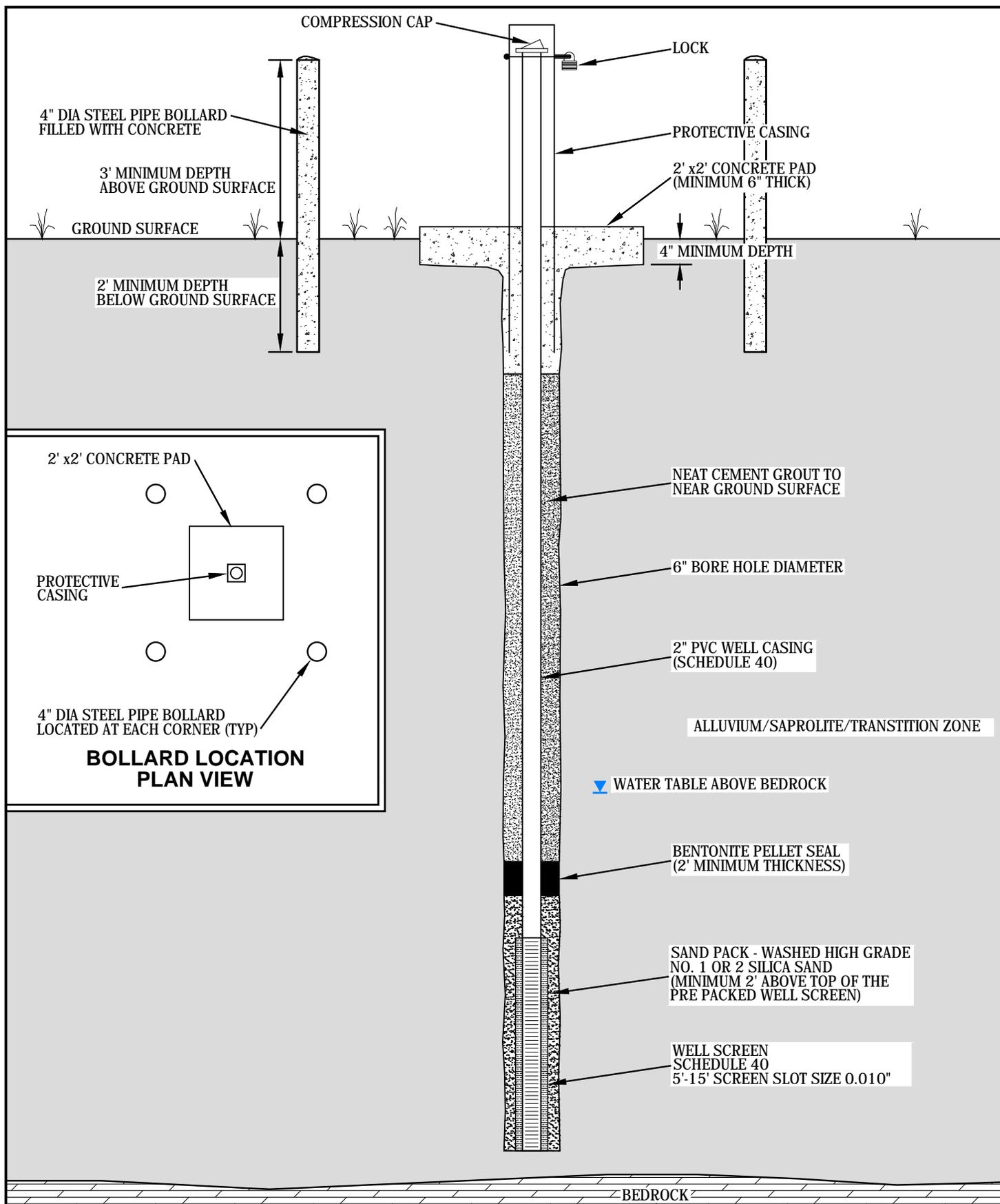
**DUKE ENERGY CAROLINAS**

40 0 40 80  
GRAPHIC SCALE IN FEET

148 RIVER STREET, SUITE 220  
GREENVILLE, SOUTH CAROLINA 29601  
PHONE 864-421-9999  
www.synterra.com

DRAWN BY: T. KING DATE: 06/03/2019  
PROJECT MANAGER: T. PLATING  
CHECKED BY: T. PLATING

**FIGURE 4-1A**  
**PROPOSED WORK PLAN ADDENDUM SOURCE AREA**  
**VERIFICATION SOIL SAMPLING**  
**FORMER BRAMLETTE MGP SITE**  
**EAST BRAMLETTE ROAD**  
**GREENVILLE, SOUTH CAROLINA**



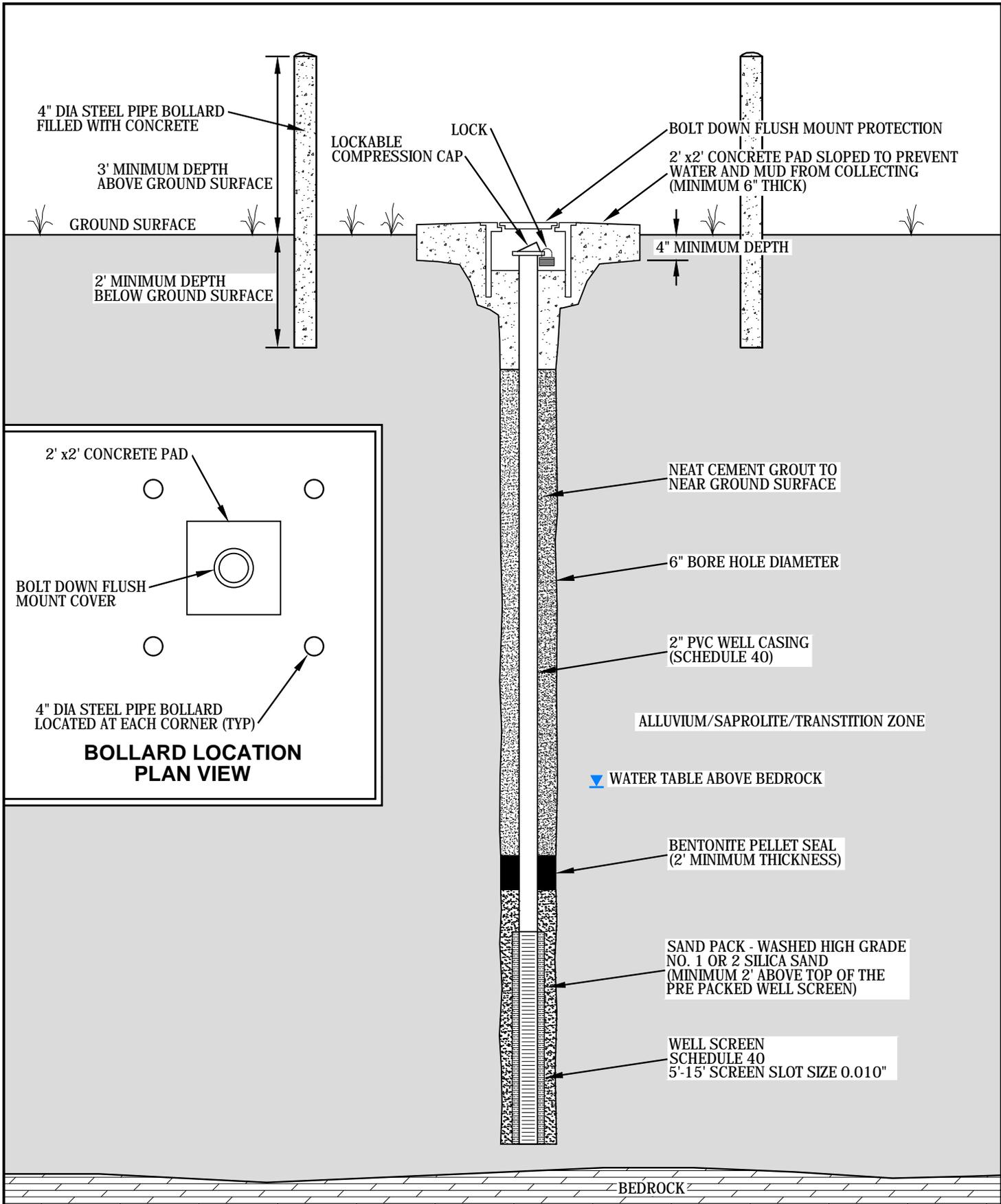
**NOT TO SCALE**

148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com

DRAWN BY: JOHN CHASTAIN DATE: 01/21/2015  
 PROJECT MANAGER: KATHY WEBB  
 LAYOUT: 2 INCH SAPROLITE WELL STICK UP

01/22/2015 2:45 PM G:\JOHN\O ACAD LIBRARY MW\MW.DWG\BRAMLETTE MONITORING WELL SCHEMATICS.dwg

**FIGURE 4-2**  
**TYPICAL SHALLOW WELL CONSTRUCTION**  
**DETAIL - STICK UP**  
**FORMER BRAMLETTE MGP SITE**  
**DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**



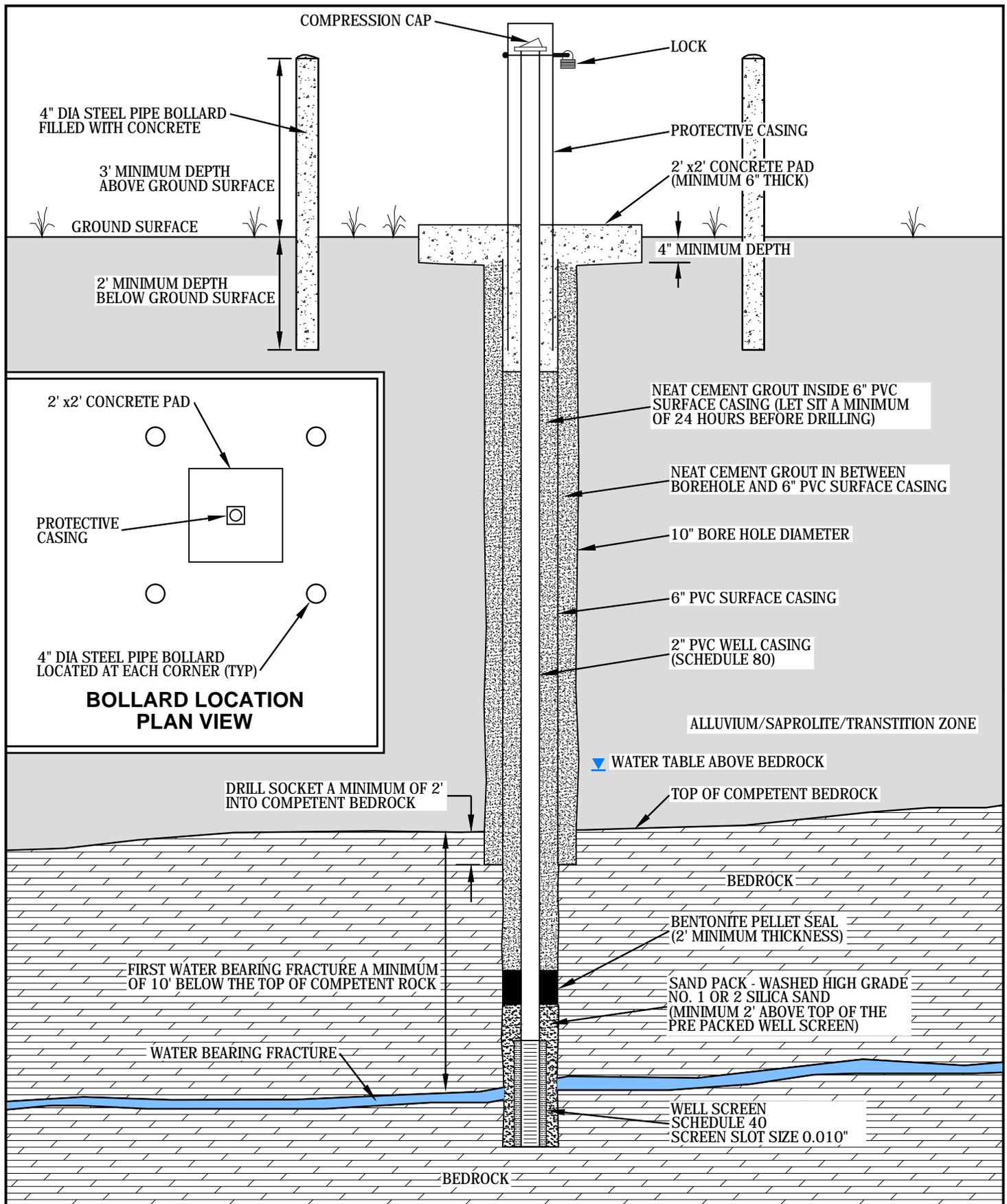
**NOT TO SCALE**

148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com

DRAWN BY: JOHN CHASTAIN DATE: 01/21/2015  
 PROJECT MANAGER: KATHY WEBB  
 LAYOUT: 2 INCH SAPROLITE WELL FLUSH MOUNT

01/22/2015 2:46 PM G:\JOHN\O ACAD LIBRARY MW\MW.DWG\BRAMLETTE MONITORING WELL SCHEMATICS.dwg

**FIGURE 4-3**  
**TYPICAL SHALLOW WELL CONSTRUCTION**  
**DETAIL - FLUSH MOUNT**  
**FORMER BRAMLETTE MGP SITE**  
**DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**



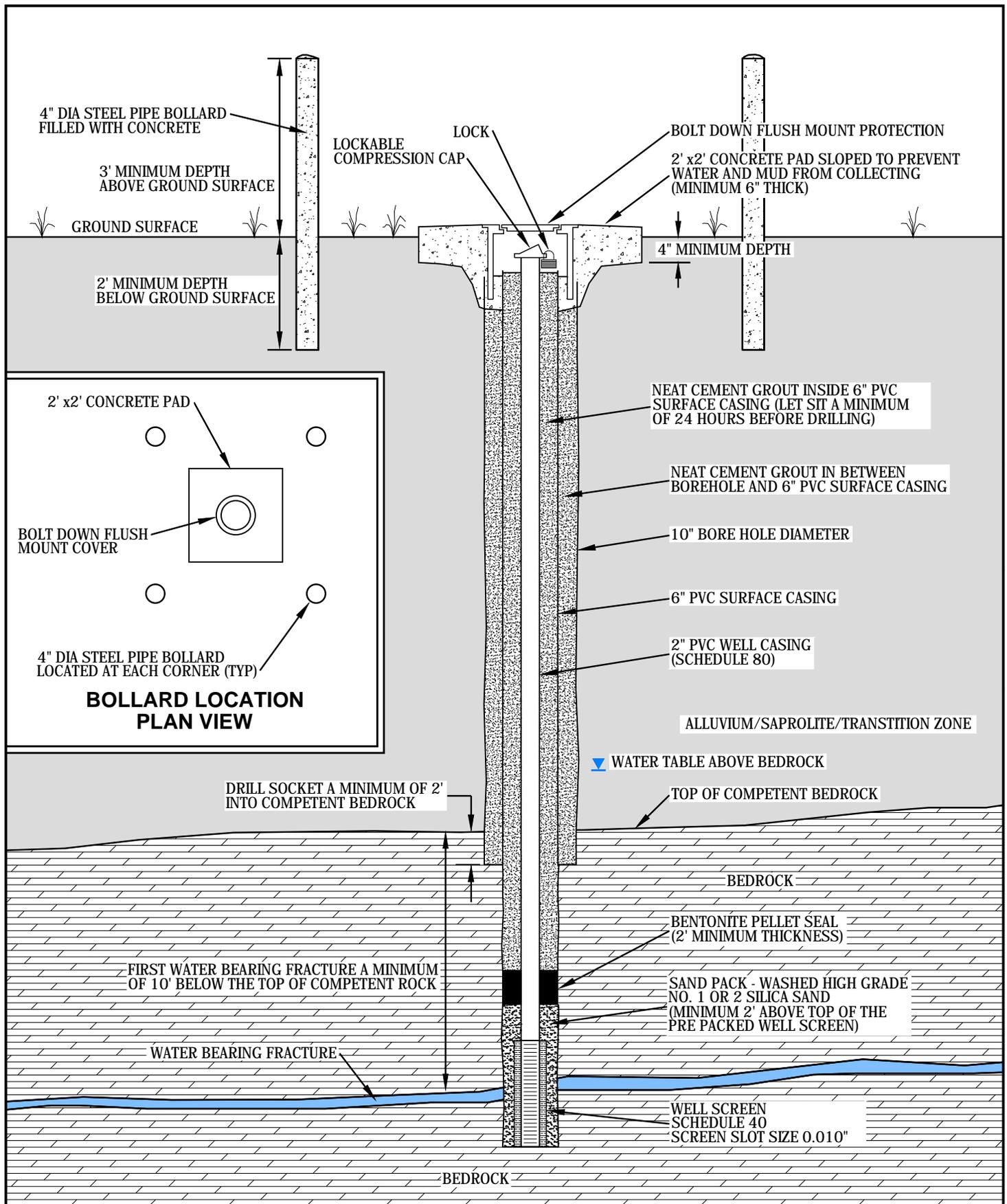
**NOT TO SCALE**

148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com

DRAWN BY: JOHN CHASTAIN DATE: 01/21/2015  
 PROJECT MANAGER: KATHY WEBB  
 LAYOUT: 2 INCH BEDROCK WELL STICK UP

01/22/2015 2:46 PM G:\JOHN\O ACAD LIBRARY MW\MW.DWG\BRAMLETTE MONITORING WELL SCHEMATICS.dwg

**FIGURE 4-4**  
**TYPICAL BEDROCK WELL CONSTRUCTION**  
**DETAIL - STICK UP**  
**FORMER BRAMLETTE MGP SITE**  
**DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**



**NOT TO SCALE**

148 RIVER STREET, SUITE 220  
 GREENVILLE, SOUTH CAROLINA 29601  
 PHONE 864-421-9999  
 www.synterracorp.com

DRAWN BY: JOHN CHASTAIN DATE: 01/21/2015  
 PROJECT MANAGER: KATHY WEBB  
 LAYOUT: 2 INCH BEDROCK WELL FLUSH MOUNT

01/22/2015 2:47 PM G:\JOHN\O ACAD LIBRARY MW\MW.DWG\BRAMLETTE MONITORING WELL SCHEMATICS.dwg

**FIGURE 4-5**  
**TYPICAL BEDROCK WELL CONSTRUCTION**  
**DETAIL - FLUSH MOUNT**  
**FORMER BRAMLETTE MGP SITE**  
**DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

# Tables

**TABLE 3-1  
MONITORING WELL CONSTRUCTION DETAILS  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Well	Installed By/For		Install Date	Well Status	Northing	Easting	Ground Elevation	TOC Elevation	Bottom of Well		Screen Length	Screen Interval				Historical Well Classification	Preliminary Revised Hydro- Stratigraphic Well Classifications <sup>1</sup>	
	Consultant	Client/Owner							ft-bls	Elevation		ft	Top	Bottom	Top			Bottom
													ft-bls		Elevation			
<b>CSXT PARCEL 1 - FORMER MGP SITE</b>																		
MW-7	AES	CSXT	Mar-96	Abandoned	---	---	933.44	935.74	15.0	918.4	10	5	15	928.4	918.4	Shallow	---	
MW-7R	Anchor QEA	Duke Energy	Jun-17	Active	1104849.061	1574503.135	932.93	936.01	15.0	917.9	10	5	15	927.9	917.9	Shallow	---	
MW-8	Duke Engineering	Duke Power	Mar-99	Abandoned	---	---	933.54	935.99	15.5	918.0	13	1.7	14.7	931.8	918.8	Combined	---	
MW-9	Duke Engineering	Duke Power	Mar-99	Abandoned	---	---	933.54	936.03	30.4	903.1	5	25.2	30.2	908.3	903.3	Deep	---	
MW-9R	Anchor QEA	Duke Energy	Jun-17	Active	1104848.766	1574514.012	933.62	936.47	29.9	903.7	5	21	26	912.6	907.6	---	---	
MW-10	Duke Engineering	Duke Power	Feb-99	Abandoned	---	---	941.47	943.39	19.5	922.0	15	3	18	938.5	923.5	Combined	---	
MW-11	Duke Engineering	Duke Power	Feb-99	Abandoned	---	---	939.49	941.81	25.7	913.8	10	14	24	925.5	915.5	Mid-Depth	---	
MW-12	Duke Engineering	Duke Power	Feb-99	Abandoned	---	---	939.19	941.89	12.0	927.2	10	1.5	11.5	937.7	927.7	Shallow	---	
MW-13	Duke Engineering	Duke Power	Mar-99	Abandoned	---	---	938.08	940.48	23.1	915.0	10	11.5	21.5	926.6	916.6	Mid-Depth	---	
MW-13R	Anchor QEA	Duke Energy	Jun-17	Active	1105219.021	1574610.864	937.93	940.94	23.5	914.5	10	10	20	927.9	917.9	---	---	
MW-14	Duke Engineering	Duke Power	Mar-99	Abandoned	---	---	937.64	940.18	13.0	924.6	10	2	12	935.6	925.6	Shallow	---	
MW-15	Duke Engineering	Duke Power	Mar-99	Active	1105042.194	1574275.573	936.39	939.09	58.4	878.0	5	50	55	886.4	881.4	Deep	Deep Saprolite	
MW-16	Duke Engineering	Duke Power	Mar-99	Active	1105037.868	1574270.95	936.73	938.61	16.0	920.7	10	5	15	931.7	921.7	Shallow	Shallow	
MW-17	Duke Engineering	Duke Power	Mar-99	Abandoned	---	---	933.29	935.22	16.0	917.3	13.9	1.6	15.5	931.7	917.8	Combined	---	
MW-26	Anchor QEA	Duke Energy	Jun-17	Active	1105207.707	1574618.806	937.90	940.91	58.4	879.5	10	45	55	892.9	882.9	---	---	
MW-27	Anchor QEA	Duke Energy	Jun-17	Active	1105213.38	1574614.926	937.83	940.93	38.6	899.2	10	25	35	912.8	902.8	---	---	
MW-28	Anchor QEA	Duke Energy	Jun-17	Active	1104848.427	1574522.331	933.88	936.69	44.6	889.3	10	35	45	898.9	888.9	---	---	
<b>CSXT PARCEL 2 - NORTH OF EAST BRAMLETT ROAD</b>																		
MW-29S	SynTerra	Duke Energy	Feb-19	Active	1573975.681	1104564.845	930.25	932.86	17.8	912.5	10	5	15	925.3	915.3	---	---	
MW-29TZ	SynTerra	Duke Energy	Feb-19	Active	1573972.226	1104558.837	930.27	932.90	34.0	896.3	5	26	31	904.3	899.3	---	---	
<b>CSXT PARCEL 3 - VAUGHN LANDFILL/WETLANDS</b>																		
MW-1	AES	CSXT	Mar-96	Active	1104523.176	1574147.694	931.47	934.31	15.0	916.5	10	5	15	926.5	916.5	Shallow	Shallow	
MW-2	AES	CSXT	Mar-96	Active	1104411.968	1573894.503	932.17	934.82	15.0	917.2	10	5	15	927.2	917.2	Shallow	Shallow	
MW-3	AES	CSXT	Mar-96	Active	1104205.179	1574124.53	932.90	935.53	14.0	918.9	5	9	14	923.9	918.9	Shallow	Shallow	
MW-3D	AES	CSXT	Mar-96	Abandoned	1104199.629	1574122.517	932.81	935.41	20.0	912.8	5	15	20	917.8	912.8	Deep	Mid-Depth Saprolite	
MW-3BR	SynTerra	Duke Energy	Mar-19	Active	1574138.038	1104216.352	932.99	935.87	64.5	868.5	5	59	64	874.0	869.0	---	---	
MW-4	AES	CSXT	Mar-96	Abandoned	---	---	932.54	935.06	7.0	925.5	5	2	7	930.5	925.5	Shallow	---	
MW-6	AES	CSXT	Mar-96	Abandoned	---	---	930.67	933.24	12.0	918.7	10	2	12	928.7	918.7	Shallow	---	
MW-6A	Duke Engineering	Duke Energy	Nov-05	Abandoned	1103722.942	1574325.996	928.50	931.62	15.0	913.5	10	5	15	923.5	913.5	Shallow	Shallow	
MW-18	Duke Engineering	Duke Power	Mar-99	Active	1103555.79	1574116.247	931.08	933.34	25.0	906.1	15	9.5	24.5	921.6	906.6	Combined	Shallow	
MW-19	Duke Engineering	Duke Power	Mar-99	Abandoned	1104516.773	1574147.074	931.65	934.20	19.0	912.7	10	9	19	922.7	912.7	Mid-Depth	Mid-Depth Saprolite	
MW-20	Duke Engineering	Duke Power	Apr-99	Active	1104213.556	1574128.665	933.23	935.71	25.5	907.7	5	20	25	913.2	908.2	Deep	Mid-Depth Saprolite	
MW-21	Duke Engineering	Duke Power	Mar-99	Active	1103738.846	1574327.052	930.68	934.53	18.0	912.7	13	5	18	925.7	912.7	Deep	Shallow	
RI-SG-1	SynTerra	Duke Energy	Mar-19	Active	1104444.149	1573969.381	927.79	---	---	---	---	---	---	---	---	---	---	
RI-SG-2	SynTerra	Duke Energy	Mar-19	Active	1104200.322	1574301.565	930.31	---	---	---	---	---	---	---	---	---	---	
RI-SG-3	SynTerra	Duke Energy	Mar-19	Active	1103695.769	1574251.979	927.44	---	---	---	---	---	---	---	---	---	---	
<b>CSXT PARCEL 4 - REEDY RIVER FLOODPLAIN/WETLANDS</b>																		
MW-5	AES	CSXT	Mar-96	Active	1103060.693	1574402.095	929.73	929.58	14.0	915.7	10	4	14	925.7	915.7	Shallow	Shallow	
MW-22	AES	CSXT	Apr-99	Active	1103063.776	1574406.424	930.47	930.30	36.5	894.0	10	25	35	905.5	895.5	Mid-Depth	Mid-Depth Saprolite	
<b>CSXT PARCEL 5 - REEDY RIVER FLOODPLAIN/WETLANDS</b>																		
MW-23	Duke Engineering	Duke Power	May-99	Active	1103037.2	1574608.164	922.25	924.63	43.0	879.3	10	32.5	42.5	889.8	879.8	Deep	Deep Saprolite	
MW-24	Duke Engineering	Duke Power	May-99	Active	1103032.223	1574601.039	922.21	926.13	11.0	911.2	10	0.4	10.4	921.8	911.8	Shallow	Shallow	
<b>GREENVILLE COUNTY - LEGACY CHARTER ELEMENTARY</b>																		
MW-25	Duke Engineering	Duke Power	May-99	Abandoned	---	---	928.53	928.53	16.7	911.8	15	1	16	927.5	912.5	Combined	---	
MW-25R	S&ME	Duke Energy	Jul-11	Active	1104577.939	1574384.196	930.79	930.75	16.6	914.2	15	1.6	16.6	929.2	914.2	Combined	Shallow	
<b>GREENVILLE COUNTY - SWAMP RABBIT TRAIL</b>																		
MW-30	SynTerra	Duke Energy	Dec-18	Active	1104136.705	1573788.946	932.84	932.60	19.9	912.9	15	4.9	19.9	927.9	912.9	---	---	
MW-31S	SynTerra	Duke Energy	Oct-18	Active	1103712.782	1573935.913	932.51	932.11	20.0	912.5	15	5	20	927.5	912.5	---	---	
MW-31TZ	SynTerra	Duke Energy	Oct-18	Active	1103705.803	1573938.694	932.37	932.07	38.0	894.4	10	28	38	904.4	894.4	---	---	
<b>REEDY RIVER</b>																		
RI-RR-1	SynTerra	Duke Energy	Apr-19	Active	1104357.704	1573609.153	938.68	---	---	---	---	---	---	---	---	---	---	
RI-RR-2	SynTerra	Duke Energy	Apr-19	Active	1103762.840	1573864.499	934.14	---	---	---	---	---	---	---	---	---	---	
RI-RR-3	SynTerra	Duke Energy	Apr-19	Active	1102176.144	1575064.152	929.49	---	---	---	---	---	---	---	---	---	---	
RI-RR-4	SynTerra	Duke Energy	Apr-19	Active	1102266.233	1575034.784	925.81	---	---	---	---	---	---	---	---	---	---	

Prepared by: VJH/MSM Checked by: TCK

**Notes:**

'---' Indicates that data is not available or not applicable

<sup>1</sup> Proposed Hydro-Stratigraphic Well Classifications (Altamont, 2016) based on the following subjective criteria:  
Deep Saprolite - Saturated Screen Mid-Point greater than 20± feet below water table surface.

Elevation - Feet relative to North American Vertical Datum (NAVD 1988)

ft - feet

ft-bls - Feet below land surface

Mid-Depth Saprolite - Saturated Screen Mid-Point between 7± and 20± feet below water table surface.

Shallow - Saturated Screen Mid-Point (SSMP) less than 7± feet.

**TABLE 3-2  
SLUG TEST RESULTS  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Shallow Zone							
Well ID	Slug Test	Slug Test Number	Analytical Solution	Hydraulic Conductivity (cm/sec)		Hydraulic Conductivity (ft/day)	
				Measured	Geometric Mean	Measured	Geometric Mean
MW-29S	Rising Head	Test 1	Bouwer-Rice	1.23E-02	1.23E-02	3.49E+01	3.49E+01
	Rising Head	Test 2	Bouwer-Rice	1.23E-02		3.49E+01	
MW-30S	Rising Head	Test 1	Bouwer-Rice	8.01E-03	5.74E-03	2.27E+01	1.63E+01
	Rising Head	Test 2	Bouwer-Rice	4.12E-03		1.17E+01	
MW-31S	Rising Head	Test 1	Bouwer-Rice	4.08E-03	2.43E-03	1.16E+01	6.88E+00
	Rising Head	Test 2	Bouwer-Rice	1.45E-03		4.10E+00	
				GEOMETRIC MEAN	5.56E-03		1.58E+01
				HIGHEST CONDUCTIVITY	1.23E-02		3.49E+01
				LOWEST CONDUCTIVITY	1.45E-03		4.10E+00

Transition Zone							
Well ID	Slug Test	Slug Test Number	Analytical Solution	Hydraulic Conductivity (cm/sec)		Hydraulic Conductivity (ft/day)	
				Measured	Geometric Mean	Measured	Geometric Mean
MW-29TZ	Rising Head	Test 1	Hvorslev	8.22E-05	9.60E-05	2.33E-01	2.72E-01
	Rising Head	Test 2	Hvorslev	1.12E-04		3.18E-01	
MW-31TZ	Rising Head	Test 1	Hvorslev	2.00E-04	1.94E-04	5.67E-01	5.50E-01
	Rising Head	Test 2	Hvorslev	1.88E-04		5.32E-01	
				GEOMETRIC MEAN	1.36E-04		3.87E-01
				HIGHEST CONDUCTIVITY	2.00E-04		5.67E-01
				LOWEST CONDUCTIVITY	8.22E-05		2.33E-01

Bedrock Zone							
Well ID	Slug Test	Slug Test Number	Analytical Solution	Hydraulic Conductivity (cm/sec)		Hydraulic Conductivity (ft/day)	
				Measured	Geometric Mean	Measured	Geometric Mean
MW-03BR	Rising Head	Test 1	Hvorslev	1.90E-05	1.87E-05	5.38E-02	5.29E-02
	Rising Head	Test 2	Hvorslev	1.84E-05		5.21E-02	
				GEOMETRIC MEAN	1.87E-05		5.29E-02
				HIGHEST CONDUCTIVITY	1.90E-05		5.38E-02
				LOWEST CONDUCTIVITY	1.84E-05		5.21E-02

Prepared by: CHB Checked by: TCK

**Notes:**

- ft - feet
- bls - below land surface
- cm - centimeter
- sec - second
- gpm - gallons per minute

**TABLE 3-3  
NAPL RESULTS SUMMARY  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analyte	Reporting Units	MW-6A NAPL	MW-3BR NAPL
3-Methyl-1-butene	µg/kg	ND	ND
Isopentane	µg/kg	ND	ND
1-Pentene	µg/kg	ND	ND
2-Methyl-1-Butene	µg/kg	ND	ND
Pentane	µg/kg	ND	ND
trans-2-Pentene	µg/kg	ND	ND
Isoprene	µg/kg	ND	ND
cis-2-Pentene	µg/kg	ND	ND
Tertiary Butanol	µg/kg	ND	ND
2,2-Dimethylbutane	µg/kg	ND	ND
4-Methyl-1-pentene	µg/kg	ND	ND
Cyclopentane	µg/kg	ND	ND
2,3-Dimethylbutane	µg/kg	ND	ND
2-Methylpentane	µg/kg	ND	ND
Methyl tert butyl ether	µg/kg	ND	ND
3-Methylpentane	µg/kg	ND	ND
1-Hexene	µg/kg	ND	ND
n-Hexane	µg/kg	ND	ND
Isopropyl Ether	µg/kg	ND	ND
trans-2-Hexene	µg/kg	ND	ND
2-Methyl-2-pentene	µg/kg	ND	ND
cis-2-Hexene	µg/kg	ND	ND
Ethyl-Tert-Butyl-Ether	µg/kg	ND	ND
2,2-Dimethylpentane	µg/kg	ND	ND
Methylcyclopentane	µg/kg	ND	ND
2,4-Dimethylpentane	µg/kg	ND	ND
2,2,3-Trimethylbutane	µg/kg	ND	ND
1,2-Dichloroethane	µg/kg	ND	ND
3,3-Dimethylpentane	µg/kg	ND	ND
Cyclohexane	µg/kg	ND	ND
2-Methylhexane	µg/kg	ND	ND
Benzene	µg/kg	32600J	1920J
2,3-Dimethylpentane	µg/kg	ND	ND
Thiophene	µg/kg	ND	ND
1,1-Dimethylcyclopentane	µg/kg	ND	ND
3-Methylhexane	µg/kg	ND	ND
Tertiary-Amyl Methyl Ether	µg/kg	ND	ND
1,3-Dimethylcyclopentane (cis)	µg/kg	ND	ND
3-Ethylpentane	µg/kg	ND	ND
1,3-DMCP (trans)/2-Methyl-1-hexene	µg/kg	ND	ND
1-Heptene/1,2-DMCP (trans)	µg/kg	ND	ND
Isooctane	µg/kg	ND	ND
trans-3-Heptene	µg/kg	ND	ND
Heptane	µg/kg	ND	ND
trans-2-Heptene	µg/kg	ND	ND
cis-2-Heptene	µg/kg	ND	ND
2,2-Dimethylhexane	µg/kg	ND	ND
Methylcyclohexane	µg/kg	ND	ND
2,5-Dimethylhexane	µg/kg	ND	ND
Xylene (Total)	µg/kg	874000	29300
2,4-Dimethylhexane	µg/kg	ND	ND
Ethylcyclopentane	µg/kg	ND	ND
2,2,3-Trimethylpentane	µg/kg	ND	ND
2,3,4-Trimethylpentane	µg/kg	ND	ND
2,3,3-Trimethylpentane	µg/kg	ND	ND
2,3-Dimethylhexane	µg/kg	ND	ND
2-Methylheptane	µg/kg	ND	ND
4-Methylheptane	µg/kg	ND	ND
3-Methylheptane	µg/kg	ND	ND
3-Ethylhexane	µg/kg	ND	ND
Toluene	µg/kg	198000	3110J
2-Methylthiophene	µg/kg	ND	ND
1,4-Dimethylcyclohexane (trans)	µg/kg	ND	ND
3-Methylthiophene	µg/kg	ND	ND
1-Octene	µg/kg	ND	ND
Octane	µg/kg	ND	ND
1,2-Dimethylcyclohexane (trans)	µg/kg	ND	ND
1,2-Dibromoethane	µg/kg	ND	ND
cis-2-Octene	µg/kg	ND	ND
Isopropylcyclopentane	µg/kg	ND	ND
1,2-Dimethylcyclohexane (cis)	µg/kg	ND	ND
2,5-Dimethylheptane	µg/kg	ND	ND

**TABLE 3-3  
NAPL RESULTS SUMMARY  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analyte	Reporting Units	MW-6A NAPL	MW-3BR NAPL
3,5-Dimethylheptane	µg/kg	ND	ND
3,3-Dimethylheptane	µg/kg	ND	ND
1,1,4-Trimethylcyclohexane	µg/kg	ND	ND
2,3-Dimethylheptane	µg/kg	ND	ND
3,4-Dimethylheptane	µg/kg	ND	ND
4-Methyloctane	µg/kg	ND	ND
2-Methyloctane	µg/kg	ND	ND
Ethylbenzene	µg/kg	311000	26500
2-Ethylthiophene	µg/kg	ND	ND
3-Methyloctane	µg/kg	ND	ND
3,3-Diethylpentane	µg/kg	ND	ND
p/m-Xylene	µg/kg	614000	19800
1-Nonene	µg/kg	ND	ND
trans-3-Nonene	µg/kg	ND	ND
cis-3-Nonene	µg/kg	ND	ND
Nonane (C9)	µg/kg	28700J	ND
Styrene	µg/kg	ND	ND
o-Xylene	µg/kg	260000	9480
2-Nonene	µg/kg	ND	ND
Isopropylcyclohexane	µg/kg	ND	ND
Isopropylbenzene	µg/kg	63100J	3090J
3,3-Dimethyloctane	µg/kg	ND	ND
n-Propylbenzene	µg/kg	11100J	798J
2-Methylnonane	µg/kg	ND	ND
3-Methylnonane	µg/kg	ND	ND
1-Methyl-3-Ethylbenzene	µg/kg	340000	34000
1-Methyl-4-Ethylbenzene	µg/kg	195000	17000
1,3,5-Trimethylbenzene	µg/kg	204000	9590
1-Decene	µg/kg	ND	ND
Isobutylcyclohexane	µg/kg	ND	ND
1-Methyl-2-Ethylbenzene	µg/kg	51400J	2530J
Decane (C10)	µg/kg	74100J	1140J
tert-Butylbenzene	µg/kg	ND	ND
1,2,4-Trimethylbenzene	µg/kg	554000	28500
Isobutylbenzene	µg/kg	ND	ND
sec-Butylbenzene	µg/kg	ND	ND
1-Methyl-3-Isopropylbenzene	µg/kg	53000J	4210
1-Methyl-4-Isopropylbenzene	µg/kg	33500J	2300J
1,2,3-Trimethylbenzene	µg/kg	194000	8640
1-Methyl-2-Isopropylbenzene	µg/kg	ND	ND
Indane	µg/kg	207000	53900
1,3-Diethylbenzene	µg/kg	44400J	11100
1-Methyl-3-N-Propylbenzene	µg/kg	24700J	1570J
Indene	µg/kg	2270000	78900
1-Methyl-4-N-Propylbenzene	µg/kg	18500J	2040J
n-Butylbenzene	µg/kg	18300J	1130J
1,2-Dimethyl-4-Ethylbenzene	µg/kg	56600J	5050
1,2-Diethylbenzene	µg/kg	ND	ND
1-Methyl-2-N-Propylbenzene	µg/kg	ND	566J
1,4-Dimethyl-2-Ethylbenzene	µg/kg	33800J	2610J
Undecane	µg/kg	121000	3760
1,3-Dimethyl-4-Ethylbenzene	µg/kg	40000J	2650J
1,3-Dimethyl-5-Ethylbenzene	µg/kg	137000	25000
1,3-Dimethyl-2-Ethylbenzene	µg/kg	14100J	658J
1,2-Dimethyl-3-Ethylbenzene	µg/kg	20000J	1390J
1,2,4,5-Tetramethylbenzene	µg/kg	59500J	7400
1,2,3,5-Tetramethylbenzene	µg/kg	94200J	12800
N-Pentylbenzene	µg/kg	14700J	398J
1,2,3,4-Tetramethylbenzene	µg/kg	74600J	6220
1,3-Dimethyl-5-tert-Butylbenzene	µg/kg	ND	ND
Dodecane (C12)	µg/kg	157000J	8360
1,3,5-Triethylbenzene	µg/kg	ND	ND
Naphthalene	µg/kg	28500000E	1910000E
Benzothiophene	µg/kg	706000	62600
1,2,4-Triethylbenzene	µg/kg	ND	ND
Hexylbenzene	µg/kg	ND	ND
MMT	µg/kg	ND	ND
Tridecane	µg/kg	171000J	13200
2-Methylnaphthalene	µg/kg	9570000	2160000E
1-Methylnaphthalene	µg/kg	4790000	1140000E
Tetradecane (C14)	µg/kg	189000J	17200
Pentadecane	µg/kg	242000J	7980

**TABLE 3-3  
NAPL RESULTS SUMMARY  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analyte	Reporting Units	MW-6A NAPL	MW-3BR NAPL
Dibromofluoromethane	%	82	83
Toluene-d8	%	86	85
4-Bromofluorobenzene	%	103	105
Naphthalene	µg/kg	33500000	2100000
2-Methylnaphthalene	ug/kg	NA	2600000
1-Methylnaphthalene	ug/kg	NA	1400000
Dibromofluoromethane	%	80	81
Toluene-d8	%	84	83
4-Bromofluorobenzene	%	103	104
cis/trans-Decalin	mg/kg	9.51	ND
C1-Decalins	mg/kg	15.8	1.28J
C2-Decalins	mg/kg	30	2.37
C3-Decalins	mg/kg	26.7	3.04
C4-Decalins	mg/kg	43.4	5.29
Naphthalene	mg/kg	27500E	1840
C1-Naphthalenes	mg/kg	13200	2280
C2-Naphthalenes	mg/kg	7680	1970
C3-Naphthalenes	mg/kg	3270	830
C4-Naphthalenes	mg/kg	1080	177
Benzothiophene	mg/kg	1100	70.7
C1-Benzo(b)thiophenes	mg/kg	523	130
C2-Benzo(b)thiophenes	mg/kg	333	125
C3-Benzo(b)thiophenes	mg/kg	154	47.9
C4-Benzo(b)thiophenes	mg/kg	57.2	11.9
Biphenyl	mg/kg	2160	203
Dibenzofuran	mg/kg	6150	119
Acenaphthylene	mg/kg	2920	190
Acenaphthene	mg/kg	10200	884
Fluorene	mg/kg	7800	509
C1-Fluorenes	mg/kg	2260	320
C2-Fluorenes	mg/kg	1170	171
C3-Fluorenes	mg/kg	587	51.9
Dibenzothiophene	mg/kg	1110	197
4-Methyldibenzothiophene(4MDT)	mg/kg	84	70.5
2/3-Methyldibenzothiophene(2MDT)	mg/kg	257	76.4
1-Methyldibenzothiophene(1MDT)	mg/kg	70.5	13.7
C1-Dibenzothiophenes BS	mg/kg	612	180
C2-Dibenzothiophenes	mg/kg	364	83.4
C3-Dibenzothiophenes	mg/kg	289	19.7
C4-Dibenzothiophenes	mg/kg	142	4.68
Phenanthrene	mg/kg	20100E	1530
3-Methylphenanthrene (3MP)	mg/kg	1540	301
2-Methylphenanthrene (2MP)	mg/kg	1880	311
2-Methylanthracene (2MA)	mg/kg	1420	119
9/4-Methylphenanthrene (9MP)	mg/kg	1610	210
1-Methylphenanthrene (1MP)	mg/kg	1120	137
C1-Phenanthrenes/Anthracenes	mg/kg	7620	1090
C2-Phenanthrenes/Anthr BS	mg/kg	3040	329
C3-Phenanthrenes/Anthracenes	mg/kg	1220	60.3
C4-Phenanthrenes/Anthracenes	mg/kg	422	9.27
Retene	mg/kg	ND	ND
Anthracene	mg/kg	7340	466
Carbazole	mg/kg	1880	17.3
Fluoranthene	mg/kg	10600	324
Benzo(b)fluorene	mg/kg	2120	61.7
Pyrene	mg/kg	8130	543
C1-Fluoranthenes/Pyrenes	mg/kg	6460	394
C2-Fluoranthenes/Pyrenes	mg/kg	2180	99.1
C3-Fluoranthenes/Pyrenes	mg/kg	894	22.1
C4-Fluoranthenes/Pyrenes	mg/kg	444	7.22
Naphthobenzothiophenes	mg/kg	530	22.2
C1-Naphthobenzothiophenes	mg/kg	322	12.2
C2-Naphthobenzothiophenes	mg/kg	176	4.24
C3-Naphthobenzothiophenes	mg/kg	108	3.54
C4-Naphthobenzothiophenes	mg/kg	44.6	2.28
Benz(a)anthracene	mg/kg	5350	143
Chrysene/Triphenylene	mg/kg	4400	108
C1-Chrysenes	mg/kg	2450	82.1
C2-Chrysenes BS	mg/kg	1220	29.6
C3-Chrysenes	mg/kg	1080	14.6
C4-Chrysenes	mg/kg	372	5.29
Benzo(b)fluoranthene	mg/kg	3280	47.2

**TABLE 3-3  
NAPL RESULTS SUMMARY  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analyte	Reporting Units	MW-6A NAPL	MW-3BR NAPL
Benzo(j)+(k)fluoranthene	mg/kg	4010	73.8
Benzo(a)fluoranthene	mg/kg	1600	34.3
Benzo(e)pyrene	mg/kg	2750	60.5
Benzo(a)pyrene	mg/kg	5320	141
Perylene	mg/kg	1360	17.7
Indeno(1,2,3-cd)pyrene	mg/kg	2700	37.2
Dibenz(a,h)+(a,c)anthracene	mg/kg	784	11.1
Benzo(g,h,i)perylene	mg/kg	2790	44.5
Naphthalene-d8	%	124	127
Phenanthrene-d10	%	108	110
Benzo(a)pyrene-d12	%	106	101
Naphthalene	mg/kg	34500	NA
Phenanthrene	mg/kg	23300	NA
Naphthalene-d8	%	106	NA
Phenanthrene-d10	%	108	NA
Benzo(a)pyrene-d12	%	100	NA
n-Nonane (C9)	mg/kg	59.3J	ND
n-Decane (C10)	mg/kg	191	8.40J
n-Undecane (C11)	mg/kg	371	28.6
n-Dodecane (C12)	mg/kg	1280	80.5
n-Tridecane (C13)	mg/kg	659	23.6
2,6,10-Trimethyldodecane (1380)	mg/kg	125J	4.20J
n-Tetradecane (C14)	mg/kg	454	56.9
2,6,10-Trimethyltridecane (1470)	mg/kg	ND	145
n-Pentadecane (C15)	mg/kg	12200	954
n-Hexadecane (C16)	mg/kg	9030	620
Norpristane (1650)	mg/kg	ND	ND
n-Heptadecane (C17)	mg/kg	391	30.4
Pristane	mg/kg	477	46.2
n-Octadecane (C18)	mg/kg	25700	1760
Phytane	mg/kg	8620	499
n-Nonadecane (C19)	mg/kg	329	13.9J
n-Eicosane (C20)	mg/kg	192	37.4
n-Heneicosane (C21)	mg/kg	287	10.2J
n-Docosane (C22)	mg/kg	338	14.2J
n-Tricosane (C23)	mg/kg	315	ND
n-Tetracosane (C24)	mg/kg	645	9.01J
n-Pentacosane (C25)	mg/kg	ND	ND
n-Hexacosane (C26)	mg/kg	122J	ND
n-Heptacosane (C27)	mg/kg	172J	ND
n-Octacosane (C28)	mg/kg	254	7.58J
n-Nonacosane (C29)	mg/kg	ND	51.5
n-Triacontane (C30)	mg/kg	ND	8.31J
n-Hentriacontane (C31)	mg/kg	537	17.4J
n-Dotriacontane (C32)	mg/kg	360	ND
n-Tritriacontane (C33)	mg/kg	948	15.8J
n-Tetracontane (C34)	mg/kg	74.5J	ND
n-Pentatriacontane (C35)	mg/kg	460	10.6J
n-Hexatriacontane (C36)	mg/kg	63.5J	ND
n-Heptatriacontane (C37)	mg/kg	318	5.26J
n-Octatriacontane (C38)	mg/kg	ND	ND
n-Nonatriacontane (C39)	mg/kg	ND	ND
n-Tetracontane (C40)	mg/kg	ND	ND
Total Petroleum Hydrocarbons (C9-C44)	mg/kg	590000	35900
Total Saturated Hydrocarbons	mg/kg	65000J	4460J
ortho-terphenyl	%	97	104
d50-Tetracosane	%	108	100

Prepared by: TCK Checked by: TDP

**Notes:**

MW-6A NAPL sample collected while abandoning well on 3/26/19

MW-3BR NAPL sample collected while drilling well on 3/27/19

% - percent

< - concentration not detected at or above the adjusted reporting limit.

µg/kg - Micrograms per liter

E - Analyte concentration exceeded the calibration range. The reported result is estimated.

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

mg/kg - Milligrams per kilogram

NA - Not analyzed

ND - Non detect

**TABLE 3-4  
ANALYTICAL RESULTS SUMMARY - GROUNDWATER  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter	8260B (VOA and MTBE)							8260B (Other VOC)				8270D (PAH)						
	Benzene	Ethylbenzene	Toluene	Xylene			MTBE	2-Butanone (MEK)	2-Hexanone	Acetone	Trichloroethene	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	
				m&p-Xylene	o-Xylene	Total Xylene												
Reporting Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Regulatory Standard	5	700	1,000	NE	NE	10,000	40	NE	NE	NE	NE	25	NE	NE	NE	NE	NE	
Sample ID	Sample Collection Date	Analytical Results							Analytical Results				Analytical Results					
MW-01	03/20/2019	<b>25.8</b>	<b>44.9</b>	<b>11.2</b>	<b>35.4</b>	<b>27.8</b>	<b>63.3</b>	<10	<50	<50	<250	<10	<b>1700 M1</b>	<b>491</b>	<b>479</b>	<b>225</b>	<10	<b>10.5</b>
MW-02	03/20/2019	<b>3.4</b>	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<b>2.3 j</b>	<10	<10	<10	<10	<10
MW-03BR	4/10/2019	<b>620</b>	<b>128</b>	<b>251</b>	<b>118</b>	<b>61.9</b>	<b>180</b>	<10	<50	<50	<250	<10	<b>2910</b>	<b>226 E</b>	<b>367 E</b>	<b>24.6</b>	<b>167 E</b>	<b>2.9 j</b>
MW-05	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-07R	03/22/2019	<b>25.5</b>	<b>0.75 j</b>	<1	<b>1.7 j</b>	<b>0.25 j</b>	<1	<b>1.5</b>	<5	<5	<25	<1	<b>33.8</b>	<b>6.5 j</b>	<b>6.3 j</b>	<b>2.3 j</b>	<9.9	<9.9
MW-09R	03/22/2019	<1	<1	<1	<2	<1	<1	<b>2.3</b>	<5	<5	<25	<1	<1	<9.9	<9.9	<9.9	<9.9	<9.9
MW-13R	03/21/2019	<1	<1	<1	<2	<1	<1	<b>1.2</b>	<5	<5	<25	<b>0.72 j</b>	<1	<10	<10	<10	<10	<10
MW-15	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
MW-16	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<9.9	<9.9	<9.9	<9.9	<9.9
MW-21	03/20/2019	<b>30.4</b>	<b>4.8</b>	<b>8.9</b>	<b>2.8</b>	<b>7.2</b>	<b>9.9</b>	<1	<5	<5	<25	<1	<b>57.5</b>	<b>21</b>	<9.8	<b>27.8</b>	<b>1.8 j</b>	<b>4.1 j</b>
MW-22	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<b>0.65 j</b>	<10	<10	<10	<10	<10
MW-25R	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<b>1.5 j</b>	<10	<10	<10	<10	<10
MW-26	03/21/2019	<1	<1	<1	<2	<1	<1	<b>0.48 j</b>	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-27	03/21/2019	<1	<1	<1	<2	<1	<1	<b>1.8</b>	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-28	03/22/2019	<1	<1	<1	<2	<1	<1	<b>2</b>	<5	<5	<25	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
MW-29S	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-29TZ	03/21/2019	<b>1920</b>	<b>411</b>	<b>66.3</b>	<b>181</b>	<b>109</b>	<b>290</b>	<25	<125	<125	<625	<25	<b>4060</b>	<b>258 E</b>	<b>412 E</b>	<b>109 E</b>	<10	<10
MW-30S	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-30S	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
MW-31S	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<b>2.8 j</b>	<10	<10
MW-31S	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<b>3 j</b>	<10	<10
MW-31TZ	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<b>0.38 j</b>	<10	<10	<10	<10	<10
MW-31TZ	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
<b>QC SAMPLE RESULTS</b>																		
EOB	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<b>3.7 j</b>	<b>0.58 j</b>	<b>18.6 j</b>	<1	<1	<10	<10	<10	<10	<10
EOB-01	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<9.9	<9.9	<9.9	<9.9	<9.9
EOB-1	03/20/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
EOB-2	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
EB-01	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
EOB-3	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
EB	4/10/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
FB 1	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<b>3.6 j</b>	<b>0.56 j</b>	<b>18.4 j</b>	<1	<1	<10	<10	<10	<10	<10
FB-01	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<9.4	<9.4	<9.4	<9.4	<9.4
FD-01 (MW-02)	03/20/2019	<b>1.5</b>	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<b>0.98 j</b>	<10	<10	<10	<10	<10
FD-02 (MW-13R)	03/21/2019	<1	<1	<1	<2	<1	<1	<b>1.1</b>	<5	<5	<25	<b>0.57 j</b>	<1	<10	<10	<10	<10	<10
MW-30S DUP	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	<10	<10	<10	<10	<10
TRIP BLANK	12/12/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK	03/12/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK	03/14/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK	03/15/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK_SED	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK_Soil	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK_SW	03/19/2019	<0.15	<0.26	<0.24	<0.41	<0.22	<0.63	<0.28	<3.3	<0.57	<6.2	<0.22	<0.35	NA	NA	NA	NA	NA
TRIP BLANK	03/21/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TB_SED	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TRIP BLANK_GW	03/22/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA
TB	4/10/2019	<1	<1	<1	<2	<1	<1	<1	<5	<5	<25	<1	<1	NA	NA	NA	NA	NA

Prepared by: MSM Checked by: IDP

**Notes:**  
 Bold type indicates that the compound was detected above the adjusted method detection limit.  
 Yellow shading indicates that the compound was detected above a potentially applicable regulatory standard listed in Section 4.8 of the RIWP-A  
 < - concentration not detected at or above the adjusted reporting limit.  
 µg/L - Micrograms per liter  
 E - Analyte concentration exceeded the calibration range. The reported µg/L - Micrograms per liter  
 j - Estimated concentration above the adjusted method detection limit in umhos/cm - Micro mhos per centimeter  
 M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.  
 NA - Not analyzed  
 NE - No regulatory standard established at this time. A site-specific target level may be established as part of the risk assessment outlined in Section 5.0 of the RIWP-A.

**TABLE 3-4  
ANALYTICAL RESULTS SUMMARY - GROUNDWATER  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter		8270D (PAH)											8270D (Other SVOC)					
		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	2,4-Dimethylphenol	2,4-Dinitrotoluene	2-Methylphenol(o-Cresol)	Dibenzofuran	Phenol
Reporting Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Regulatory Standard		10	0.2	10	NE	10	10	10	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Sample ID	Sample Collection Date	Analytical Results											Analytical Results					
MW-01	03/20/2019	<10	<10	<10	<10	<10	<10	<10	3 j	66.1	<10	56.3	4.2 j	<10	<10	<10	22.5	<10
MW-02	03/20/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-03BR	4/10/2019	<10	<10	<10	<10	<10	<10	<10	<10	24.7	<10	17	<10	75.2	<10	4.8 j	7.5 j	<10
MW-05	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-07R	03/22/2019	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
MW-09R	03/22/2019	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
MW-13R	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-15	03/22/2019	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
MW-16	03/22/2019	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
MW-21	03/20/2019	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	3.9 j	12.8	<9.8	2.2 j	2.9 j	<9.8	<9.8	<9.8	11.3	<9.8
MW-22	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-25R	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-26	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-27	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-28	03/22/2019	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
MW-29S	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-29TZ	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	19.3	<10	9.5 j	<10	174 E	<10	8.8 j	6.2 j	11.1
MW-30S	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-30S	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-31S	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-31S	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-31TZ	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	5.3 j	<10	<10	<10
MW-31TZ	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
<b>QC SAMPLE RESULTS</b>																		
EOB	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EOB-01	12/19/2018	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9	<9.9
EOB-1	03/20/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EOB-2	03/21/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EB-01	03/22/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EOB-3	03/22/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EB	4/10/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
FB 1	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
FB-01	12/19/2018	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4
FD-01 (MW-02)	03/20/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
FD-02 (MW-13R)	03/21/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
MW-30S DUP	12/12/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRIP BLANK	12/12/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	12/19/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	03/12/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	03/14/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	03/15/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK_SED	03/19/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK_Soil	03/19/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK_SW	03/19/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	03/21/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TB_SED	03/22/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK	03/22/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TRIP BLANK_GW	03/22/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TB	4/10/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Prepared by: MSM Checked by: IDP

**Notes:**  
 Bold type indicates that the compound was detected above the adjusted method detection limit.  
 Yellow shading indicates that the compound was detected above a potentially applicable regulatory standard listed in Section 4.8 of the RIWP-A  
 < - concentration not detected at or above the adjusted reporting limit.  
 µg/L - Micrograms per liter  
 E - Analyte concentration exceeded the calibration range. The reported result is estimated.  
 j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
 M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.  
 NA - Not analyzed  
 NE - No regulatory standard established at this time. A site-specific target level may be established as part of the risk assessment outlined in Section 5.0 of the RIWP-A.

**TABLE 3-5  
ANALYTICAL RESULTS SUMMARY - SURFACE WATER  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter	8260B (VOA and MTBE)							8260B (Other VOC)	8270D (PAH)						
	Benzene	Ethylbenzene	Toluene	Xylene			MTBE	Chloromethane	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	
				m&p-Xylene	o-Xylene	Total Xylene									
Reporting Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Regulatory Standard	5	700	1,000	NE	NE	10,000	40	NE	25	NE	NE	NE	NE	NE	
Sample ID	Sample Collection Date	Analytical Results							Analytical Results	Analytical Results					
SW-01	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10
SW-02	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<b>4.4</b>	<1	<10	<10	<10	<10	<10
SW-03	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10
SW-04	03/19/2019	<b>2.3</b>	<b>0.5 j</b>	<1	<2	<1	<1	<1	<b>13.2</b>	<10	<10	<10	<10	<10	<10
SW-05	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10
SW-06	03/19/2019	<1	<1	<1	<2	<1	<1	<1	<b>10.5</b>	<1	<10	<10	<10	<10	<10
SW-07	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<9.6	<9.6	<9.6	<9.6	<9.6
SW-08	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
SW-09	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
SW-10	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
SW-11	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<9.8	<9.8	<9.8	<9.8	<9.8
SW-12	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<10	<10	<10	<10	<10
<b>QC SAMPLE RESULTS</b>															
SW-DUP1 (SW-12)	12/19/2018	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<9.6	<9.6	<9.6	<9.6

Prepared by: MSM

Checked by: TDP

**Notes:**

Bold type indicates that the compound was detected above the adjusted method detection limit.

Yellow shading indicates that the compound was detected above a potentially applicable regulatory standard listed in Section 4.8 of the RIWP-A

< - concentration not detected at or above the adjusted reporting limit.

µg/L - Micrograms per liter

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

NE - No regulatory standard established at this time. A site-specific target level may be established as part of the risk assessment outlined in Section 5.0 of the RIWP-A.

**TABLE 3-5  
ANALYTICAL RESULTS SUMMARY - SURFACE WATER  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter		8270D (PAH)											
		Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
Reporting Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Regulatory Standard		10	0.2	10	NE	10	10	10	NE	NE	NE	NE	NE
Sample ID	Sample Collection Date	Analytical Results											
SW-01	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-02	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-03	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-04	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-05	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-06	03/19/2019	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SW-07	12/19/2018	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
SW-08	12/19/2018	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
SW-09	12/19/2018	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
SW-10	12/19/2018	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
SW-11	12/19/2018	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8	<9.8
SW-12	12/19/2018	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
<b>QC SAMPLE RESULTS</b>													
SW-DUP1 (SW-12)	12/19/2018	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6

Prepared by: MSM      Checked by: TDP

**Notes:**  
 Bold type indicates that the compound was detected above the adjusted method detection limit.  
 Yellow shading indicates that the compound was detected above a potentially applicable regulatory standard listed in Section 4.8 of the RIWP-A  
 < - concentration not detected at or above the adjusted reporting limit.  
 µg/L - Micrograms per liter  
 j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
 NE - No regulatory standard established at this time. A site-specific target level may be established as part of the risk assessment outlined in Section 5.0 of the RIWP-A.

**TABLE 3-6  
ANALYTICAL RESULTS SUMMARY - SEDIMENT  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter		ASTM D2974-87	8260B (VOA and MTBE)						8260B (Other VOC)					8270D (PAH)			
		Percent Moisture	Benzene	Ethylbenzene	Toluene	Xylene			MTBE	2-Butanone (MEK)	4-Methyl-2-pentanone (MIBK)	Acetone	Chloroform	Methylene chloride	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene
						m&p-Xylene	o-Xylene	Xylene (Total)									
Reporting Units	%	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Industrial Screening Level	NE	5,100	25,000	47,000,000	2,400,000	2,800,000	2,500,000	210,000	190,000,000	140,000,000	670,000,000	1,400	1,000,000	17,000	73,000	3,000,000	
Sample ID	Sample Collection Date	Analytical Results								Analytical Results					Analytical Results		
SW-01-SED	03/19/2019	55.8	<9.6	<9.6	<9.6	<19.3	<9.6	<19.3	<9.6	12.7 j	12 j,B	211	4.3 j	18.2 j	2.7 j	7.5 j,M1	12.3 j,M1
SW-02-SED	03/22/2019	55.4	<12.1	<12.1	<12.1	<24.2	<12.1	<24.2	<12.1	<242	<121	35.8 j	<12.1	<48.5	8 j	4 j	5.9 j
SW-03-SED	03/19/2019	29.2	<7.8	<7.8	<7.8	<15.6	<7.8	<15.6	<7.8	<156	10.5 j,B	251	<7.8	<31.3	2.7 j	57.2	90.5
SW-04-SED	03/19/2019	66.5	<19.8	<19.8	<19.8	<39.6	<19.8	<39.6	<19.8	31.1 j	<198	738	9.1 j	62.3 j	14.4 j	11.3 j	11.5 j
SW-05-SED	03/19/2019	64.7	<13.2	<13.2	<13.2	<26.5	<13.2	<26.5	<13.2	17.1 j	<132	455	5.9 j	14.8 j	14.2 j	8.6 j	9.3 j
SW-06-SED	03/19/2019	55.9	<13	<13	<13	<26	<13	<26	<13	11.5 j	<130	183 j	5.2 j	14.1 j	<13	54.7	83.9
SW-07-SED	12/19/2018	26.9	<7.8	<7.8	<7.8	<15.5	<7.8	<15.5	<7.8	<155	<77.7	<155	<7.8	<31.1	<7.8	<451	<451
SW-08-SED	12/19/2018	21.4	<4.9	<4.9	<4.9	<9.8	<4.9	<9.8	<4.9	<97.6	<48.8	<97.6	<4.9	<19.5	<4.9	<420	<420
SW-09-SED	12/19/2018	20.7	<6.2	<6.2	<6.2	<12.4	<6.2	<12.4	<6.2	<124	<62.1	<124	<6.2	<24.8	<6.2	<423	<423
SW-10-SED	12/19/2018	20.6	<4.4	<4.4	<4.4	<8.9	<4.4	<8.9	<4.4	<88.8	<44.4	<88.8	<4.4	<17.8	<4.4	<420	<420
SW-11-SED	12/19/2018	26.7	<5	<5	<5	<10.1	<5	<10.1	<5	<101	<50.3	<101	<5	<20.1	<5	<449	<449
SW-12-SED	12/19/2018	20.3	<4.4	<4.4	<4.4	<8.8	<4.4	<8.8	<4.4	<88.1	<44.1	<88.1	<4.4	<17.6	<411	<411	<411
<b>QC SAMPLE RESULTS</b>																	
SW-DUP1-SED (SW-12)	12/19/2018	20.1	<4.4	<4.4	<4.4	<8.7	<4.4	<8.7	<4.4	<87.1	<43.5	<87.1	<4.4	<17.4	<4.4	<419	<419

Prepared by: MSM Checked by: IDP

**Notes:**

Bold type indicates that the compound was detected above the adjusted method detection limit.

Yellow shading indicates that the compound was detected above a potentially applicable screening level listed in Section 4.8 of the RIWP-A

% - Percent

< - concentration not detected at or above the adjusted reporting limit.

B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.

NE - No screening level established at this time. A site-specific risk-based screening level may be established as part of the risk assessment process outlined in Section 5.0 of the RIWP-A.

µg/kg - Micrograms per kilogram

**TABLE 3-6  
ANALYTICAL RESULTS SUMMARY - SEDIMENT  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter		8270D (PAH)														
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
Reporting Units		µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Industrial Screening Level		45,000,000	NE	230,000,000	21,000	2,100	21,000	NE	210,000	2,100,000	2,100	30,000,000	30,000,000	21,000	NE	23,000,000
Sample ID	Sample Collection Date	Analytical Results														
SW-01-SED	03/19/2019	<b>10 j,M1</b>	<b>113 M1</b>	<b>60.2 M1</b>	<b>296 M1</b>	<b>295 M1</b>	<b>358 M1</b>	<b>189 M1</b>	<b>155 M1</b>	<b>266 M1</b>	<b>57.1 M1</b>	<b>351 M1</b>	<b>17.2 j,M1</b>	<b>169 M1</b>	<b>91 M1</b>	<b>488 M1</b>
SW-02-SED	03/22/2019	<b>2.5 j</b>	<b>15 j</b>	<b>15.4 j</b>	<b>63.9</b>	<b>61.5</b>	<b>77.7</b>	<b>27.4</b>	<b>31.4</b>	<b>66.5</b>	<b>9.7 j</b>	<b>90.2</b>	<b>3.8 j</b>	<b>26.6</b>	<b>32.9</b>	<b>88.2</b>
SW-03-SED	03/19/2019	<b>218</b>	<b>31.8</b>	<b>459</b>	<b>909</b>	<b>599</b>	<b>1050</b>	<b>334</b>	<b>321</b>	<b>890</b>	<b>132</b>	<b>1910</b>	<b>259</b>	<b>328</b>	<b>1730</b>	<b>1450</b>
SW-04-SED	03/19/2019	<b>28.5 j</b>	<b>140</b>	<b>90.4</b>	<b>432</b>	<b>415</b>	<b>537</b>	<b>210</b>	<b>212</b>	<b>421</b>	<b>65.2</b>	<b>628</b>	<b>35.1</b>	<b>188</b>	<b>195</b>	<b>776</b>
SW-05-SED	03/19/2019	<28.7	<b>139</b>	<b>115</b>	<b>1030</b>	<b>584</b>	<b>813</b>	<b>278</b>	<b>281</b>	<b>1240</b>	<b>110</b>	<b>889</b>	<b>26.7 j</b>	<b>224</b>	<b>850</b>	<b>1980</b>
SW-06-SED	03/19/2019	<b>55.5</b>	<b>418</b>	<b>714</b>	<b>2160</b>	<b>1840</b>	<b>2170</b>	<b>733</b>	<b>715</b>	<b>1910</b>	<b>256</b>	<b>3400</b>	<b>207</b>	<b>772</b>	<b>2020</b>	<b>2990</b>
SW-07-SED	12/19/2018	<451	<451	<451	<451	<451	<451	<451	<451	<451	<451	<b>106 j</b>	<451	<451	<451	<b>90 j</b>
SW-08-SED	12/19/2018	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420
SW-09-SED	12/19/2018	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423	<423
SW-10-SED	12/19/2018	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420	<420
SW-11-SED	12/19/2018	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449	<449
SW-12-SED	12/19/2018	<411	<b>106 j</b>	<b>167 j</b>	<b>503</b>	<b>435</b>	<b>562</b>	<b>183 j</b>	<b>236 j</b>	<b>490</b>	<411	<b>822</b>	<411	<b>186 j</b>	<b>217 j</b>	<b>791</b>
QC SAMPLE REUSLTS																
SW-DUP1-SED (SW-12)	12/19/2018	<419	<419	<419	<b>145 j</b>	<b>162 j</b>	<b>213 j</b>	<b>124 j</b>	<b>92 j</b>	<b>141 j</b>	<419	<b>230 j</b>	<419	<b>104 j</b>	<419	<b>197 j</b>

Prepared by: MSM Checked by: TDP

**Notes:**

Bold type indicates that the compound was detected above the adjusted method detection limit.

Yellow shading indicates that the compound was detected above a potentially applicable screening level listed in Section 4.8 of the RIWP-A

% - Percent

< - concentration not detected at or above the adjusted reporting limit.

B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.

NE - No screening level established at this time. A site-specific risk-based screening level may be established as part of the risk assessment process outlined in Section 5.0 of the RIWP-A.

µg/kg - Micrograms per kilogram

**TABLE 3-7  
ANALYTICAL RESULTS SUMMARY - SOIL  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter		ASTM D2974-87	8260B (VOA and MTBE)							8260B (Other VOC)						8270D (PAH)			
		Percent Moisture	Benzene	Ethylbenzene	Toluene	Xylene			MTBE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Chloroform	Acetone	Chloromethane	Isopropylbenzene (Cumene)	Methylene chloride	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene
						m&p-Xylene	o-Xylene	Xylene (Total)											
Reporting Units	%	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Industrial Screening Level		NE	5,100	25,000	47,000,000	2,400,000	2,800,000	2,500,000	210,000	1,800,000	1,500,000	1,400	670,000,000	460,000	9,900,000	1,000,000	17,000	73,000	3,000,000
Sample ID	Sample Collection Date	Analytical Results	Analytical Results							Analytical Results						Analytical Results			
T10-SB3 (14.5)	03/14/2019	11.4	<b>4.5 j,M1</b>	<b>6.4 j,M1,R1</b>	<7.1	<14.3	<7.1	<14.3	<7.1	<7.1	<7.1	<7.1	<b>14.7 j,L1</b>	<14.3	<7.1	<28.5	<b>241 M1</b>	<b>68.4 M1</b>	<b>118 M1</b>
T11-SB1 (18.5)	03/14/2019	7.2	<5.6	<5.6	<5.6	<11.2	<5.6	<11.2	<5.6	<5.6	<5.6	<5.6	<112	<11.2	<5.6	<22.4	<b>105</b>	<b>27.1</b>	<b>48.5</b>
T11-SB2 (16.5)	03/14/2019	8.7	<8.4	<8.4	<8.4	<16.8	<8.4	<16.8	<8.4	<8.4	<8.4	<8.4	<168	<16.8	<8.4	<33.6	<b>61.2</b>	<b>10.8 j</b>	<b>15.6</b>
T11-SB3 (13.5)	03/14/2019	11.9	<6.6	<6.6	<6.6	<13.1	<6.6	<13.1	<6.6	<6.6	<6.6	<6.6	<131	<13.1	<6.6	<26.3	<b>3.4 j</b>	<11.4	<11.4
T12-SB1 (16.5)	03/20/2019	14.3	<5	<5	<5	<10	<5	<10	<5	<5	<5	<b>67.2 j</b>	<10	<5	<19.9	<5	<11.5	<11.5	
T12-SB3 (16)	03/20/2019	20.2	<6.2	<6.2	<6.2	<12.4	<6.2	<12.4	<6.2	<6.2	<6.2	<b>89.6 j</b>	<12.4	<6.2	<24.7	<6.2	<12.4	<12.4	
T13-SB1 (13)	03/20/2019	8.9	<5.6	<5.6	<5.6	<11.1	<5.6	<11.1	<5.6	<5.6	<5.6	<b>40.7 j</b>	<11.1	<5.6	<22.3	<b>4.3 j</b>	<b>3.5 j</b>	<b>6.2 j</b>	
T13-SB2 (15)	03/20/2019	19	<6.5	<6.5	<6.5	<12.9	<6.5	<12.9	<6.5	<6.5	<6.5	<b>67.3 j</b>	<12.9	<6.5	<25.9	<b>1.6 j</b>	<b>3.4 j</b>	<b>4.9 j</b>	
T14-SB3 (12.5)	03/19/2019	26.1	<5.6	<5.6	<5.6	<11.2	<5.6	<11.2	<5.6	<5.6	<b>2.4 j,B</b>	<b>74.4 j</b>	<11.2	<5.6	<5.6	<b>3.5 j</b>	<b>2.8 j</b>	<b>0.93 j</b>	<b>3 j</b>
T15-SB1 (15.5)	03/19/2019	16.5	<6.8	<6.8	<6.8	<13.5	<6.8	<13.5	<6.8	<6.8	<6.8	<b>2.9 j,B</b>	<13.5	<6.8	<6.8	<12	<12	<12	
T15-SB2 (17)	03/19/2019	9	<3.9	<3.9	<3.9	<7.7	<3.9	<7.7	<3.9	<3.9	<b>1.8 j,B</b>	<b>69.7 j</b>	<7.7	<3.9	<15.5	<b>2.5 j,B</b>	<11.1	<11.1	
T17-SB1 (15.5)	03/29/2019	16.5	<6.7	<6.7	<6.7	<13.5	<6.7	<13.5	<6.7	<6.7	<6.7	<b>33.8 j</b>	<13.5	<6.7	<26.9	<6.7	<b>10.1 j</b>	<12	
T17-SB2 (15.5)	03/29/2019	9.4	<b>26</b>	<b>8.4</b>	<5.4	<10.9	<5.4	<10.9	<5.4	<5.4	<5.4	<b>33.5 j,M1</b>	<10.9	<5.4	<21.7	<b>90.6</b>	<b>78.7 M1</b>	<b>3.5 j</b>	
T1-SB1 (16.5)	03/21/2019	13.7	<5.5	<5.5	<5.5	<11	<5.5	<11	<5.5	<5.5	<5.5	<5.5	<110	<11	<5.5	<21.9	<5.5	<11.6	<11.6
T1-SB1 (17)	03/21/2019	10.5	<4.6	<4.6	<4.6	<9.3	<4.6	<9.3	<4.6	<4.6	<4.6	<4.6	<93	<9.3	<4.6	<18.6	<4.6	<11.2	<11.2
T1-SB2 (15.5)	03/21/2019	4.3	<8.1	<8.1	<8.1	<16.3	<8.1	<16.3	<8.1	<8.1	<8.1	<163	<16.3	<8.1	<32.5	<8.1	<10.3	<10.3	
T1-SB2 (16.5)	03/21/2019	15.8	<5.3	<5.3	<5.3	<10.7	<5.3	<10.7	<5.3	<5.3	<5.3	<107	<10.7	<5.3	<21.3	<b>2.8 j</b>	<12	<b>0.84 j</b>	
T2-SB3 (15)	03/21/2019	16.4	<5.4	<5.4	<5.4	<10.9	<5.4	<10.9	<5.4	<5.4	<5.4	<109	<10.9	<5.4	<21.8	<b>1.4 j</b>	<12.1	<b>1.9 j</b>	
T4-SB1 (15.5)	03/18/2019	15.7	<5.3	<5.3	<5.3	<10.7	<5.3	<10.7	<5.3	<5.3	<b>2.4 j,B</b>	<b>61.4 j</b>	<10.7	<5.3	<21.4	<b>1.2 j</b>	<11.8	<11.8	
T4-SB2 (18)	03/19/2019	8.9	<5.8	<5.8	<5.8	<11.7	<5.8	<11.7	<5.8	<5.8	<b>2.4 j,B</b>	<b>74 j</b>	<11.7	<5.8	<5.8	<b>6 j</b>	<b>5.2 j</b>	<b>2.3 j</b>	<b>3.6 j</b>
T4-SB3 (17)	03/18/2019	6.7	<5.5	<5.5	<5.5	<10.9	<5.5	<10.9	<5.5	<5.5	<5.5	<b>84.6 j</b>	<10.9	<5.5	<21.8	<b>4.4 j</b>	<b>3.7 j</b>	<b>5.8 j</b>	
T5-SB2 (17)	03/18/2019	8.8	<6.6	<6.6	<6.6	<13.2	<6.6	<13.2	<6.6	<6.6	<b>2.7 j,B</b>	<b>470</b>	<13.2	<6.6	<b>10.4 j</b>	<b>93.4</b>	<b>476</b>	<b>865</b>	
T5-SB3 (18)	03/18/2019	10.7	<6.4	<6.4	<6.4	<12.9	<6.4	<12.9	<6.4	<6.4	<b>2.6 j,B</b>	<b>13.8 j</b>	<12.9	<6.4	<b>12.1 j</b>	<b>10100</b>	<b>202</b>	<b>365</b>	
T6-SB3 (17.5)	03/18/2019	13.2	<b>79.9 j</b>	<b>110 j</b>	<120	<241	<120	<241	<120	<b>56.2 j</b>	<120	<b>55.3 j,B</b>	<b>1790 j</b>	<241	<120	<482	<b>3820</b>	<b>174</b>	<b>317</b>
T7-SB1 (17)	03/15/2019	23.4	<b>74.5 j</b>	<b>89.5 j</b>	<194	<388	<194	<388	<194	<194	<194	<194	<b>1740 j</b>	<b>124 j,L1</b>	<194	<777	<b>4730 BC</b>	<b>64.7</b>	<b>124</b>
T7-SB1 (19)	03/15/2019	12.6	<b>7.5</b>	<b>8.1</b>	<4.2	<b>4.5 j</b>	<b>2.3 j</b>	<8.4	<4.2	<b>2.4 j</b>	<4.2	<4.2	<b>20.3 j</b>	<8.4	<4.2	<16.8	<b>1710 B,BC</b>	<b>10.4 j</b>	<b>18.7</b>
T7-SB2 (15.5)	03/15/2019	12.2	<4.4	<4.4	<4.4	<8.9	<4.4	<8.9	<4.4	<4.4	<4.4	<b>26.2 j</b>	<8.9	<4.4	<17.7	<b>113 BC</b>	<b>43.9</b>	<b>80.5</b>	
T7-SB3 (16)	03/15/2019	17.5	<b>9.8</b>	<b>8.5</b>	<5.4	<b>6.9 j</b>	<5.4	<10.9	<5.4	<b>17.8</b>	<b>7</b>	<5.4	<b>49.6 j</b>	<10.9	<b>2.5 j</b>	<21.8	<b>1860 B,BC</b>	<b>54.1</b>	<b>91.8</b>
T8-SB2 (10)	03/12/2019	30.8	<6	<6	<6	<b>5 j</b>	<6	<11.9	<6	<6	<6	<b>26.3 j</b>	<11.9	<6	<23.9	<b>3.3 j</b>	<b>13 j</b>	<b>8 j</b>	
T8-SB2 (17)	03/12/2019	23.2	<5.4	<5.4	<5.4	<10.7	<5.4	<10.7	<5.4	<5.4	<5.4	<b>2.1 j,B,M1</b>	<10.7	<5.4	<21.4	<5.4	<13.1	<13.1	
T8-SB3 (17)	03/12/2019	9	<5.4	<5.4	<5.4	<10.9	<5.4	<10.9	<5.4	<5.4	<5.4	<b>2.3 j,B</b>	<10.9	<5.4	<21.8	<b>35.3</b>	<b>1.9 j</b>	<b>3.4 j</b>	
T9-SB1 (18)	03/13/2019	11.5	<b>3.4 j</b>	<5.9	<b>2.7 j</b>	<11.7	<5.9	<11.7	<5.9	<5.9	<5.9	<b>2.4 j</b>	<b>19.8 j</b>	<11.7	<5.9	<23.4	<b>137</b>	<b>32.4</b>	<b>58.6</b>
T9-SB2 (19)	03/13/2019	8.3	<236	<236	<236	<473	<236	<473	<236	<236	<236	<b>102 j</b>	<4730	<473	<236	<b>5260</b>	<b>25900</b>	<b>39200</b>	
T9-SB2 (22)	03/13/2019	3.8	<5.4	<5.4	<5.4	<10.8	<5.4	<10.8	<5.4	<5.4	<5.4	<b>2.3 j</b>	<b>36 j</b>	<10.8	<5.4	<21.7	<b>6.4</b>	<b>10.5</b>	<b>21.6</b>
<b>QC SAMPLE RESULTS</b>																			
BLIND DUPLICATE_T13-SB2 (15)	03/20/2019	13.7	<5.5	<5.5	<5.5	<11	<5.5	<11	<5.5	<5.5	<5.5	<5.5	<b>53.4 j</b>	<11	<5.5	<22	<b>2.5 j</b>	<11.4	<b>0.85 j</b>
BLIND DUPLICATE_T9-SB1 (18)	03/13/2019	11.3	<b>23.7</b>	<b>4.6 j</b>	<b>15.4</b>	<12.8	<6.4	<12.8	<6.4	<6.4	<6.4	<b>3 j</b>	<b>22.6 j</b>	<12.8	<6.4	<25.6	<b>306</b>	<b>71.3</b>	<b>137</b>

Prepared by: MSM Checked by: IDP

**Notes:**  
 Bold type indicates that the compound was detected above the adjusted method detection limit.  
 Yellow shading indicates that the compound was detected above a potentially applicable screening level listed in Section 4.8 of the RIWP-A  
 % - Percent  
 < - concentration not detected at or above the adjusted reporting limit.  
 B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.  
 BC - The same analyte was detected in an associated blank at a concentration above 1/2 the reporting limit but below the laboratory reporting limit.  
 D6 - The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.  
 j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
 L1 - Analyte recovery in the laboratory control sample (LCS) was above quality control (QC) limits. Results may be biased high.  
 M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.  
 NE - No screening level established at this time. A site-specific risk-based screening level may be established as part of the risk assessment process outlined in Section 5.0 of the RIWP-A.  
 R1 - Relative Percent Difference (RPD) value was outside control limits.  
 µg/kg - Micrograms per kilogram

**TABLE 3-7  
ANALYTICAL RESULTS SUMMARY - SOIL  
REMEDIATION INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Analytical Parameter	8270D (PAH)															8270D (Other SVOC)	
	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Dibenzofuran	
Reporting Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Industrial Screening Level	45,000,000	NE	230,000,000	21,000	2,100	21,000	NE	210,000	2,100,000	2,100	30,000,000	30,000,000	21,000	NE	23,000,000	1,000,000	
Sample ID	Sample Collection Date	Analytical Results															Analytical Results
T10-SB3 (14.5)	03/14/2019	<b>57.1 M1</b>	<11.3	<b>6.2 j</b>	<11.3	<11.3	<11.3	<11.3	<11.3	<11.3	<b>1.6 j</b>	<b>19.5 M1</b>	<11.3	<b>38.7</b>	<b>2.2 j</b>	<376	
T11-SB1 (18.5)	03/14/2019	<b>19.4</b>	<b>3.3 j</b>	<b>3.7 j</b>	<10.9	<10.9	<10.9	<10.9	<10.9	<10.9	<b>3 j</b>	<b>9.9 j</b>	<10.9	<b>26.1</b>	<b>4.9 j</b>	<358	
T11-SB2 (16.5)	03/14/2019	<b>22</b>	<b>1.4 j</b>	<b>2.8 j</b>	<10.9	<10.9	<10.9	<10.9	<10.9	<10.9	<10.9	<b>7 j</b>	<10.9	<b>12</b>	<b>1.5 j</b>	<356	
T11-SB3 (13.5)	03/14/2019	<b>7.4 j</b>	<b>1.1 j</b>	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<b>3.3 j</b>	<11.4	<11.4	<11.4	<376	
T12-SB1 (16.5)	03/20/2019	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<11.5	<382	
T12-SB3 (16)	03/20/2019	<b>2.4 j</b>	<12.4	<12.4	<12.4	<12.4	<12.4	<12.4	<12.4	<12.4	<12.4	<b>1.5 j</b>	<12.4	<12.4	<12.4	<418	
T13-SB1 (13)	03/20/2019	<b>3.7 j</b>	<b>4.9 j</b>	<b>5.3 j</b>	<b>10.5 j</b>	<b>9.8 j</b>	<b>10.8 j</b>	<b>3.9 j</b>	<b>4.1 j</b>	<b>9.1 j</b>	<b>1.4 j</b>	<b>18.2</b>	<b>3.7 j</b>	<b>3.9 j</b>	<b>9.9 j</b>	<b>21.3</b>	<366
T13-SB2 (15)	03/20/2019	<b>19</b>	<b>2.7 j</b>	<b>3.3 j</b>	<b>5.2 j</b>	<b>4.5 j</b>	<b>4.6 j</b>	<b>1.8 j</b>	<b>2.4 j</b>	<b>4.5 j</b>	<12.5	<b>10.5 j</b>	<b>4.1 j</b>	<b>1.8 j</b>	<b>10.8 j</b>	<b>8.8 j</b>	<410
T14-SB3 (12.5)	03/19/2019	<b>0.77 j</b>	<b>0.85 j</b>	<b>1.6 j</b>	<b>2.7 j</b>	<b>1.8 j</b>	<b>2.7 j</b>	<13.6	<b>0.84 j</b>	<b>2.3 j</b>	<13.6	<b>6.1 j</b>	<b>1.3 j</b>	<13.6	<b>6.1 j</b>	<b>4.6 j</b>	<442
T15-SB1 (15.5)	03/19/2019	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<397
T15-SB2 (17)	03/19/2019	<11.1	<b>0.57 j</b>	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<360
T17-SB1 (15.5)	03/29/2019	<b>15.4</b>	<12	<b>0.67 j</b>	<12	<12	<12	<12	<12	<12	<12	<12	<12	<b>3.7 j</b>	<12	<b>3.4 j</b>	<391
T17-SB2 (15.5)	03/29/2019	<b>53.8</b>	<b>1 j</b>	<b>6.7 j</b>	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<b>19.6</b>	<11.2	<b>42</b>	<b>1.3 j</b>	<367
T1-SB1 (16.5)	03/21/2019	<b>6.4 j</b>	<11.6	<11.6	<11.6	<11.6	<11.6	<11.6	<11.6	<11.6	<11.6	<11.6	<b>1 j</b>	<11.6	<11.6	<11.6	<376
T1-SB1 (17)	03/21/2019	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<11.2	<369
T1-SB2 (15.5)	03/21/2019	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<10.3	<347
T1-SB2 (16.5)	03/21/2019	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<397
T2-SB3 (15)	03/21/2019	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<395
T4-SB1 (15.5)	03/18/2019	<b>25.8</b>	<b>1.1 j</b>	<b>0.63 j</b>	<11.8	<11.8	<11.8	<11.8	<11.8	<11.8	<11.8	<b>0.91 j</b>	<11.8	<11.8	<11.8	<11.8	<391
T4-SB2 (18)	03/19/2019	<b>2.8 j</b>	<b>0.75 j</b>	<b>0.71 j</b>	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<b>2.2 j</b>	<11.1	<11.1	<b>6.6 j</b>	<b>1.6 j</b>	<365
T4-SB3 (17)	03/18/2019	<b>4.8 j</b>	<b>0.87 j</b>	<b>0.53 j</b>	<10.7	<10.7	<10.7	<10.7	<10.7	<10.7	<10.7	<b>2.2 j</b>	<10.7	<10.7	<b>4.5 j</b>	<10.7	<357
T5-SB2 (17)	03/18/2019	<b>506</b>	<10.8	<b>180</b>	<b>76.2</b>	<b>55.7</b>	<b>41.2</b>	<b>14.9</b>	<b>16.4</b>	<b>57.1</b>	<b>4.9 j</b>	<b>195</b>	<b>286</b>	<b>12.6</b>	<b>805</b>	<b>337</b>	<364
T5-SB3 (18)	03/18/2019	<b>122</b>	<b>27.4</b>	<b>42.6</b>	<b>9 j</b>	<b>5.1 j</b>	<b>3.8 j</b>	<b>1.2 j</b>	<b>1.8 j</b>	<b>6.5 j</b>	<11.1	<b>35.5</b>	<b>85.8</b>	<b>1.1 j</b>	<b>203</b>	<b>61.8</b>	<372
T6-SB3 (17.5)	03/18/2019	<b>127</b>	<11.6	<b>13.8</b>	<b>1.2 j</b>	<b>0.79 j</b>	<b>1 j</b>	<11.6	<b>0.52 j</b>	<b>0.82 j</b>	<11.6	<b>6.6 j</b>	<b>42.6</b>	<11.6	<b>73.9</b>	<b>9.7 j</b>	<374
T7-SB1 (17)	03/15/2019	<b>41.7</b>	<13	<b>1.6 j</b>	<13	<13	<13	<13	<13	<13	<13	<13	<b>10.8 j</b>	<13	<b>12.5 j</b>	<13	<425
T7-SB1 (19)	03/15/2019	<b>8 j</b>	<b>0.7 j</b>	<b>0.65 j</b>	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<b>2.5 j</b>	<11.4	<b>4.3 j</b>	<11.4	<372
T7-SB2 (15.5)	03/15/2019	<b>43.8</b>	<b>7 j</b>	<b>10.7 j</b>	<b>4.9 j</b>	<b>3.7 j</b>	<b>3.9 j</b>	<b>1.5 j</b>	<b>1.6 j</b>	<b>4 j</b>	<11.2	<b>12.2</b>	<b>19.4</b>	<b>1.3 j</b>	<b>48.5</b>	<b>19.7</b>	<370
T7-SB3 (16)	03/15/2019	<b>38.4</b>	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<12.1	<b>5.1 j</b>	<12.1	<b>2.3 j</b>	<12.1	<393
T8-SB2 (10)	03/12/2019	<b>95.1 D6</b>	<b>205 D6</b>	<b>189 D6</b>	<b>826 D6</b>	<b>727 D6</b>	<b>1050 D6</b>	<b>399 D6</b>	<b>429 D6</b>	<b>799 D6</b>	<b>116 D6</b>	<b>1070 D6</b>	<b>49.7 D6</b>	<b>376 D6</b>	<b>249 D6</b>	<b>1310 D6</b>	<477
T8-SB2 (17)	03/12/2019	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<13.1	<431
T8-SB3 (17)	03/12/2019	<b>1.7 j</b>	<11	<11	<b>1.5 j</b>	<b>1.3 j</b>	<b>1.7 j</b>	<11	<11	<11	<11	<b>2 j</b>	<11	<11	<11	<b>2.3 j</b>	<357
T9-SB1 (18)	03/13/2019	<b>16.9</b>	<b>10 j</b>	<b>1.8 j</b>	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<11.1	<b>7.6 j</b>	<11.1	<b>10.2 j</b>	<b>2.8 j</b>	<379
T9-SB2 (19)	03/13/2019	<b>4820</b>	<b>19700</b>	<b>10900</b>	<b>4900</b>	<b>3530</b>	<b>2870</b>	<b>1200</b>	<b>1450</b>	<b>3630</b>	<b>383 j</b>	<b>11300</b>	<b>15300</b>	<b>1020</b>	<b>39300</b>	<b>17300</b>	<b>4940</b>
T9-SB2 (22)	03/13/2019	<b>5.4 j</b>	<b>13.2</b>	<b>1.6 j</b>	<b>1.2 j</b>	<b>0.68 j</b>	<10.5	<10.5	<10.5	<b>0.72 j</b>	<10.5	<b>2.8 j</b>	<b>4.1 j</b>	<10.5	<b>6.1 j</b>	<b>6.9 j</b>	<349
<b>QC SAMPLE RESULTS</b>																	
BLIND DUPLICATE_T13-SB2 (15)	03/20/2019	<b>12.8</b>	<b>1.1 j</b>	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<11.4	<384
BLIND DUPLICATE_T9-SB1 (18)	03/13/2019	<b>19.7</b>	<b>37.1</b>	<b>13.6</b>	<b>4.8 j</b>	<b>3.3 j</b>	<b>2.7 j</b>	<11.4	<b>1 j</b>	<b>3.3 j</b>	<11.4	<b>12.8</b>	<b>26.4</b>	<11.4	<b>58.7</b>	<b>21.4</b>	<375

Prepared by: MSM Checked by: IDP

**Notes:**  
 Bold type indicates that the compound was detected above the adjusted method detection limit.  
 Yellow shading indicates that the compound was detected above a potentially applicable screening level listed in Section 4.8 of the RIWP-A  
 % - Percent  
 < - concentration not detected at or above the adjusted reporting limit.  
 B - Target analyte detected in method blank at or above the reporting limit. Target analyte concentration in sample is less than 10X the concentration in the method blank. Analyte concentration in sample could be due to blank contamination.  
 BC - The same analyte was detected in an associated blank at a concentration above 1/2 the reporting limit but below the laboratory reporting limit.  
 D6 - The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.  
 j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
 L1 - Analyte recovery in the laboratory control sample (LCS) was above quality control (QC) limits. Results may be biased high.  
 M1 - Matrix spike recovery was high: the associated Laboratory Control Spike (LCS) was acceptable.  
 NE - No screening level established at this time. A site-specific risk-based screening level may be established as part of the risk assessment process outlined in Section 5.0 of the RIWP-A.  
 R1 - Relative Percent Difference (RPD) value was outside control limits.  
 µg/kg - Micrograms per kilogram

**TABLE 3-8  
ANALYTICAL RESULTS SUMMARY - SHEEN  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREEVILLE, SC**

Analyte	Reporting Units	SS-01_SS_20190424	SS-02_SS_20190424	SS-03_SS_20190424
1-Methylnaphthalene	mg/kg	27.8	15.9	24.1
2,6,10-Trimethyldodecane (1380)	mg/kg	<781	<833	<694
2,6,10-Trimethyltridecane (1470)	mg/kg	<781	<833	<694
2-Methylnaphthalene	mg/kg	61.7	33.5	57.9
Acenaphthene	mg/kg	58.2	13	19.9
Acenaphthylene	mg/kg	17.6	2.63 j	<10.4
Anthracene	mg/kg	26.7	9.4 j	7.58 j
Benz(a)anthracene	mg/kg	65.7	11 j	2.54 j
Benzo(a)fluoranthene	mg/kg	18.7	<12.5	<10.4
Benzo(a)pyrene	mg/kg	85.4	12.7	4.32 j
Benzo(b)fluoranthene	mg/kg	74	24.4	3.41 j
Benzo(e)pyrene	mg/kg	66.7	18.8	3.18 j
Benzo(g,h,i)perylene	mg/kg	58.1	13.7	3.5 j
Benzo(j) + (k)fluoranthene	mg/kg	81.7	21	3.6 j
Benzothiophene	mg/kg	<11.7	<12.5	<10.4
Biphenyl	mg/kg	25.8	12.1 j	24.2
C1-Benzo(b)thiophenes	mg/kg	16.3	8.69 j	12.5
C1-Chrysenes	mg/kg	36.3	7.69 j	2.23 j
C1-Decalins	mg/kg	<11.7	<12.5	<10.4
C1-Dibenzothiophenes BS	mg/kg	8.41 j	<12.5	4.91 j
C1-Fluoranthenes/Pyrenes	mg/kg	55.8	9.92 j	4.82 j
C1-Fluorenes	mg/kg	15.9	5.16 j	8.9 j
C1-Naphthalenes	mg/kg	61.1	33.9	56.1
C1-Naphthobenzothiophenes	mg/kg	8.09 j	3.52 j	<10.4
C1-Phenanthrenes/Anthracenes	mg/kg	53.6	16.1	22.9
C2-Benzo(b)thiophenes	mg/kg	5.8 j	<12.5	3.8 j
C2-Chrysenes BS	mg/kg	17.5	6.32 j	<10.4
C2-Decalins	mg/kg	5.38 j	7.06 j	<10.4
C2-Dibenzothiophenes	mg/kg	12.9	5.01 j	7.33 j
C2-Fluoranthenes/Pyrenes	mg/kg	36.9	11.1 j	3.76 j
C2-Fluorenes	mg/kg	28.5	12.4 j	20.6
C2-Naphthalenes	mg/kg	78.7	35.2	63.8
C2-Naphthobenzothiophenes	mg/kg	11.1 j	11.5 j	<10.4
C2-Phenanthrenes/Anthr BS	mg/kg	26.7	6.51 j	6.67 j
C3-Benzo(b)thiophenes	mg/kg	7.73 j	4.67 j	6.08 j
C3-Chrysenes	mg/kg	20.5	<12.5	<10.4
C3-Decalins	mg/kg	6.12 j	7.26 j	<10.4
C3-Dibenzothiophenes	mg/kg	8.6 j	5.82 j	4.96 j
C3-Fluoranthenes/Pyrenes	mg/kg	19	6 j	<10.4
C3-Fluorenes	mg/kg	26.6	14.8	16.4
C3-Naphthalenes	mg/kg	47.6	17.6	33.7
C3-Naphthobenzothiophenes	mg/kg	7.4 j	4.47 j	<10.4
C3-Phenanthrenes/Anthracenes	mg/kg	16.1	4.6 j	3.52 j
C4-Benzo(b)thiophenes	mg/kg	4.39 j	<12.5	<10.4
C4-Chrysenes	mg/kg	<11.7	<12.5	<10.4
C4-Decalins	mg/kg	15.3	14.6	10.7
C4-Dibenzothiophenes	mg/kg	<11.7	<12.5	<10.4
C4-Fluoranthenes/Pyrenes	mg/kg	12.1	9.56 j	3.09 j
C4-Naphthalenes	mg/kg	23.8	9.9 j	17
C4-Naphthobenzothiophenes	mg/kg	<11.7	<12.5	<10.4
C4-Phenanthrenes/Anthracenes	mg/kg	9.13 j	<12.5	<10.4
Chrysene	mg/kg	85.6	33.6	3.84 j
cis/trans-Decalin	mg/kg	<5.86	<6.25	<5.21
Dibenz(a,h) + (a,c)anthracene	mg/kg	15.9	4.28 j	<10.4
Dibenzofuran	mg/kg	103	45.4	95.6
Dibenzothiophene	mg/kg	17.4	6.94 j	12.1
DRO (C10-C28)	mg/kg	64100	66300	46100
Fluoranthene	mg/kg	133	36.2	28
Fluorene	mg/kg	36.4	16.8	28.1
Indeno(1,2,3-cd)pyrene	mg/kg	48.1	11.8 j	2.89 j
Naphthalene	mg/kg	33.8	24.1	29.4
Naphthobenzothiophenes	mg/kg	11.5 j	5.66 j	<10.4
n-Decane (C10)	mg/kg	<781	<833	<694
n-Docosane (C22)	mg/kg	159 j	132 j	111 j
n-Dodecane (C12)	mg/kg	<781	<833	<694
n-Dotriacontane (C32)	mg/kg	1270	3310	2130
n-Eicosane (C20)	mg/kg	162 j	<833	109 j
n-Heneicosane (C21)	mg/kg	152 j	169 j	<694
n-Hentriacontane (C31)	mg/kg	2760	9390	2480
n-Heptatriacontane (C37)	mg/kg	1250	1860	1260
n-Hexacosane (C26)	mg/kg	702 j	1680	1100
n-Hexadecane (C16)	mg/kg	202 j	<833	199 j
n-Hexatriacontane (C36)	mg/kg	658 j	2210	1910
n-Nonacosane (C29)	mg/kg	2710	7620	3440
n-Nonadecane (C19)	mg/kg	<781	<833	<694
n-Nonane (C9)	mg/kg	<781	<833	<694
n-Nonatriacontane (C39)	mg/kg	397 j	1130	978
n-Octacosane (C28)	mg/kg	1090	2540	1700
n-Octadecane (C18)	mg/kg	919	928	835
n-Octatriacontane (C38)	mg/kg	471 j	1280	903
Norpristane (1650)	mg/kg	<781	<833	<694
n-Pentacosane (C25)	mg/kg	1110	2240	1260
n-Tetracontane (C40)	mg/kg	294 j	958	820

**TABLE 3-8  
ANALYTICAL RESULTS SUMMARY - SHEEN  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREEVILLE, SC**

Analyte	Reporting Units	SS-01_SS_20190424	SS-02_SS_20190424	SS-03_SS_20190424
n-Tetracosane (C24)	mg/kg	262 j	533 j	447 j
n-Tetradecane (C14)	mg/kg	187 j	<833	203 j
n-Tetracontane (C34)	mg/kg	1360	3040	1920
n-Triacontane (C30)	mg/kg	1500	3100	2140
n-Tricosane (C23)	mg/kg	388 j	607 j	319 j
n-Tridecane (C13)	mg/kg	<781	<833	<694
n-Tritriacontane (C33)	mg/kg	1780	5320	2050
n-Undecane (C11)	mg/kg	<781	<833	<694
Perylene	mg/kg	24.6	6.45 j	3.22 j
Phenanthrene	mg/kg	233	114	195
Phytane	mg/kg	<781	<833	<694
Pristane	mg/kg	<781	<833	<694
Pyrene	mg/kg	110	23	14.2
Retene	mg/kg	2.9 j	<12.5	<10.4
Total Petroleum Hydrocarbons (C9-C44)	mg/kg	173000	236000	119000
Total Saturated Hydrocarbons	mg/kg	26000 j	60500 j	32800 j
1,1,4-Trimethylcyclohexane	µg/kg	<357000	<192000	<250000
1,1-Dimethylcyclopentane	µg/kg	<357000	<192000	<250000
1,2,3,4-Tetramethylbenzene	µg/kg	<357000	<192000	<250000
1,2,3,5-Tetramethylbenzene	µg/kg	<357000	<192000	<250000
1,2,3-Trimethylbenzene	µg/kg	<357000	<192000	<250000
1,2,4,5-Tetramethylbenzene	µg/kg	<357000	<192000	<250000
1,2,4-Triethylbenzene	µg/kg	<357000	<192000	<250000
1,2,4-Trimethylbenzene	µg/kg	<357000	<192000	<250000
1,2-Dichloroethane	µg/kg	<357000	<192000	<250000
1,2-Diethylbenzene	µg/kg	<357000	<192000	<250000
1,2-Dimethyl-3-Ethylbenzene	µg/kg	<357000	<192000	<250000
1,2-Dimethyl-4-ethylbenzene	µg/kg	<357000	<192000	<250000
1,2-Dimethylcyclohexane (cis)	µg/kg	<357000	<192000	<250000
1,2-Dimethylcyclohexane (trans)	µg/kg	<357000	<192000	<250000
1,3,5-Triethylbenzene	µg/kg	<357000	<192000	<250000
1,3,5-Trimethylbenzene	µg/kg	<357000	<192000	<250000
1,3-Diethylbenzene	µg/kg	<357000	<192000	<250000
1,3-Dimethyl-2-Ethylbenzene	µg/kg	<357000	<192000	<250000
1,3-Dimethyl-4-ethylbenzene	µg/kg	<357000	<192000	<250000
1,3-Dimethyl-5-Ethylbenzene	µg/kg	<357000	<192000	<250000
1,3-Dimethyl-5-tert-Butylbenzene	µg/kg	<357000	<192000	<250000
1,3-Dimethylcyclopentane (cis)	µg/kg	<357000	<192000	<250000
1,3-DMCP (trans)/2-Methyl-1-hexene	µg/kg	<714000	<385000	<500000
1,4-Dimethyl-2-Ethylbenzene	µg/kg	<357000	<192000	<250000
1,4-Dimethylcyclohexane (trans)	µg/kg	<357000	<192000	<250000
1-Decene	µg/kg	<357000	<192000	<250000
1-Heptene/1,2-DMCP (trans)	µg/kg	<714000	<385000	<500000
1-Hexene	µg/kg	<357000	<192000	<250000
1-Methyl-2-ethylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-2-isopropylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-2-n-propylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-3-ethylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-3-isopropylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-3-n-propylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-4-Ethylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-4-Isopropylbenzene	µg/kg	<357000	<192000	<250000
1-Methyl-4-N-Propylbenzene	µg/kg	<357000	<192000	<250000
1-Nonene	µg/kg	<893000	<481000	<625000
1-Octene	µg/kg	<893000	<481000	<625000
1-Pentene	µg/kg	<357000	<192000	<250000
2,2,3-Trimethylbutane	µg/kg	<357000	<192000	<250000
2,2,3-Trimethylpentane	µg/kg	<357000	<192000	<250000
2,2-Dimethylbutane	µg/kg	<357000	<192000	<250000
2,2-Dimethylhexane	µg/kg	<357000	<192000	<250000
2,2-Dimethylpentane	µg/kg	<357000	<192000	<250000
2,3,3-Trimethylpentane	µg/kg	<357000	<192000	<250000
2,3,4-Trimethylpentane	µg/kg	<357000	<192000	<250000
2,3-Dimethylbutane	µg/kg	<357000	<192000	<250000
2,3-Dimethylheptane	µg/kg	<357000	<192000	<250000
2,3-Dimethylhexane	µg/kg	<357000	<192000	<250000
2,3-Dimethylpentane	µg/kg	<357000	<192000	<250000
2,4-Dimethylhexane	µg/kg	<357000	<192000	<250000
2,4-Dimethylpentane	µg/kg	<357000	<192000	<250000
2,5-Dimethylheptane	µg/kg	<357000	<192000	<250000
2,5-Dimethylhexane	µg/kg	<357000	<192000	<250000
2-Ethylthiophene	µg/kg	<357000	<192000	<250000
2-Methyl-1-Butene	µg/kg	<357000	<192000	<250000
2-Methyl-2-pentene	µg/kg	<357000	<192000	<250000
2-Methylheptane	µg/kg	<357000	<192000	<250000
2-Methylhexane	µg/kg	<357000	<192000	<250000
2-Methylnonane	µg/kg	<357000	<192000	<250000
2-Methyloctane	µg/kg	<357000	<192000	<250000
2-Methylpentane	µg/kg	<357000	<192000	<250000
2-Methylthiophene	µg/kg	<357000	<192000	<250000
2-Nonene	µg/kg	<893000	<481000	<625000
3,3-Diethylpentane	µg/kg	<357000	<192000	<250000
3,3-Dimethylheptane	µg/kg	<357000	<192000	<250000

**TABLE 3-8  
ANALYTICAL RESULTS SUMMARY - SHEEN  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREEVILLE, SC**

Analyte	Reporting Units	SS-01_SS_20190424	SS-02_SS_20190424	SS-03_SS_20190424
3,3-Dimethyloctane	µg/kg	<357000	<192000	<250000
3,3-Dimethylpentane	µg/kg	<357000	<192000	<250000
3,4-Dimethylheptane	µg/kg	<357000	<192000	<250000
3,5-Dimethylheptane	µg/kg	<357000	<192000	<250000
3-Ethylhexane	µg/kg	<357000	<192000	<250000
3-Ethylpentane	µg/kg	<357000	<192000	<250000
3-Methyl-1-butene	µg/kg	<357000	<192000	<250000
3-Methylheptane	µg/kg	<357000	<192000	<250000
3-Methylhexane	µg/kg	<357000	<192000	<250000
3-Methylnonane	µg/kg	<357000	<192000	<250000
3-Methyloctane	µg/kg	<357000	<192000	<250000
3-Methylpentane	µg/kg	<357000	<192000	<250000
3-Methylthiophene	µg/kg	<357000	<192000	<250000
4-Methyl-1-pentene	µg/kg	<357000	<192000	<250000
4-Methylheptane	µg/kg	<357000	<192000	<250000
4-Methyloctane	µg/kg	<357000	<192000	<250000
Benzene	µg/kg	<357000	<192000	<250000
Benzothiophene	µg/kg	<357000	<192000	<250000
cis-2-Heptene	µg/kg	<357000	<192000	<250000
cis-2-Hexene	µg/kg	<357000	<192000	<250000
cis-2-Octene	µg/kg	<357000	<192000	<250000
cis-2-Pentene	µg/kg	<357000	<192000	<250000
cis-3-Nonene	µg/kg	<357000	<192000	<250000
Cyclohexane	µg/kg	<357000	<192000	<250000
Cyclopentane	µg/kg	<357000	<192000	<250000
Decane (C10)	µg/kg	<357000	<192000	<250000
Dodecane (C12)	µg/kg	<893000	<481000	<625000
Ethylbenzene	µg/kg	<357000	<192000	<250000
Ethylcyclopentane	µg/kg	<357000	<192000	<250000
Ethylene dibromide	µg/kg	<357000	<192000	<250000
Ethyl-Tert-Butyl-Ether	µg/kg	<357000	<192000	<250000
Heptane	µg/kg	<357000	<192000	<250000
Hexylbenzene	µg/kg	<357000	<192000	<250000
Indane	µg/kg	<357000	<192000	<250000
Indene	µg/kg	<357000	<192000	<250000
Isobutylbenzene	µg/kg	<357000	<192000	<250000
Isobutylcyclohexane	µg/kg	<357000	<192000	<250000
Isooctane	µg/kg	<357000	<192000	<250000
Isopentane	µg/kg	<357000	<192000	<250000
Isoprene	µg/kg	<357000	<192000	<250000
Isopropyl Ether	µg/kg	<357000	<192000	<250000
Isopropylbenzene	µg/kg	<357000	<192000	<250000
Isopropylcyclohexane	µg/kg	<357000	<192000	<250000
Isopropylcyclopentane	µg/kg	<357000	<192000	<250000
Methylcyclohexane	µg/kg	<357000	<192000	<250000
Methylcyclopentane	µg/kg	<357000	<192000	<250000
Methyl-tert-butyl ether	µg/kg	<357000	<192000	<250000
MMT	µg/kg	<893000	<481000	<625000
n-Butylbenzene	µg/kg	<357000	<192000	<250000
n-Hexane	µg/kg	<357000	<192000	<250000
Nonane (C9)	µg/kg	<357000	<192000	<250000
N-Pentylbenzene	µg/kg	<357000	<192000	<250000
n-Propylbenzene	µg/kg	<357000	<192000	<250000
Octane	µg/kg	<357000	<192000	<250000
o-Xylene	µg/kg	<357000	<192000	<250000
p/m-Xylene	µg/kg	<714000	<385000	<500000
Pentadecane	µg/kg	<893000	<481000	<625000
Pentane	µg/kg	<357000	<192000	<250000
sec-Butylbenzene	µg/kg	<357000	<192000	<250000
Styrene	µg/kg	<357000	<192000	<250000
tert-Butylbenzene	µg/kg	<357000	<192000	<250000
Tertiary Butanol	µg/kg	<4460000	<2400000	<3120000
Tertiary-Amyl Methyl Ether	µg/kg	<357000	<192000	<250000
Tetradecane (C14)	µg/kg	<893000	<481000	<625000
Thiophene	µg/kg	<357000	<192000	<250000
Toluene	µg/kg	<357000	<192000	<250000
trans-2-Heptene	µg/kg	<357000	<192000	<250000
trans-2-Hexene	µg/kg	<357000	<192000	<250000
trans-2-Pentene	µg/kg	<357000	<192000	<250000
trans-3-Heptene	µg/kg	<357000	<192000	<250000
trans-3-Nonene	µg/kg	<357000	<192000	<250000
Tridecane	µg/kg	<893000	<481000	<625000
Undecane	µg/kg	<357000	<192000	<250000
Xylene (Total)	µg/kg	<357000	<192000	<250000

**Notes:**

Sheen samples collected on 4/24/19.

% - percent

< - concentration not detected at or above the adjusted reporting limit.

µg/kg - Micrograms per liter

j - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

mg/kg - Milligrams per kilogram

NA - Not analyzed

Prepared by: MSM Checked by: IDP

**TABLE 4-1  
PROPOSED MONITORING WELL INSTALLATION DETAILS  
REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
FORMER BRAMLETTE MGP SITE  
DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Location	Well ID	Approximate Surface Casing Depth (feet bls)	Approximate Total Depth of Well (screened interval - feet bls)		Approximate Total Depth of Boring to Facilitate Geophysics (feet bls)	Purpose
Source area (Parcel 1)	MW-37S	--	5	20	--	Provide monitoring at property line east from source area.
	MW-37TZ	--	40	45	--	
	MW-37BR	50	60	65	100	
	MW-36S	--	10	25	--	Characterize groundwater concentrations beneath former MGP process areas.
	MW-36TZ	--	35	40	--	
	MW-36BR	45	55	60	145	
Downgradient of source area (Parcel 2)	MW-35S	--	5	20	--	Provide additional resolution of groundwater concentration (horizontal and vertical) downgradient of the source area between Parcel 2 and Legacy Charter Elementary.
	MW-35TZ	--	30	35	--	
	MW-35BR	40	50	55	90	
	MW-29BR	40	50	55	90	Provide horizontal and vertical delineation of groundwater COIs based on MW-29TZ groundwater monitoring results.
	MW-34S	--	5	20	--	
	MW-34TZ	--	35	40	--	
West of Vaughn Landfill (Parcel 3)	MW-34BR	45	55	60	95	
	MW-02TZ	--	25	30	--	Provide horizontal and vertical delineation of groundwater COIs based on MW-02 and MW-29TZ groundwater monitoring results.
MW-02BR	35	45	50	85		
Vaughn Landfill (Parcel 3)	MW-03BRL	70	80	85	140	Provide vertical delineation of groundwater COIs based on MW-03BR monitoring results.
	MW-21TZ	--	20	25	--	Provide vertical delineation of groundwater COIs based on observations at MW-06A and MW-21.
	MW-21BR	30	40	45	130	
Adjacent to Reedy River (Swamp Rabbit Trail)	MW-32S	--	5	20	--	Increase data resolution and verify current conclusion that groundwater COIs are not affecting surface water.
	MW-32TZ	--	35	40	--	
	MW-33S	--	5	20	--	
	MW-33TZ	--	35	40	--	
	MW-40S	--	5	20	--	
	MW-40TZ	--	40	45	--	
South of Vaughn landfill (Parcel 4 - near property line adjacent to private properties)	MW-40BR	50	60	65	100	
	MW-38S	--	5	20	--	Provide verification of no constituent migration toward property line between Vaughn Landfill and adjacent private properties. Wells are located hydraulically upgradient from Parcel 3; constituent migration is not expected toward this area. Access in this area is difficult and seasonally inundated or saturated conditions will factor into final well location.
	MW-39S	--	5	20	--	
MW-39TZ	--	35	40	--		
Behind Legacy Charter Elementary School	MW-41S	--	5	20	--	Provide verification of no constituent migration onto neighboring property and long term monitoring.
	MW-41TZ	--	30	35	--	
	MW-41BR	40	50	55	90	

Prepared By: TCK Checked By: IDP

**Notes:**  
All depths are approximate. Total depths are subject to change based on field conditions.  
bls - below land surface

**TABLE 4-2  
 APPLICABLE REGULATORY STANDARDS AND SCREENING LEVELS  
 REMEDIAL INVESTIGATION WORK PLAN ADDENDUM  
 FORMER BRAMLETTE MGP SITE  
 DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC**

Groundwater		Surface Water		Sediment		Soil	
Analytical Parameter	Regulatory Standard (µg/L) <sup>1</sup>	Analytical Parameter	Regulatory Standard (µg/L) <sup>1</sup>	Analytical Parameter	Regulatory Standard (µg/kg) <sup>2</sup>	Analytical Parameter	Regulatory Standard (µg/L) <sup>2</sup>
Benzene	5	Benzene	5	Benzene	5,100	Benzene	5,100
Ethylbenzene	700	Ethylbenzene	700	Ethylbenzene	25,000	Ethylbenzene	25,000
Toluene	1,000	Toluene	1,000	Toluene	47,000,000	Toluene	47,000,000
m&p-Xylene	NE	m&p-Xylene	NE	m&p-Xylene	2,400,000	m&p-Xylene	2,400,000
o-Xylene	NE	o-Xylene	NE	o-Xylene	2,800,000	o-Xylene	2,800,000
Total Xylene	10,000	Total Xylene	10000	Xylene (Total)	2,500,000	Xylene (Total)	2,500,000
MTBE	40	MTBE	40	MTBE	210,000	MTBE	210,000
2-Butanone (MEK)	NE	Chloromethane	NE	2-Butanone (MEK)	190,000,000	1,2,4-Trimethylbenzene	1,800,000
2-Hexanone	NE	Naphthalene	25	4-Methyl-2-pentanone (MIBK)	140,000,000	1,3,5-Trimethylbenzene	1,500,000
Acetone	NE	1-Methylnaphthalene	NE	Acetone	670,000,000	Chloroform	1,400
Trichloroethene	NE	2-Methylnaphthalene	NE	Chloroform	1,400	Acetone	670,000,000
Naphthalene	25	Acenaphthene	NE	Methylene chloride	1,000,000	Chloromethane	460,000
1-Methylnaphthalene	NE	Acenaphthylene	NE	Naphthalene	17,000	Isopropylbenzene (Cumene)	9,900,000
2-Methylnaphthalene	NE	Anthracene	NE	1-Methylnaphthalene	73,000	Methylene chloride	1,000,000
Acenaphthene	NE	Benzo(a)anthracene	10	2-Methylnaphthalene	3,000,000	Naphthalene	17,000
Acenaphthylene	NE	Benzo(a)pyrene	0.2	Acenaphthene	45,000,000	1-Methylnaphthalene	73,000
Anthracene	NE	Benzo(b)fluoranthene	10	Acenaphthylene	NE	2-Methylnaphthalene	3,000,000
Benzo(a)anthracene	10	Benzo(g,h,i)perylene	NE	Anthracene	230,000,000	Acenaphthene	45,000,000
Benzo(a)pyrene	0.2	Benzo(k)fluoranthene	10	Benzo(a)anthracene	21,000	Acenaphthylene	NE
Benzo(b)fluoranthene	10	Chrysene	10	Benzo(a)pyrene	2,100	Anthracene	230,000,000
Benzo(g,h,i)perylene	NE	Dibenz(a,h)anthracene	10	Benzo(b)fluoranthene	21,000	Benzo(a)anthracene	21,000
Benzo(k)fluoranthene	10	Fluoranthene	NE	Benzo(g,h,i)perylene	NE	Benzo(a)pyrene	2,100
Chrysene	10	Fluorene	NE	Benzo(k)fluoranthene	210,000	Benzo(b)fluoranthene	21,000
Dibenz(a,h)anthracene	10	Indeno(1,2,3-cd)pyrene	NE	Chrysene	2,100,000	Benzo(g,h,i)perylene	NE
Fluoranthene	NE	Phenanthrene	NE	Dibenz(a,h)anthracene	2,100	Benzo(k)fluoranthene	210,000
Fluorene	NE	Pyrene	NE	Fluoranthene	30,000,000	Chrysene	2,100,000
Indeno(1,2,3-cd)pyrene	NE			Fluorene	30,000,000	Dibenz(a,h)anthracene	2,100
Phenanthrene	NE			Indeno(1,2,3-cd)pyrene	21,000	Fluoranthene	30,000,000
Pyrene	NE			Phenanthrene	NE	Fluorene	30,000,000
2,4-Dimethylphenol	NE			Pyrene	23,000,000	Indeno(1,2,3-cd)pyrene	21,000
2,4-Dinitrotoluene	NE					Phenanthrene	NE
2-Methylphenol(o-Cresol)	NE					Pyrene	23,000,000
Dibenzofuran	NE					Dibenzofuran	1,000,000
Phenol	NE						

Prepared by: TCK      Checke by: MSM

**Notes:**

<sup>1</sup>SCDHEC R.61-68 Human Health MCL values

<sup>2</sup>EPA RSLs for Industrial Soils.

NE - No regulatory standard established at this time. A site-specific target level may be established as part of the risk assessment outlined in Section 5.0 of the RIWP-A.

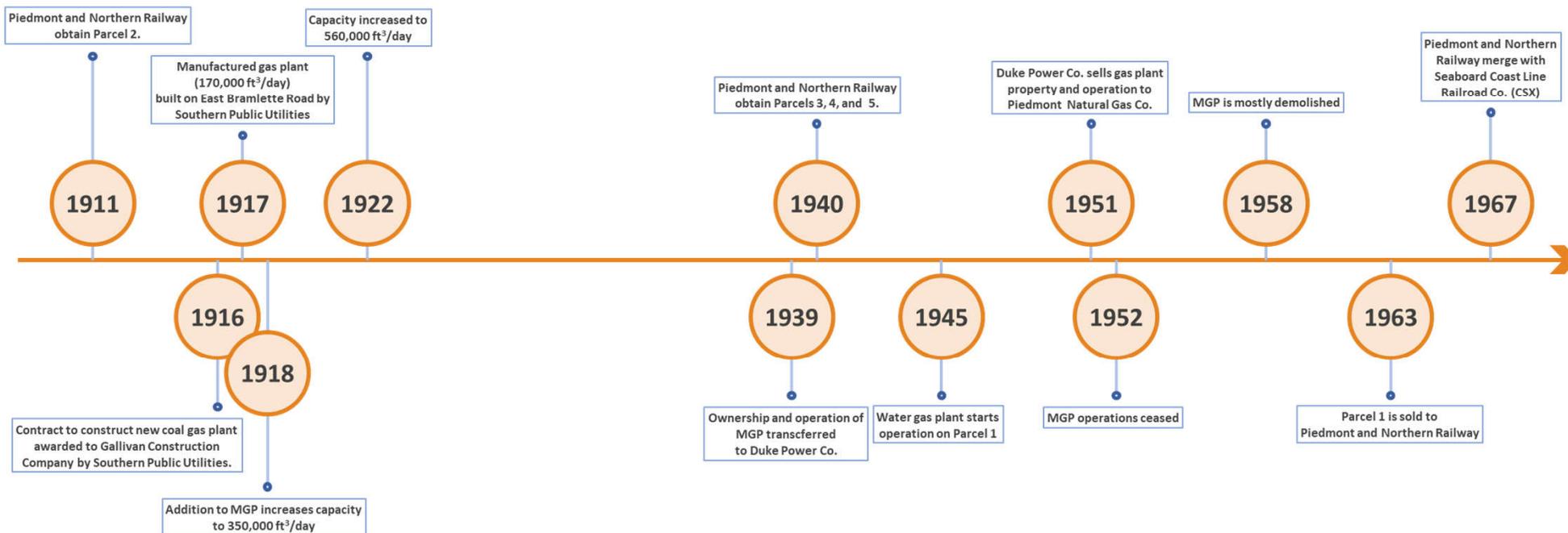
µg/L - Micrograms per liter

µg/kg - Micrograms per kilogram

# **APPENDIX A**

## **Project Timeline**

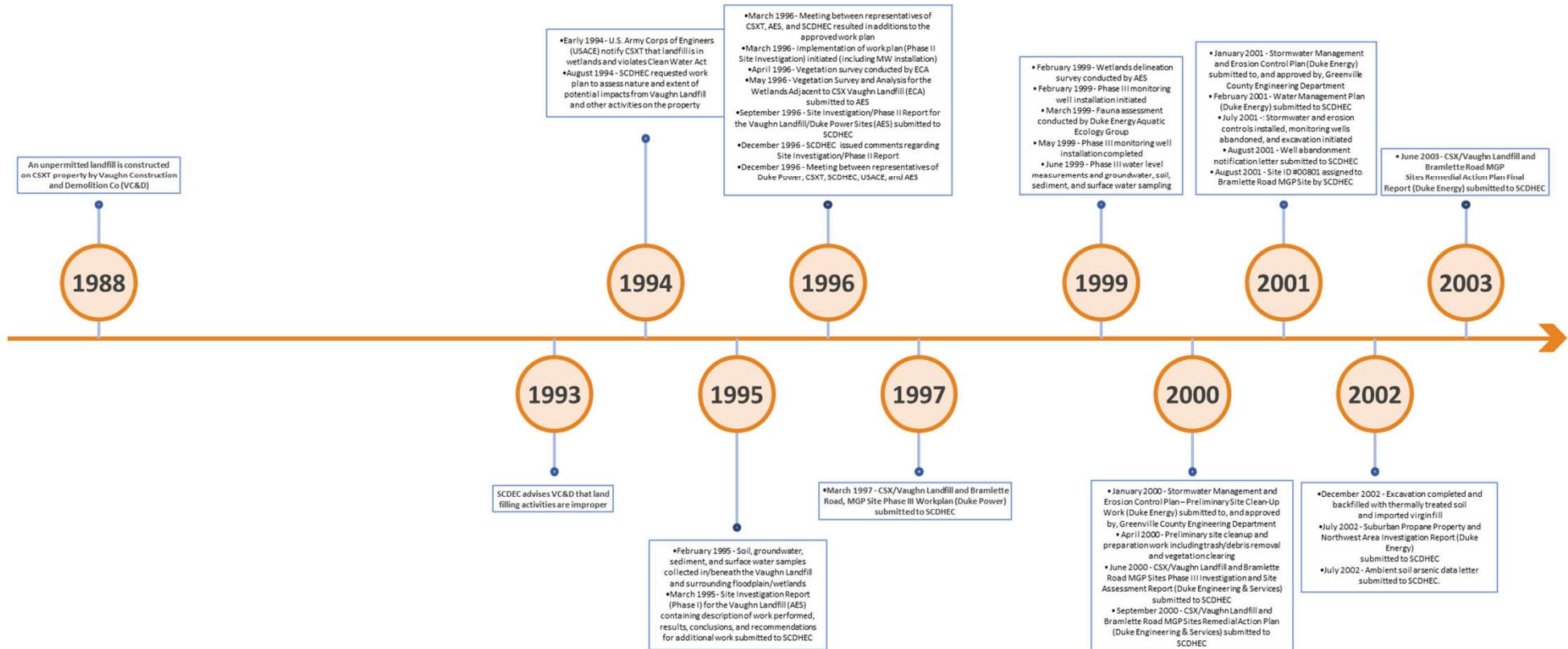
# Project Timeline (1911-1967)



	148 RIVER STREET, SUITE 220 GREENVILLE, SOUTH CAROLINA 29601 PHONE 864-421-9999 www.synTerraCorp.com	<b>PROJECT TIMELINE (1911-1967)</b> <b>FORMER BRAMLETTE MGP SITE</b> <b>DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC</b>
	DRAWN BY: T KING PROJECT MANAGER: T PLATING LAYOUT:	

P:\Duke Energy Progress.1026102\_Ashville Ash Basin GW Assessment\Plan\60.EHS IAP Monitoring & Reporting\April 2018 Annual Report\Figures

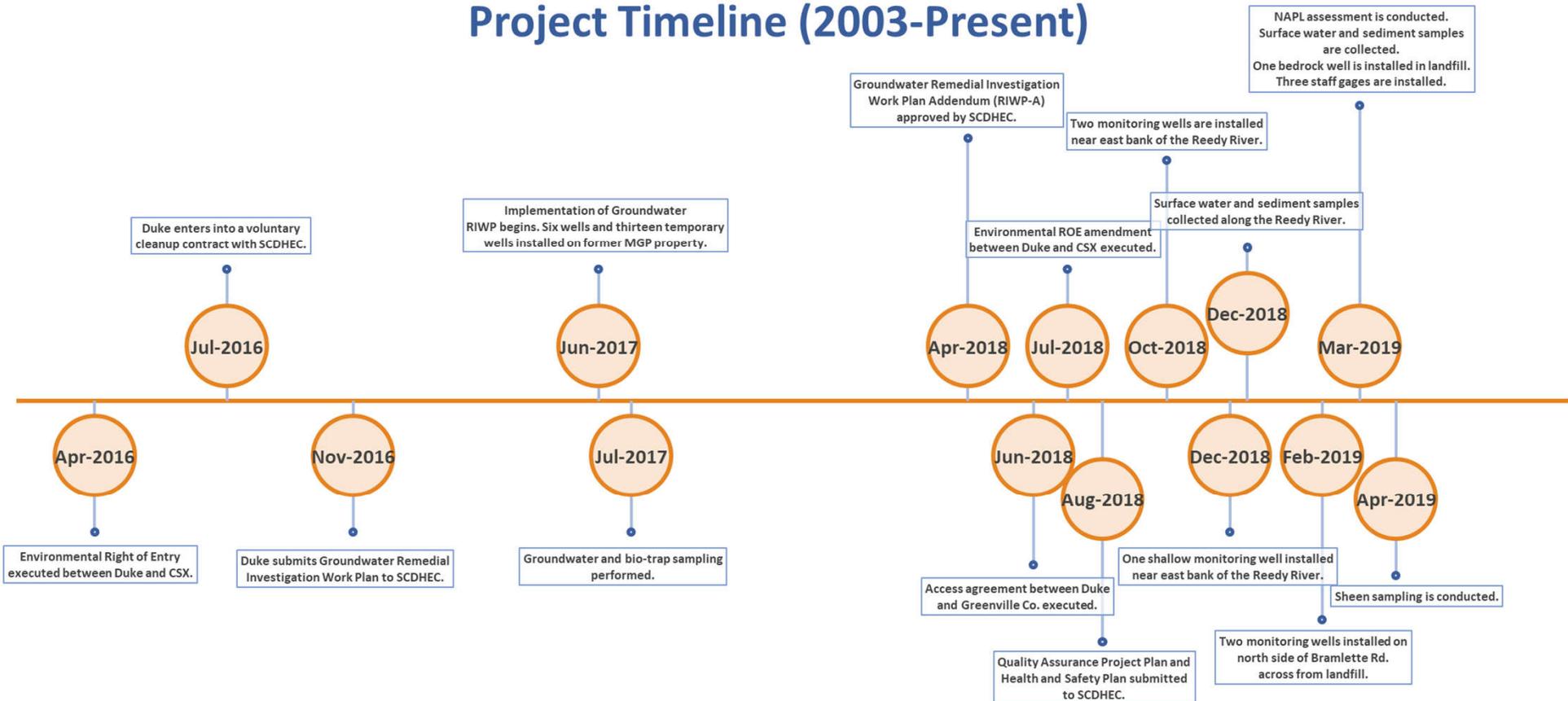
# Project Timeline (1967-2003)



	148 RIVER STREET, SUITE 220 GREENVILLE, SOUTH CAROLINA 29601 PHONE 864-421-8999 www.synTerraCorp.com	<b>PROJECT TIMELINE (1967-2003)</b> <b>FORMER BRAMLETTE MGP SITE</b> <b>DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC</b>
	DRAWN BY: T KING PROJECT MANAGER: T PLATING LAYOUT:	

P:\Duke Energy Progress.1026102\_Ashville Ash Basin GW Assessment Plan\60.EHS IAP Monitoring & Reporting\April 2018 Annual Report\Figures

# Project Timeline (2003-Present)



	148 RIVER STREET, SUITE 220 GREENVILLE, SOUTH CAROLINA 29601 PHONE 864-421-9999 www.synterracorp.com	<b>PROJECT TIMELINE (2003-PRESENT)</b> <b>FORMER BRAMLETTE MGP SITE</b> <b>DUKE ENERGY CAROLINAS, LLC, GREENVILLE, SC</b>
	DRAWN BY: T KING PROJECT MANAGER: T PLATING LAYOUT:	
<small>P:\Duke Energy Progress.1026102_Ashville Ash Basin GW Assessment\Plan\60.EHS IAP Monitoring &amp; Reporting\April 2018 Annual Report\Figures</small>		

## **APPENDIX B**

# **Monitoring Well and Soil Boring Logs, Construction Forms, and Abandonment Forms**

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>MW-03BR</b>
PROJECT NO: 1026.800	STARTED: 3/27/19 COMPLETED: 4/1/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104216.352 EASTING: 1574138.038
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 935.87 ft M.P. ELEV: 935.87 ft
BOREHOLE DIAMETER: 9.25, 6 IN	DEPTH TO WATER: ft TOC TOTAL DEPTH: 64.5 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5			FILL; Lean clay with some silt; low plasticity; moist; few fine micaceous coarse sand; trace rootlets, brick, asphalt, and concrete debris; wet above 0.9'. No odor, no visual impacts.		5.5			
10			FILL; Wood debris; wet; dark gray; trace plastic debris. Light sheen, faint hydrocarbon odor.				3.8	
15			SAND; Gray, micaceous; fine-medium; poorly graded, medium dense; moist; interlayered with stiff lean clay, silt, and well graded coarse sand to gravel. 10.5' - 11' - Trace NAPL coated seams (cm scale), strong hydrocarbon odors. 12' - 14.3' - Seams of NAPL saturation, strong hydrocarbon odor. 14.3' - 16.2' - NAPL coated seams, hydrocarbon odor.		8.1		25-35	
20			SAPROLITE; Sandy; dark purple-gray, light gray banding; cohesive/brittle; micaceous; slightly moist. Faint hydrocarbon odor, no visual impacts.		4.5		41.8	
25			SAPROLITE; Sandy; dark purple-gray, light gray banding; cohesive/brittle; micaceous; slightly moist. No odors, no visual impacts.		8.0			← Grout (bentonite cement)
30			SAPROLITE; Sandy; dark purple-gray, light gray banding; cohesive/brittle; micaceous; slightly moist. No odors, no visual impacts.		11.2			← 6.25" Sch 40 PVC surface casing
35			SAPROLITE; Sandy; dark purple-gray, light gray banding; cohesive/brittle; micaceous; slightly moist. No odors, no visual impacts.		2.4			← 2 inch sch 40 PVC riser
40			PWR; Dark gray/purple-gray, trace garnet, wet. Fractures observed at 43'. No odor, no visual impacts.		4.1			
45			GNEISS; Granitic; light gray with some garnet and trace greenish hue; interlayered weak to very strong rock. Fractures observed at 47' (iron oxide staining), 50', 52', 57.5' (green staining, rounded edges on fracture face), 63' (pyrite on fracture face). No odor, no visual impacts.		2.2			
					2.4			

LOG.D - VI DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 5/23/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>MW-03BR</b>
PROJECT NO: 1026.800	STARTED: 3/27/19 COMPLETED: 4/1/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104216.352 EASTING: 1574138.038
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 935.87 ft M.P. ELEV: 935.87 ft
BOREHOLE DIAMETER: 9.25, 6 IN	DEPTH TO WATER: ft TOC TOTAL DEPTH: 64.5 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
55			<b>GNEISS;</b> Granitic; light gray with some garnet and trace greenish hue; interlayered weak to very strong rock. Fractures observed at 47' (iron oxide staining), 50', 52', 57.5' (green staining, rounded edges on fracture face), 63' (pyrite on fracture face). No odor, no visual impacts. <i>(continued)</i>		4.0			
60					7.6			
65			Bottom of boring 64.5 feet.					
70								
75								
80								
85								
90								
95								

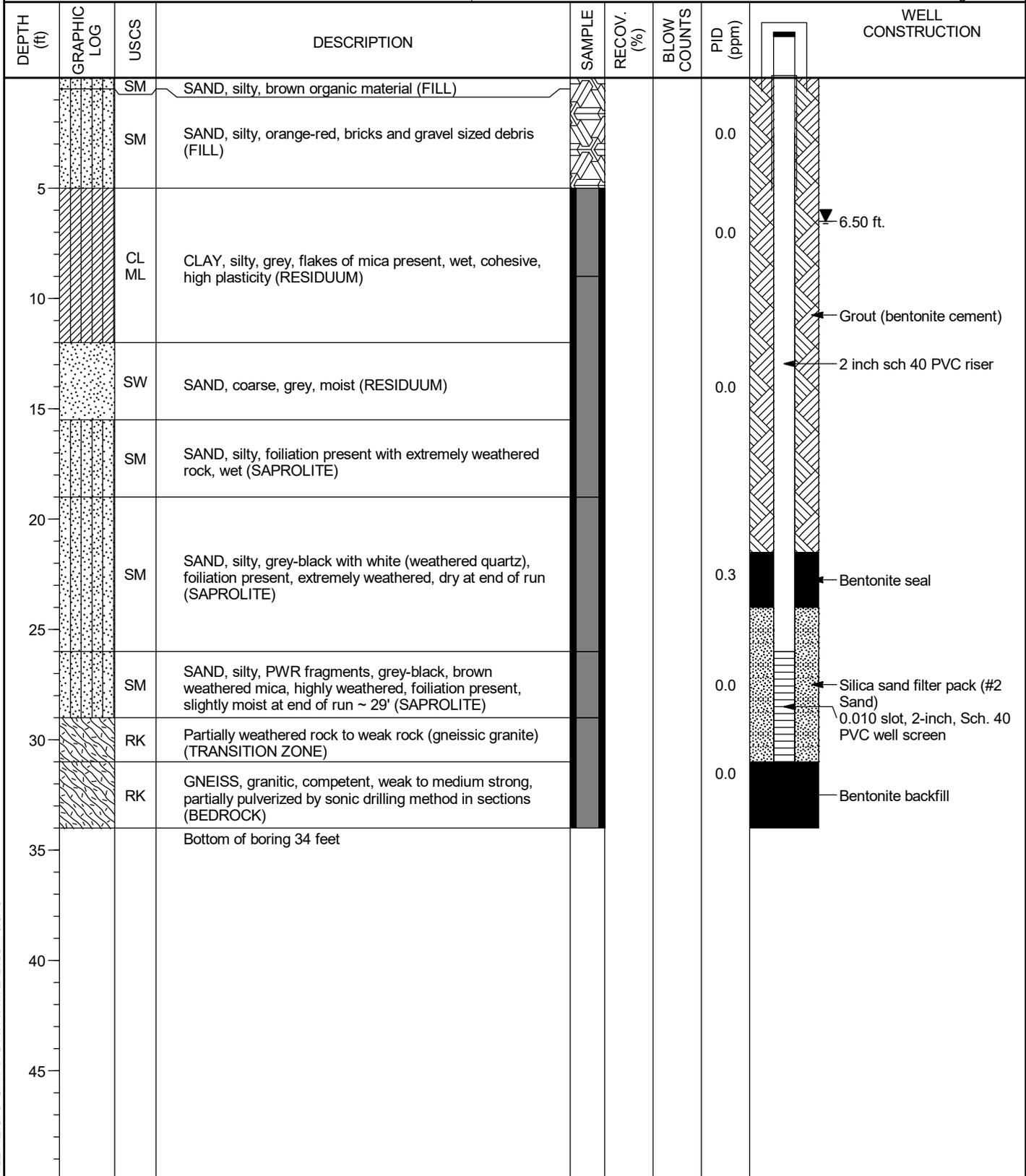
LOG.D - VI DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 5/23/19

PROJECT: Bramlette Road MGP Site	WELL / BORING NO: <b>MW-29S</b>
PROJECT NO: 1026.800	STARTED: 2/22/19 COMPLETED: 2/22/19
DRILLING COMPANY: Cascade Drilling	NORTHING: EASTING:
DRILLING METHOD: Rotary Sonic	G.S. ELEV: TBD ft M.P. ELEV: TBD ft
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 6.51 ft TOC TOTAL DEPTH: 15.0 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: T. King CHECKED BY: T. Plating

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
0 - 1.5	[Dotted pattern]	SM	SAND, silty, brown organic material (FILL)					Grout (cement)
1.5 - 5.0	[Dotted pattern]	SM	SAND, silty, orange-red, bricks and gravel sized debris (FILL)					2 inch sch 40 PVC riser Bentonite seal
5.0 - 11.5	[Diagonal hatching]	CL ML	CLAY, silty, grey, flakes of mica present, wet, cohesive, high plasticity (RESIDUUM)					6.51 ft.
11.5 - 13.5	[Dotted pattern]	SW	SAND, coarse, grey, moist (RESIDUUM)					Silica sand filter pack (#2 Sand) 0.010 Slot, 2-inch, Sch. 40 PVC well screen
13.5 - 15.0			Bottom of boring 15 feet					

LOG.D. DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 3/8/19

PROJECT: Bramlette Road MGP Site	WELL / BORING NO: <b>MW-29TZ</b>
PROJECT NO: 1026.800	STARTED: 2/21/19 COMPLETED: 2/22/19
DRILLING COMPANY: Cascade Drilling	NORTHING: EASTING:
DRILLING METHOD: Rotary Sonic	G.S. ELEV: TBD ft M.P. ELEV: TBD ft
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 6.50 ft TOC TOTAL DEPTH: 31.0 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: T. King CHECKED BY: T. Plating



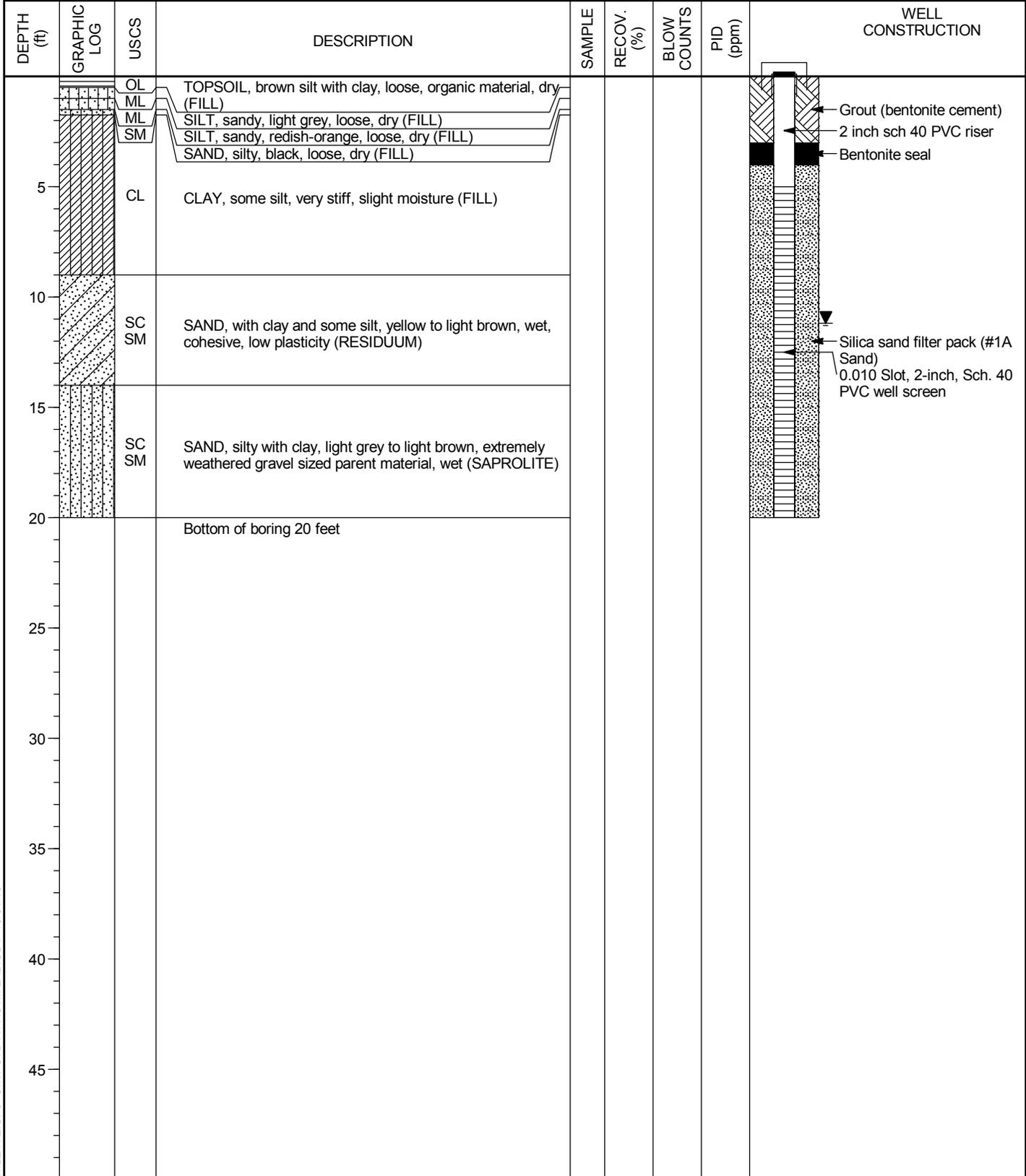
LOG.D. DEC BRAMLETTE.GPJ GINT STD A4 ASTM LAB.GDT 3/8/19

PROJECT: Bramlette Road MGP Site	WELL / BORING NO: <b>MW-30S</b>
PROJECT NO: 1026.800	STARTED: 12/4/18 COMPLETED: 12/5/18
DRILLING COMPANY: Cascade Drilling	NORTHING: TBD EASTING: TBD
DRILLING METHOD: Hollow Stem Augers/DPT	G.S. ELEV: TBD M.P. ELEV: TBD
BOREHOLE DIAMETER: 4.25 IN	DEPTH TO WATER: 11.76 ft TOC TOTAL DEPTH: 19.9 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: T. King CHECKED BY: H. Frank

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
0		SM	SAND, silty, brown, dry, organic material					<p>Grout (neat cement) 2 inch sch 40 PVC riser Bentonite seal 11.76 ft 0.010 Slot, 2-inch, Sch. 40 PVC well screen Silica sand filter pack (#2 Sand)</p>
0-5		ML	SILT, sandy, red-orange, mica present, moist, noncohesive (FILL)		60			
5		CL	CLAY, silty, orange, moist, noncohesive (FILL)					
5-10		ML	SILT, sandy, red grey, moist, noncohesive (FILL)		60			
10		CL	CLAY, silty, red, high plasticity, cohesive, moist (FILL)					
10-15		SM	SAND, silty, red, cohesive, low plasticity moist (RESIDUUM)		100			
15		SP	SAND, grey, non-cohesive, wet (RESIDUUM)					
15-20		SM	SAND, silty, grey to red-orange, foliation present from highly weathered parent rock, wet (SAPROLITE)		100			
20			Bottom of boring 20 feet					
25								
30								
35								
40								
45								

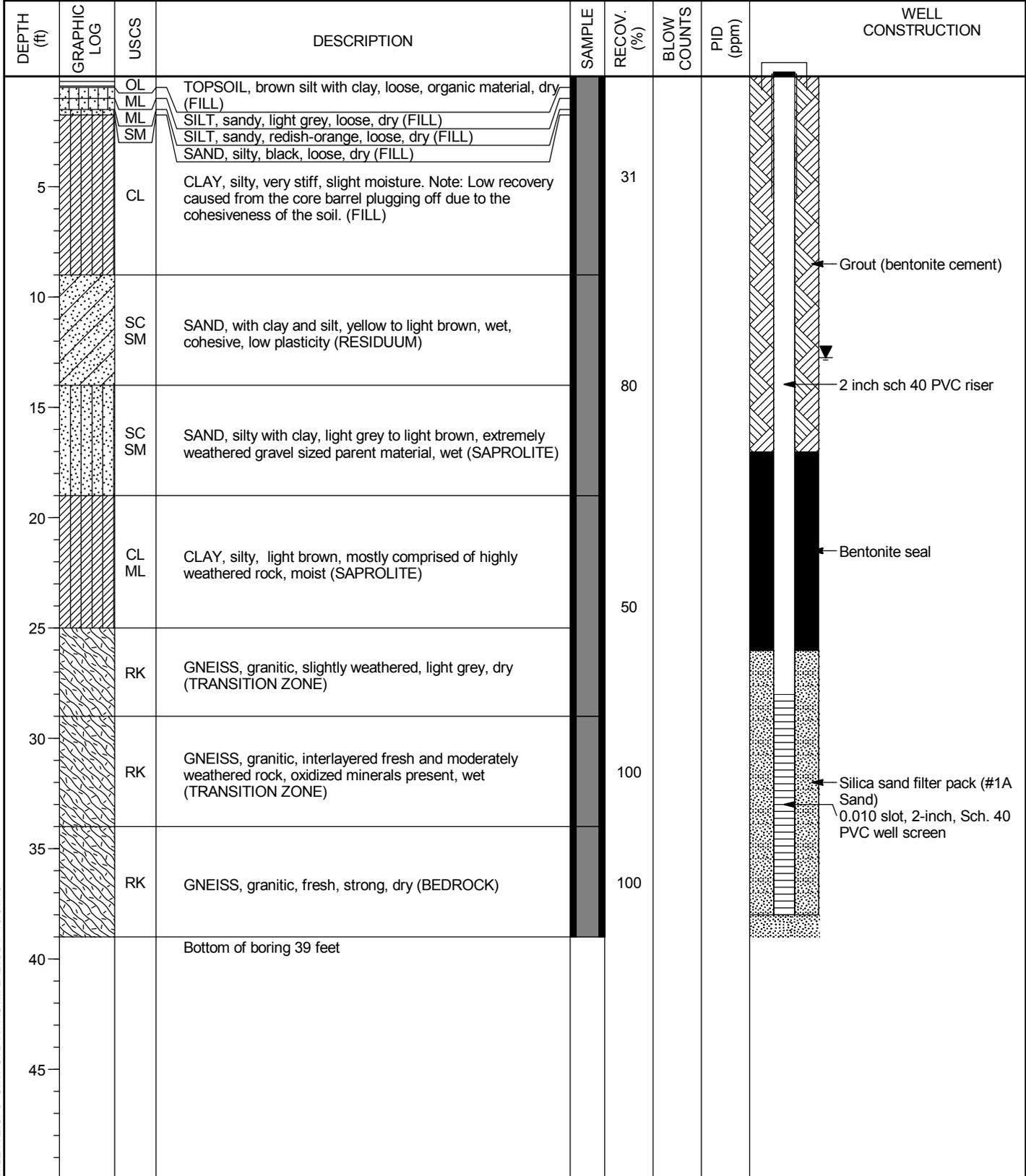
LOG.D. DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 12/18/18

PROJECT: Bramlette Road MGP Site	WELL / BORING NO: <b>MW-31S</b>
PROJECT NO: 1026.800	STARTED: 10/10/18 COMPLETED: 10/11/18
DRILLING COMPANY: Cascade Drilling	NORTHING: EASTING:
DRILLING METHOD: Rotary Sonic	G.S. ELEV: ft M.P. ELEV: ft
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 11.18 ft TOC TOTAL DEPTH: 20.0 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: T. King CHECKED BY: H. Frank



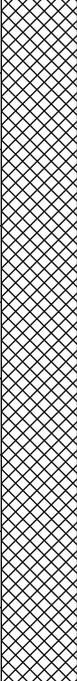
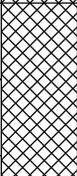
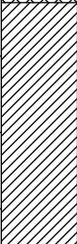
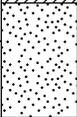
LOG.D. DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 10/31/18

PROJECT: Bramlette Road MGP Site	WELL / BORING NO: <b>MW-31TZ</b>
PROJECT NO: 1026.800	STARTED: 10/9/18 COMPLETED: 10/10/18
DRILLING COMPANY: Cascade Drilling	NORTHING: EASTING:
DRILLING METHOD: Rotary Sonic	G.S. ELEV: ft M.P. ELEV: ft
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 12.75 ft TOC TOTAL DEPTH: 39.0 ft BGS
NOTES: Well Permit #MW-11615	LOGGED BY: T. King CHECKED BY: H. Frank



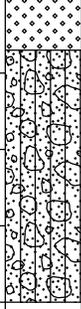
LOG.D. DEC BRAMLETTE.GPJ\_GINT STD A4 ASTM LAB.GDT 10/31/18

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>RI-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/26/19 COMPLETED: 3/26/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104357.88 EASTING: 1574056.359
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.17 ft MSL M.P. ELEV: 934.17 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5			FILL; Various shades of brown, reddish brown, dark gray; mostly silt with some clay; little well graded sand; medium dense; moist (wet above 1.3'); sporadic brick, concrete, asphalt, and wood debris. No odor, No visible impact.		5.0			
10			FILL; Same as above Abundant wood debris below 10.4', dark gray/black No odor, No visible impact.					
15		CL	CLAY, lean; Grades from dark gray to brown-gray with olive brown mottling; low to medium plasticity; medium moist; trace rootlets; fine micaceous sand; few silt. No odor, No visible impact.		8.8			
		SP	SAND; White-gray-black color; fine to medium grain, poorly graded, little sand; trace micaceous grains; medium dense; moist.					
		SW	SAND; Fine to coarse grain, well graded, silt grades out.					
		SW	SAND; Fine to coarse grain, well-graded, NAPL coated, hydrocarbon odor, light sheen with dark brown staining.				109.2	
		SW	SAND; Same as above;					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>RI-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/26/19 COMPLETED: 3/26/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104357.88 EASTING: 1574056.359
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.17 ft MSL M.P. ELEV: 934.17 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25		SW	<p>Fine to coarse grain, well-graded; hydrocarbon odor throughout; light sheen in spots; 20.4'-20.7' with NAPL coated seams, NAPL staining throughout; dark brown staining and hydrocarbon odor. <i>(continued)</i></p> <p>SAPROLITE; Dark purplish gray with lighter gray banding; cohesive/brittle; micaceous and sandy structure; slightly moist; pulverized via drilling</p> <p>@ 20.7'-21.0' wet clayey structure with hydrocarbon odor, sheen, and brown staining; some sand mixed in.</p> <p>@ 21.0'-21.8' half above sand and half above clayey saprolite; hydrocarbon odor and brown staining.</p> <p>@ 22.8-23.3' more lighter grays with trace greenish hue and trace light pink specks; faint hydrocarbon odor above 22.3'.</p> <p>End of Boring @ 24' below ground surface Backfilled with bentonite chips to ground surface</p>		10.2			

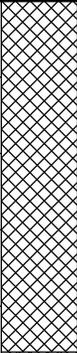
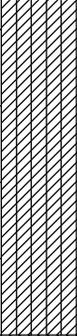
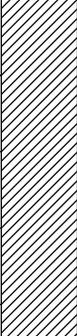
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>RI-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/26/19 COMPLETED: 3/26/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104429.315 EASTING: 1574094.712
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.94 ft MSL M.P. ELEV: 931.94 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5			FILL; Various shades of brown, reddish brown, dark gray; mostly lean clay with some silt, medium moist; few fine micaceous to coarse sand; trace rootlets; sporadic gravel, brick, and concrete debris; wood debris below 4.9'. No odor, No visible impact.		5.3			
10			FILL; Same as above Mostly clayey; more wet; low to medium plasticity; grading to lean clay. No odor, No visible impact.					
		CL	CLAY, lean; Brown to 11.1' then gray with olive brown mottling; medium to stiff to 11.1' then stiff; moist; trace fine micaceous sand, silt, rootlets. @ 13.4'-13.7' sandy clay; no mottling. Faint hydrocarbon odor; No visible impact.		11.3			
15		SW	SAND; White-gray-black color; trace micaceous fine to coarse well-graded sand; medium dense; moist; trace clayey seams; NAPL coated; dark brown staining, strong hydrocarbon odor. SAPROLITE; Dark purplish gray with lighter gray banding; trace light pink specks, cohesive/brittle; micaceous and sandy structure; mostly pulverized by drilling; moist and clayey structure above 15.5'. @ 17.0'-17.4' dark brown NAPL staining; strong hydrocarbon odor. @ 17.8'-18.1' trace NAPL staining; hydrocarbon odor. @ 18.8'-19.0' NAPL coated; strong hydrocarbon odor; (field team suspect drilling dragdown from above interval) End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface				125	
							350	

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>RI-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/28/19 COMPLETED: 3/28/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103727.056 EASTING: 1574337.708
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 928.61 ft MSL M.P. ELEV: 928.61 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 17.0 ft BGS
NOTES: Hand Auger 0-2'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Silt with some clay, various shades of brown, red-brown, gray; Micaceous, coarse well-graded sand, sporadic gravel, asphalt-like, brick, concrete, and fabric debris, medium dense, moist; Hand auger refusal at 2'. No odor, no visual impact.					
5		CL	CLAY, lean; @ 5.2'-6.5' Dark gray, low plasticity, some silt, organic matter/rootlets, some slag and coal ranging from coarse sand to gravel, moist, no odor; @ 6.5'-8.5' SAA with no slag or coal, grades from soft to medium, moist, no odor, no visual impact; @ 8.5'-9.0' gray, trace micaceous grains with orange-brown mottling, stiff, moist, trace silt, medium plasticity, no odor, no visual impact;		5.8			
10		CL	CLAY, lean; Same as above (gray with mottling); Grades from lean clay to clayey sand, trace rootlets/decaying organics, grades to low plasticity; fine-medium sand, poorly graded, mottling grades out by 10.0'. No odor, no visual impact.		10.0			
15			SAPROLITE; Dark gray with tan and purplish-gray interlayered, trace pink specks, slightly moist, cohesive/brittle, micaceous sandy structure, pulverized by drilling; No odor, no visual impact.					
			End of Boring @ 17' below ground surface. Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4-ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T10-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104294.794 EASTING: 1574213.42
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.12 ft MSL M.P. ELEV: 931.12 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Lean Clay; Reddish brown; low plasticity; medium; moist; some fine sand; trace small gravel; and some silt and trace rootlets. No odor, No visible impact.					
5		GM	FILL; Various shades of brown, gray, reddish brown, and dark gray; mostly large and small gravel and gravel-sized debris (concrete and brick) in sandy silt matrix; medium dense; and moist. - @ 5.5'-5.7' Some wood debris; dark gray. No odor, No visible impact.		8.5			
		CL	TIMBER DEBRIS; Layered large wood debris within dark gray silt matrix with some fine sand; and moist. Slight pine/woody odor, No visible impact.					
		CL	CLAY, lean; Grades from brown to dark gray to olive gray; low-medium plasticity; medium; moist; little fine sand and silt; trace large gravel and rootlets; and trace micaceous grains. No odor, No visible impact.					
10		CL	CLAY, lean; Gray; micaceous; brown mottling from 9.0'-10.9'; medium plasticity; stiff; moist; some fine sand and silt; trace purplish millimeter scale discolorations. No odor, No visible impact.					
		SP SC	SAND, clayey; White-gray-black; micaceous; fine-medium poorly graded; medium dense; moist; trace silt; and grades to trace clay. No odor, No visible impact.					
		SP SW	SAND; White-gray-black; micaceous; fine-medium poorly graded; medium dense; and moist. No odor, No visible impact.		11.3		50	
15			SAND; Lighter gray (white-gray-black); micaceous; medium to coarse; well-graded; moist; brown NAPL discoloration; some NAPL coated grains; and hydrocarbon odor. SAPROLITE; Gray (white-gray-black); micaceous; dark gray, purplish, and light gray banding; and cohesive/brittle structure mostly pulverized. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

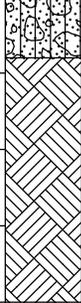
PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T10-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104280.172 EASTING: 1574232.642
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.58 ft MSL M.P. ELEV: 930.58 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		SW SM	FILL; Various shades of brown and gray; moist; medium dense; mostly well-graded sand and gravel with pieces of asphalt and concrete; and little silt. - @ 2.2'-4.7' More silty/clayey. - @ 2.8' Trace glass and seam of cohesive/rubbery asphalt sealant. No odor, No visible impact.		11.0			
		CL	TIMBER DEBRIS; Layered large wood debris within dark gray silt matrix with trace fine sand; and moist. No odor, No visible impact.					
10		CL	CLAY, lean; White-gray-black; with trace micaceous grains, fine sands; seams of olive and brown shades mixed in; medium plasticity; medium dense; moist; and trace rootlets and silt. - @ 8.0'-9.0' Sporadic millimeter scale tar seams (black); and faint hydrocarbon odor.					
		CL	CLAY, lean; Same as above; and stiff.					
		SC	- @ 9.0'-10.0' Trace seams/specks of millimeter scale tar; and faint hydrocarbon odor.					
		SW	SAND, clayey; White-gray-black; micaceous; fine-medium; poorly graded; medium dense; trace rootlets; and medium moist. No odor, No visible impact.					
15		SW	SAND; White-gray-black; micaceous; medium-coarse; well graded; moist; loose; and some small gravel. No odor, No visible impact.		11.8			
			SAPROLITE; White-gray-black; micaceous; dark gray, light gray, and dark purplish banding; trace pink specks; and cohesive, brittle structure mostly pulverized by drilling. - @ 16.0'-17.7' Lighter gray color. No odor, No visible impact.					

- @ 10' - 11': Geotechnical sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T10-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104280.172 EASTING: 1574232.642
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.58 ft MSL M.P. ELEV: 930.58 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
					5.9			
25			Partially weathered bedrock (pulverized by drilling) Light gray; and gneiss-like.					
			End of Boring @ 24' below ground surface Backfilled with bentonite to ground surface					
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T10-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104265.807 EASTING: 1574249.447
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.46 ft MSL M.P. ELEV: 930.46 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		ML	FILL; Various shades of brown, reddish brown, gray, and dark gray; silt or low plasticity clay with some gravel and gravel-sized debris (concrete, brick, and asphalt); trace rootlets; and trace fine sand. No odor, No visible impact.					
5			FILL; Wood and carpet-like material; and some small wood debris, mostly layered olive-colored carpet material in dark gray silty matrix. No odor, No visible impact.		8.8			
		CL	CLAY, lean; Gray; trace micaceous grains; brown and light brown mottling; moist; low plasticity; few silt; and trace fine sand and rootlets. No odor, No visible impact.					
10		CL	CLAY, lean; Gray; micaceous; brown mottling; medium plasticity; stiff; moist; and trace fine sand and silt. - @ 9.0'-10.2' Occasional seams of dark gray/purplish millimeter scale lenses. No odor, No visible impact.					
15		SW	SAND; White-gray-black; micaceous; fine-medium well graded; medium dense; moist; increasing amounts of coarse grains and small gravel @ 13.3'; and some clay @ 14.0'-14.2'. No odor, No visible impact.		11.2			
			SAPROLITE; White-gray-black; micaceous; dark gray, purplish, and light gray banding; cohesive/brittle structure partially pulverized; and slightly moist. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite to ground surface					

@ 14' - 15': Geotechnical sample collected  
@ 14.5': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T11-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104218.121 EASTING: 1574182.329
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.33 ft MSL M.P. ELEV: 933.33 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5			<p>FILL; Various shades of brown, reddish brown, and dark gray; mostly silt matrix with trace fine micaceous sand; medium dense; and some gravel and gravel-sized fragments of asphalt, brick, concrete.</p> <ul style="list-style-type: none"> <li>- @ 3" - 18" Lean clayey layers</li> <li>- @ 54" - 57" Concrete</li> <li>- @ 57" - 66" Lean clayey layers</li> <li>- @ 85" - 100" Dark gray; and some woody fragments</li> <li>- @ 89" Black tubing and white connector</li> <li>- @ 97" Glass shard</li> </ul> <p>No odor, No visible impact.</p>		9.1			
10		ML	<p>FILL; Woody debris in dark gray silt matrix with trace fine sand.</p> <ul style="list-style-type: none"> <li>- @ 8.4' Brick fragment.</li> <li>- @ 8.5' White plastic shards.</li> </ul> <p>No odor, No visible impact.</p>					
10		SW	<p>FILL; Woody debris; same as above including brick fragments.</p> <p>No odor, No visible impact.</p>					
10		CL	<p>SILT; Brownish gray with some well graded fine-coarse sand; soft and wet; includes small piece of concrete.</p> <p>No odor, No visible impact.</p>					
15		SW	<p>SAND; Grayish brown, white-gray-black; micaceous grains; fine-medium well graded; little silt; medium dense; moist.</p> <p>No odor, No visible impact.</p>		10.6			
15		SP SC	<p>CLAY, lean; Grades from brownish gray to gray with brown mottling then olive mottling; trace fine micaceous sand; little silt; medium to stiff; moist.</p> <p>No odor, No visible impact.</p>					
15		SW	<p>SAND; Light gray, white-gray-black; trace micaceous grains; fine-coarse; well graded; medium dense; moist.</p> <p>No odor, No visible impact.</p>					
15		SP SC	<p>SAND; Gray; micaceous grains; fine poorly graded; some clay; trace silt; trace rootlets.</p> <ul style="list-style-type: none"> <li>- @ 16.6' - 16.9' Sand; same as above; medium to coarse well graded.</li> <li>- @ 17.1' - 17.4' Sand; same as above; medium to coarse well graded.</li> </ul>					
15		SW	<p>No odor, No visible impact.</p>					
15		SP SC	<p>SAND; White-gray-black; trace micaceous grains; medium to coarse and small gravel; well graded; medium dense; moist.</p>					- @ 18.5': VOC/SVOC sample collected
15		SW	<p>No odor, No visible impact.</p>					
15		SP SC	<p>Hard rock (quartz) with trace micaceous specks; light gray.</p> <p>No odor, No visible impact.</p>					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T11-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104218.121 EASTING: 1574182.329
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.33 ft MSL M.P. ELEV: 933.33 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25			<p>SAPROLITE;            Light gray/tan with sporadic dark gray and dark greenish banding; cohesive, brittle/sandy structure partially pulverized; moist.            No odor, No visible impact.            End of Boring @ 19' below ground surface            Backfilled with bentonite chips to ground surface.</p>					
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

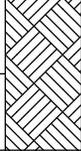
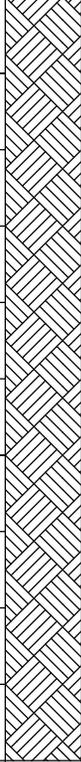
PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T11-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104212.883 EASTING: 1574219.44
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.04 ft MSL M.P. ELEV: 933.04 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 39.0 ft BGS
NOTES: Driller estimates hard rock ~35' below ground surface	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		ML	FILL; Mostly reddish brown with grayish brown layers; silt with some fine sand (trace micaceous); small/large gravel and fragments of brick, concrete, and asphalt; medium dense; moist. No odor, No visible impact.		8.8			
5		ML	FILL; Pulverized concrete; light gray with some silty dark gray fine sand. No odor, No visible impact.					
		ML	SILT; Reddish brown, then dark gray with trace well-graded sand; stiff; moist. No odor, No visible impact.					
		ML	FILL; Wood debris in dark gray silty matrix with ~2" of bright pink/red plastic/cardboard layered sheets; trace fine sand No odor, No visible impact.					
		ML	FILL; Same as above; light gray pulverized concrete chunks then reddish brown silt; same as above. No odor, No visible impact.					
10		CL	FILL; Layered wood debris within dark gray silty matrix; lean clay starts in last inch. No odor, No visible impact.					
		CL	SILT; Dark gray; some well graded sand; small gravel; wood debris; loose; wet. No odor, No visible impact.					
		CL	CLAY, lean; Gray with brown mottling; low-medium plasticity; stiff; moist; and trace fine sand and silt (micaceous). - @ 9.7' - 10.9' Sporadic seams of black tar (millimeter scale); faint hydrocarbon odor.					
15		SP SC	SAND, clayey; Gray; micaceous grains; low plasticity; fine-medium; poorly graded; dense; moist; grades to trace clay. No odor, No visible impact.		10.8			
		SW	SAND; White-gray-black; micaceous grains; well-graded; fine/coarse; medium dense; moist. No odor, No visible impact.					
			SAPROLITE; Light gray/tan; trace micaceous; gray banding and trace dark greenish seams; brittle/sandy cohesive structure pulverized; slightly moist. No odor, No visible impact.					

-@ 16.5': VOC & SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T11-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104212.883 EASTING: 1574219.44
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.04 ft MSL M.P. ELEV: 933.04 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 39.0 ft BGS
NOTES: Driller estimates hard rock ~35' below ground surface	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			SAPROLITE; Same as above with less gray banding; highly pulverized. No odor, No visible impact.		6.9			
			Weathered Bedrock; Highly pulverized; light gray/white; can be broken apart to silty material with trace micaceous fine sand; dry. No odor, No visible impact.					
25			No recovery; switched from dry to wet drilling in this interval.		0.0			
30			BEDROCK; Gneissic granite; light gray with darker gray bands in spots; white-gray-black coloring with some light green and pink; trace pyrite and mica. - Top 15" with dark gray purplish micaceous layers; sporadic garnet (light pink). No odor, No visible impact.		4.4			
35			End of Boring @ 39' below ground surface Backfilled with bentonite chips to ground surface.					

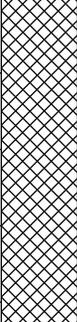
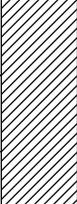
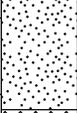
LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T11-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/14/19 COMPLETED: 3/14/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104209.432 EASTING: 1574257.526
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.68 ft MSL M.P. ELEV: 930.68 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5			<p>FILL; Various shades of dark brown, reddish brown, and dark gray; mostly silt with trace fine sand; trace rootlets near surface; moist; loose-medium. - @ 0.8' - 2.5' Mostly gravel-sized grains and debris (asphalt); and well-graded. - @ 2.5' - 2.8' Concrete; and light gray. - @ 2.8' - 5.3' Some brick fragments and wood debris; some large rounded gravel; @ 3' light blue, hard plastic shard. No odor, No visible impact.</p>		9.1			
			<p>CONCRETE; Light gray. No odor, No visible impact.</p>					
			<p>FILL; Woody debris with some silt layered; dark gray; medium dense; moist; trace fine sand and small angular gravel. - @ 7.2' - 7.5' Large brick fragments; and ~4" long piece of plastic (hard). No odor, No visible impact.</p>					
10		CL	<p>CLAY, lean; Gray with some brown mottling and trace dark gray seams; low plasticity; soft-medium; moist; trace fine sand; little silt; trace micaceous grains. No odor, No visible impact.</p>					
		CL	<p>CLAY, lean; Gray with brown mottling from 9' - 9.7'; micaceous grains; low-medium plasticity; stiff; little fine micaceous sand; trace silt; moist. No odor, No visible impact.</p>					
		SW SC	<p>SAND; White-gray-black; trace micaceous grains; medium dense; and moist. - @ 10.2' - 10.5' Medium; and poorly graded. - @ 10.5' - 10.7' Fine-medium; and well graded. - @ 10.7' - 13.8' Fine-coarse; well graded with few well graded gravel; trace clayey sand seams. No odor, No visible impact.</p>					- @ 12' - 13': Geotechnical sample collected  - @ 13.5': VOC/SVOC sample collected
15			<p>SAPROLITE; Light gray/tan with sporadic dark greenish and dark olive banding; cohesive/brittle structure; mostly pulverized from 15' - 19'; some sand. No odor, No visible impact.</p>		10.8			
			<p>End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.</p>					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T12-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104124.908 EASTING: 1574203.356
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.37 ft MSL M.P. ELEV: 931.37 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		ML	FILL; Various shades of brown, gray, and reddish brown; mostly silty with some clay; low plasticity; medium-stiff; moist; few sand and fine micaceous-coarse; trace rootlets; sporadic gravel, asphalt, and brick debris. Poor recovery through fill unit. - @ 3.5' Curved, flat (thin) metal piece. - @ 4' Light gray concrete. No odor, No visible impact.		4.3			
5			No recovery.					
10		CL	CLAY, lean; Trace micaceous grains; medium plasticity; moist; trace fine sand, silt, and rootlets. - @ 9' - 10.3' Mostly brown and dark gray; soft; low plasticity. - @ 10.3' - 11.1' Gray with low plasticity; clayey sand; medium dense. - @ 11.1' - 11.7' Gray; stiff. No odor, No visible impact.					
		SP	SAND; White-gray-black; trace micaceous grains; fine-medium poorly graded with some clay and trace clayey sand seams; medium dense; moist. No odor, No visible impact.					
15		SW	SAND; White-gray-black; trace micaceous grains; tannish gray; fine-coarse; well graded with trace small and large gravel below 16'; trace clayey sand blebs/seams; medium dense; moist. No odor, No visible impact.		9.8			
			SAPROLITE; Gray purplish with lighter gray banding; cohesive, brittle, micaceous, sandy structure; trace faint greenish banding; slightly moist. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite ships to ground surface.					- @ 16.5': VOC/SVOC sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T12-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104112.742 EASTING: 1574243.743
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.52 ft MSL M.P. ELEV: 932.52 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	FILL; Mostly clay with some silt; low plasticity; medium-stiff; moist; few sand; fine micaceous-coarse; trace rootlets; sporadic brick, concrete, rock, and wood debris ranging from gravel-sized 5" layers; various shades of brown, gray, and reddish brown. - @ 1.2' Circular plastic piece - @ 9.2' - 9.4' Plastic sheeting (black) fragment Pine/woody odor with wood, No visible impact.		10.3			
10		ML	FILL, sandy silt; Dark brownish gray; low plasticity with fine micaceous sand; coarse and small gravel; trace rootlets; moist. - @ 11.4' - 11.9' Tar coated with tar-saturated from 11.5' - 11.8'; highly viscous; slightly sticky; strong hydrocarbon odor; black.					
15		CL	CLAY, lean; Gray; trace micaceous with olive mottling that grades out below 14'; medium plasticity; stiff; moist; trace fine sand, silt, and rootlets. - @ 15' - 15.6' Stiffness decreases and grades to sandy clay. Faint hydrocarbon odor above 12.6', No visible impact.		11.2		80.5	
		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse well-graded with fine trace clayey seam @ 16.5' - 16.8'; medium dense; moist; trace wood debris. No odor, No visible impact.					
			SAPROLITE; Dark gray purplish with lighter gray banding; cohesive, brittle, micaceous, sandy structure; slightly moist. No odor, No visible impact. End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T12-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104106.736 EASTING: 1574266.294
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.58 ft MSL M.P. ELEV: 932.58 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown, reddish brown, and gray; mostly silt with some clay; most low-plasticity; medium; moist (wet above 6"); few sand (fine micaceous-coarse); trace gravel and rootlets; sporadic brick, concrete, and wood debris. - @ 5' - 6.5' Concrete layer; light gray; and broken/pulverized (some at 7'). - @ 8' Brittle cap with top of plastic. No odor, No visible impact.		8.3			
10		SW	FILL, sand; Dark brown silt matrix with tan, brown, reddish brown, and black grains comprised of primarily slag and coal; medium-coarse including small gravel; well-graded; little silt; coarse; wet. - @ 9' - 9.3' Light gray concrete block. Faint hydrocarbon odor, No visible impact.					
		CL	CLAY, lean; Gray; trace micaceous grains with white-brown mottling; medium plasticity; stiff; moist; trace fine sand, silt, and rootlets. No odor, No visible impact.					
15		SP SC	SAND, clayey; White-gray-black; micaceous grains; fine-medium poorly-graded; medium dense; moist. No odor, No visible impact.		11.0			
		SW	SAND; White-gray-black; some light brown; trace micaceous grains; fine-coarse well-graded; medium dense; moist. - @ 90" - 95" Clayey seam; and same as above No odor, No visible impact.					
			SAPROLITE; Gray and purplish gray with lighter gray banding; cohesive, brittle, micaceous, and sandy structure; slightly moist. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					-@16': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T13-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104010.593 EASTING: 1574198.055
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.86 ft MSL M.P. ELEV: 930.86 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Various shades of brown, reddish brown, and gray; mostly clay with some silt; medium moist; trace fine sand and rootlets; little gravel and coarse grains; wet above 0.8'; sporadic brick/concrete debris and glass shard @ 4.5'. No odor, No visible impact.		5.4			
5			FILL, wood debris; Dark gray; layered with trace fill matrix above. Pine/woody odor, No visible impact.					
			No recovery.					
10		ML	SILT; Brownish gray; low plasticity; soft; wet; trace fine sand. No odor, No visible impact.					
		CL	CLAY, lean; Gray; micaceous; low-medium plasticity; medium moist; some fine poorly-graded sand; trace rootlets. No odor, No visible impact.					
		SP	SAND; White-gray-black; trace micaceous grains; medium dense; moist. - @ 10.6' - 11.6' Fine-medium poorly-graded. - @ 11.6' - 13' Fine-coarse well-graded with trace small rounded gravel @ 12.8' - 13'. No odor, No visible impact.					
15			SAPROLITE; Purplish gray with lighter gray banding; cohesive, brittle, and micaceous structure mostly pulverized by drilling; slightly moist. No odor, No visible impact.		10.2			
			BEDROCK; Hard rock @ 15.5'; dry; quartz-feldspar biotite gneiss. - @ 15.3' - 15.5' Moist clayey material filling fractures; and mostly pulverized. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

- @ 13': VOC/SVOC sample collected

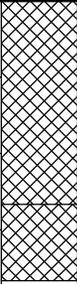
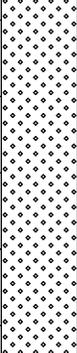
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T13-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104000.938 EASTING: 1574226.664
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.52 ft MSL M.P. ELEV: 930.52 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Various shades of brown, gray, and reddish brown; mostly clay with some silt; low plasticity; soft-medium; moist; trace sand (fine-coarse); trace rootlets; sporadic wood and brick debris (~1-3"). No odor, No visible impact.		6.7			
5			FILL; Mostly wood and some brick debris in fill matrix above. Pine/woody odor, No visible impact.				9.7	
		SW	SAND; Dark gray and black; medium-coarse with gravel; well-graded; loose; moist; some silt; few wood debris; many grains comprise of coal and slag. - @ 6' - 6.2' Clayey seams; gray; and micaceous grains - @ 7' - 7.5' Tar-coated grains; sticky, cohesive, highly viscous, and black; and strong hydrocarbon odor. Hydrocarbon odor throughout layer.					
10		SW	SAND; Same as above; fine-coarse; less gravel and no wood debris; 3" x 2" brick piece. Hydrocarbon odor, No visible impact.					
		CL	CLAY, lean; Gray; trace micaceous grains with olive brown mottling; medium plasticity; medium then grades to stiff; moist; trace fine sand silt. Faint hydrocarbon odor, No visible impact.					
		SW	SAND; White-gray-black; micaceous grains; fine-medium well-graded; medium dense; moist; trace clay in seams. - @ 14.5' - 15.2' Fine-coarse well-graded No odor, No visible impact.		10.3			
15			SAPROLITE; Dark purplish gray with lighter gray banding; cohesive, micaceous structure partially pulverized by drilling below 17'. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					- @ 15': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T13-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/20/19 COMPLETED: 3/20/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103989.468 EASTING: 1574264.903
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.86 ft MSL M.P. ELEV: 930.86 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Various shades of brown, gray, and reddish brown; mostly lean clay with some silt; low plasticity; medium; moist (wet from 10.5" - 16"); few sand (fine-coarse); trace rootlets; sporadic brick debris and glass shards. - @ 2' - 2.2' Layer of asphalt-like debris. No odor, No visible impact.					
			FILL, wood debris; Dark gray; mostly wood debris in fill matrix above. Pine/woody odor, No visible impact.					
5			No recovery. Poor recovery due to wood.		3.7			
10		CL	CLAY, lean; Gray; trace micaceous grains with olive mottling; medium plasticity; medium then grades to stiff; moist; trace fine sand, silt, and rootlets. No odor, No visible impact.					
		SP SC	SAND, clayey; White-gray-black; trace micaceous grains; low plasticity; fine poorly-graded; medium dense; moist. No odor, No visible impact.					
15		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse well-graded; medium dense; moist; trace rootlets and clayey seams; more coarse and less fine as depth increases. No odor, No visible impact.		9.9			
			SAPROLITE; Gray with lighter gray banding; cohesive, brittle, micaceous, and sandy structure; partially pulverized by drilling; slightly moist. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T14-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103895.608 EASTING: 1574267.799
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.77 ft MSL M.P. ELEV: 931.77 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	<p>FILL; Various shades of brown, reddish brown, and gray; mostly lean clay with some silt; low plasticity; moist; trace fine sand and rootlets; sporadic coarse grained and gravel-sized concrete and brick debris; a few larger chunks (~12").</p> <ul style="list-style-type: none"> <li>- @ 1.5' - 1.7' Concrete light gray.</li> <li>- @ 2.5' - 2.7' Concrete light gray.</li> <li>- @ 5.8' - 6' Fabric piece (~6" by 6").</li> </ul> <p>No odor, No visible impact.</p>		6.8			
		ML	<p>FILL, silt; Dark gray and brown; nonplastic - low plasticity; soft; wet; some coarse and gravel-sized slag/coal; few wood debris; decaying organics; trace fine sand.</p> <p><u>Faint hydrocarbon odor, No visible impact.</u></p> <p>No recovery.</p>					
10		CL	<p>CLAY, lean; Gray; trace micaceous grains with brown and olive brown mottling that grades out medium plasticity; medium; moist; trace fine sand; silt; rootlets.</p> <ul style="list-style-type: none"> <li>- @ 9' - 9.7' Darker gray; and low plasticity.</li> </ul> <p>No odor, No visible impact.</p>					
15		SP	<p>SAND; White-gray-black; trace micaceous grains; medium dense; moist.</p> <ul style="list-style-type: none"> <li>- @ 11.4' - 13' Fine-medium; poorly graded.</li> <li>- @ 13' - 13.3' Sandy clay seam.</li> <li>- @ 13.3' - 15.4' Medium poorly graded; trace clayey seams.</li> <li>- @ 15.4' - 16.1' Fine-medium; poorly graded; trace clay.</li> <li>- @ 16.1' - 16.8' Fine-coarse; well-graded with few rounded gravel.</li> </ul> <p>No odor, No visible impact.</p>		9.9			
			<p>SAPROLITE; Dark purplish gray with lighter gray banding; cohesive/brittle, micaceous, and sandy structure.</p> <p>No odor, No visible impact.</p>					
			<p>End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.</p>					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T14-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103902.653 EASTING: 1574290.858
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.26 ft MSL M.P. ELEV: 932.26 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	FILL; Various shades of dark brown, reddish brown, and gray; mostly lean clay with some silt; low plasticity; medium-stiff; moist; trace fine sand and rootlets; sporadic brick, wood/timber, and concrete debris. - @ 5' Wood debris. Pine/woody odor, No visible impact.		5.3			
			No recovery.					
10		CL	CLAY, lean; Gray; trace micaceous grains with brown mottling; medium plasticity; stiff then soft from 10' - 12.5'; moist; trace fine sand, silt, and rootlets. No odor, No visible impact.					- @ 9': Geotechnical sample collected
15		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse; well-graded; medium-dense; moist. No odor, No visible impact.					
			SAPROLITE; Gray; trace micaceous grains with some lighter gray banding; cohesive, brittle structure. No odor, No visible impact.		10.3			
			BEDROCK; Quartz-feldspar granite with trace biotite; rock pulverized during drilling; trace light pink garnet; dry. - @ 14.5' - 15.5' Slightly moist clay filling bedrock fractures (sandy clay; and low plasticity). No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4.ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T14-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103906.182 EASTING: 1574308.827
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.59 ft MSL M.P. ELEV: 934.59 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	FILL; Various shades of dark brown, reddish brown, and gray; mostly clay with some silt; low plasticity; medium moist; few fine sand; sporadic wood/timber, brick, and concrete debris. No odor, No visible impact.		8.4			
10		ML	SILT; Brown; low plasticity; some clay; soft; wet; some timber/wood debris; trace fine sand. Pine/woody odor, No visible impact.					
		CL	CLAY, lean; Gray; trace micaceous grains; medium-high plasticity; grades from soft-stiff; moist; trace fine sand. - @ 9.8' - 10.1' Some wood/timber debris; same as above. No odor, No visible impact.					- @ 11.5': Geotechnical sample collected - @ 12.5': VOC/SVOC sample collected
15			PWR/SAPROLITE; Highly disturbed/pulverized by drilling. - @ 12.4' - 13.7' Mostly hard rock with saprolite seams; gray with dark gray banding. - @ 13.9' - 17' Various shades of gray; highly pulverized saprolite with sporadic hard rock fragments. No odor, No visible impact.		10.8			
			BEDROCK; Granite, quartz, and felspar; dry; light gray, white-gray-black. - @ 18.6' - 19' Slightly moist clay/silt with trace fine sand. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite ships to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T15-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103781.24 EASTING: 1574278.993
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.56 ft MSL M.P. ELEV: 931.56 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 8.32 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
0 - 5		CL	FILL; Various shades of brown and reddish brown; lean clay with little silt; low plasticity; medium; moist; trace fine micaceous sand; medium sand; rootlets. - @ 0.5' Brick debris; plastic shard. - @ 1' - 2' Mostly concrete, brick, and asphalt debris. - @ 3.5' Layered green plastic material. - @ 4' Asphalt-like debris (~4"). No odor, No visible impact.					
5 - 6.2			CONCRETE; Light gray, partially pulverized, and dry. - @6' Lens of dark gray and brown; coarse sand; some silt; wet. No odor, No visible impact.		6.2			
6.2 - 9			No recovery.					
9 - 10		ML	SILT; Brown and dark brown with some dark gray; nonplastic-low plasticity; soft; wet; trace fine-coarse well-graded sand; little rootlet/wood debris. - @ 9' - 9.3' Concrete and brick chunks. - @ 9' Long rectangular metal piece (fill). Faint hydrocarbon odor, Light sheen.					
10 - 10.7		SW	SAND; Dark gray silt matrix with tan, brown, reddish brown, and gray sand grains; fine-coarse well-graded with few small and large gravel; loose; wet; few silt; trace rootlets/wood debris; gravel-sized pieces of slag with some coal fragments. Faint hydrocarbon odor, Light sheen.					
10.7 - 15		CL	CLAY, lean; Gray; micaceous grains; medium plasticity; moist; few fine-medium sand; stiff. Faint hydrocarbon odor, No visible impact.		10.7			
15 - 15.6		SW	SAND; White-gray-black; micaceous grains; fine-medium well-graded; medium-dense; moist. - @ 15' - 15.6' Additional coarse grains and small/large rounded gravel. No odor, No visible impact.					
15.6 - 17.8			SAPROLITE; Gray; micaceous grains with dark green, tan, and lighter gray mixed in; trace light pink specks; cohesive, brittle, and somewhat clayey structure; somewhat pulverized below 17.8'. No odor, No visible impact.					
17.8 - 19			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					



- @ 15': VOC/SVOC sample collected

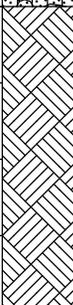
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T15-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103789.794 EASTING: 1574296.229
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.13 ft MSL M.P. ELEV: 933.13 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 29.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	<p>FILL;            Various shades of brown, gray, and reddish brown; trace micaceous grains; mostly silt with some clay; low plasticity; medium stiff; moist (wet 0" - 4"); trace rootlets.            - @ 1.3' - 1.6' Brick fragments.            - @ 1.8' - 2.4' Concrete; light gray.            - @ 3.4' - 5.2' More clayey; trace decaying organics; and large asphalt chunk near 46".            - @ 5.2' - 5.3' Concrete; light gray.            No odor, No visible impact.</p>		5.5			
10		ML	<p>SILT;            Dark grayish brown; nonplastic; soft; wet with some rootlets, wood debris, and decaying organics.            - @ 9' - 9.2' Concrete chunk.            Faint odor, No visible impact.</p>					
		CL	<p>CLAY, lean;            Dark brownish gray with brown and olive mottling; trace micaceous; low-medium plasticity; moist; little silt, rootlets, and decaying organic matter.            No odor, No visible impact.</p>					
		CL	<p>CLAY, lean;            Gray; micaceous grains with olive brown mottling; medium plasticity; medium-stiff; moist; trace fine sand, silt, and rootlets; mottling grades out at 13.9'.            No odor, No visible impact.</p>		11.2			
15		SW	<p>SAND;            White-gray-black; micaceous grains; fine-medium well-graded with trace coarse; medium-coarse; moist.            - @ 15.5' - 16.3' Some coarse and small and large gravel.            No odor, No visible impact.</p>					- @ 15': Geotechnical sample collected
			<p>SAPROLITE;            Mostly dark purplish gray; micaceous grains with lighter gray mixed in; slightly moist; cohesive, brittle, micaceous, and sandy structure; mostly pulverized by drilling; grades to partially weathered bedrock.            - @ 20' - 22' Less purplish color.            - @ 22.5' - 23' Harder rock chunks with trace light pink specks.            No odor, No visible impact.</p>					- @ 17': VOC/SVOC sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T15-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103789.794 EASTING: 1574296.229
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.13 ft MSL M.P. ELEV: 933.13 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 29.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25			<p>SAPROLITE; Mostly dark purplish gray; micaceous grains with lighter gray mixed in; slightly moist; cohesive, brittle, micaceous, and sandy structure; mostly pulverized by drilling; grades to partially weathered bedrock. - @ 20' - 22' Less purplish color. - @ 22.5' - 23' Harder rock chunks with trace light pink specks. No odor, No visible impact. <i>(continued)</i></p>		7.0			
			<p>BEDROCK; Gneiss, quartz, feldspar, and biotite; some light pink garnet; trace pyrite. Fractured. Note: Driller estimates hard rock depth at approximately 25'. RQD = 43% (poor).</p>		3.8			
30			<p>End of Boring @ 29' below ground surface Backfilled with bentonite chips to ground surface.</p>					
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T15-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103800.163 EASTING: 1574314.031
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.15 ft MSL M.P. ELEV: 934.15 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	<p>FILL;            Various shades of brown, gray, and reddish brown; mostly lean clay with some silt; low plasticity; medium-stiff; moist; trace fine micaceous sand and rootlets; trace glass shards; gravel-sized brick and concrete debris.            - @ 1.8' - 2.3' Concrete; light gray.            - @ 5.1' Flat debris resembling shingles or asphalt.            - @ 5.4' - 6.3' Mostly broken concrete debris.            No odor, No visible impact.</p>		6.3			
			No recovery.					
10		ML	<p>SILT;            Dark grayish brown; nonplastic with some medium-coarse and gravel-sized grains (mostly slag &amp; coal); soft; wet; trace rootlets; woody debris.            - @ 9' - 9.3' Concrete block.            Faint odor, No visible impact.</p>					
15		CL	<p>CLAY, lean;            Gray; trace micaceous grains with brown mottling; medium plasticity; medium-stiff; moist; trace fine sand, silt, and rootlets.            No odor, No visible impact.</p>		10.4			
		SP	<p>SAND;            White-gray-black; micaceous grains; fine-medium poorly graded; medium dense; moist.            No odor, No visible impact.</p>					
		SP	<p>SAND;            White-gray-black; trace micaceous grains; fine-coarse with little fine to coarse gravel (round); few silt; medium dense; moist.            No odor, No visible impact.</p>					- @ 16.5': Geotechnical sample collected
			<p>SAPROLITE;            Dark purplish gray with lighter gray banding, then olive brown/brown banding additionally below 18.4'; cohesive, brittle, micaceous, and sandy structure; some larger rock pieces near transition to saprolite (1" - 3").            No odor, No visible impact.            End of Boring @ 19' below ground surface</p>					

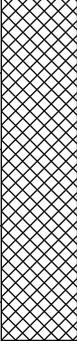
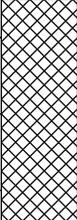
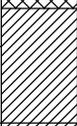
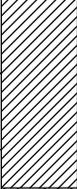
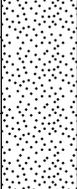
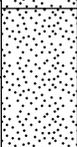
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T15-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1103800.163 EASTING: 1574314.031
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.15 ft MSL M.P. ELEV: 934.15 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25			Backfilled with bentonite chips to ground surface.					
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T17-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/29/19 COMPLETED: 3/29/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104351.438 EASTING: 1573980.625
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.92 ft MSL M.P. ELEV: 930.92 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-4.5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Hand auger to 4.5'. Fill (see below). Refusal @ 4.5' due to large debris.		0.0			
5			FILL; @ 4.5' - 6.8' Large boulder partially pulverized; light tannish-gray covered with silt; wet. @ 6.8' - 7.5' Lean clay with some silt and sand; brown; low plasticity; soft; moist. No odor, No visual impact.		5.2			
		CL	CLAY, lean; Brown/grayish-brown to gray with olive brown mottling below 8.7'; medium plasticity; medium then stiff below 8.7'; moist; some silt; trace micaceous sand and rootlets. Faint hydrocarbon odor, Trace gravel size coal pieces.					
10		CL	CLAY, lean; Gray; trace micaceous grains with olive-brown mottling; medium plasticity; stiff; moist; trace fine sand, silt, and rootlets. No odor, No visual impact.					
		SP	SAND; Trace micaceous grains; white-gray-black; fine-coarse; poorly graded; medium dense; moist; trace silt and rootlets; some clayey seams (3-5" thick). No odor, No visual impact.		10.2			
15		SW	SAND; Trace micaceous; white-gray-black; fine-coarse with trace small gravel; well graded; medium dense; and moist. No odor, No visual impact.					- @ 15.5': VOC/SVOC sample collected
			SAPROLITE; Grades from light tannish-gray to white-gray to gray with lighter gray banding; cohesive/brittle; sandy structure; mostly pulverized from drilling; moist; micaceous structure with color change below 18.3'. No odor, No visual impact.					
			End of Boring @ 19' below ground surface. Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

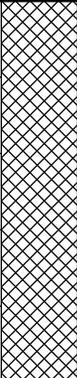
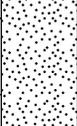
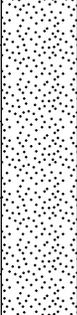
PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T17-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/29/19 COMPLETED: 3/29/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104274.307 EASTING: 1573995.887
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.40 ft MSL M.P. ELEV: 930.40 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-4.5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			Hand auger to 4.5' Sandy silt with sporadic rock/boulder-like debris. Refusal @ 4.5'. No odor, No visual impact.		0.0			
5			FILL; Mostly sandy silt with some clay, gray with brown, medium dense, moist, fine to coarse sand, micaceous, well graded, some gravel and boulder debris; No odor, No visual impact.		1.6			
10		CL	CLAY, lean; Trace micaceous grains, brownish-gray, low plasticity, soft, moist, few sand (fine-coarse, well-graded), some silt, trace rootlets; No odor, No visual impact.					
		SW	SAND; Gray, trace micaceous grains, white-gray-black color, fine to coarse, well graded, trace clayey seams (1-3" thick), few silt @ 13.5' - 14.4', medium dense, moist; No odor, No visual impact.		10.0			
15		SW	SAND; Same as above with >50% coarse grains, no clay or silt, contains trace fine to coarse gravel; No odor, No visual impact.					
			SAPROLITE; Dark purplish-gray with some lighter gray mixed in, cohesive/brittle micaceous and sandy structure, slightly moist, mostly pulverized below 17.3'; No odor, No visual impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

- @ 15.5': VOC/SVOC sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T17-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/29/19 COMPLETED: 3/29/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104181.882 EASTING: 1574008.175
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 929.48 ft MSL M.P. ELEV: 929.48 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Hand auger to 5'. Sandy silt with some clay. Sporadic rock/gravel debris. No odor, No visual impact.		0.0			
5			FILL; Various shades of brown, redish-brown, gray, mostly sandy silt with some clay; sporadic gravel, concrete, and asphalt-like debris, medium dense, moist. No odor, No visual impact.					
		CL	CLAY, lean; Gray, trace micaceous grains with orange-brown mottling, medium plasticity, stiff, moist, trace fine sand, silt and rootlets. No odor, No visual impact.		5.3			
		SP	SAND; Gray, trace micaceous grains, white-gray-black color, fine, poorly graded, trace silt, medium dense, moist. No odor, No visual impact.					
10								
		SW	SAND; Trace micaceous grains, white-gray-black color, fine to coarse, well graded, medium dense, moist, trace silt between 11.7' - 13.1', trace clayey seams (~1" thick); coarse grains grade into gravel below 14.8'; No odor, No visual impact.				9.8	
15								
			SAPROLITE; Dark purplish gray with lighter gray mixed in, cohesive/brittle micaceous and sandy structure, slightly moist. No odor, No visual impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

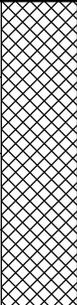
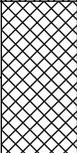
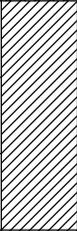
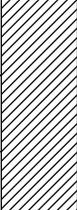
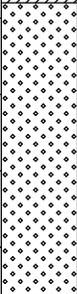
PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T1-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/21/19 COMPLETED: 3/21/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104740.513 EASTING: 1574296.71
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.97 ft MSL M.P. ELEV: 931.97 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-4'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Brown and reddish brown; sandy silt with sporadic brick, gravel, and concrete debris; Hand auger refusal ~4' No odor, No visible impact.					
5			FILL; Brown to dark brown; mostly sandy silt with brick and wood debris; @ 4.7'-5.0' plastic and metal pieces. @ 5.3'-5.7' layer of solid wood. @ 5.7'-6.2' mostly wood debris with trace black discoloration and faint odor (organic).		5.3			
		CL	CLAY, lean; Brown from 6.2'-6.4', dark gray from 6.4'-8.0'; gray with orangish brown mottling from 8.0'-9.0'; grades from low to medium plasticity; grades from little to trace silt; soft; moist; medium below 8.0'; trace fine micaceous sand; trace rootlets. No odor, No visible impact.					
10		CL	CLAY, lean; Gray with a trace of orangish brown mottling above 10.4', trace micaceous; grades from medium plasticity to low plasticity sandy clay to clayey sand to sand with trace clay; Sand fine to medium grain, poorly graded; stiff then grades to medium/medium dense; moist. No odor, No visible impact.					
15		SW	SAND; Tan, white-gray-black color; trace micaceous grains; fine to medium grain, well-graded; medium dense; moist. @ 13.8'-14.0' gray. @ 14.0'-14.2' orangish brown discoloration. @ 14.4'-14.7' dark orangish brown/reddish brown discoloration.		10.8			
		SW	SAND; Tan, white-gray-black color with slight orangish discoloration throughout; trace micaceous; fine to coarse grain including fine gravel, well-graded; medium dense; moist. No odor, No visible impact.					
			SAPROLITE; Dark purplish gray with lighter gray banding; cohesive/brittle; micaceous and sandy structure; partially pulverized below 18.0'; slightly moist. @ 16.2'-17.0' orange/reddish brown discoloration. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

- 16.5' VOC/SVOC sample collected (sampled from area with orange discoloration)  
- 17' VOC/SVOC sample collected (distinct color change)

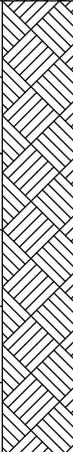
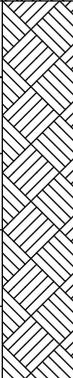
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T1-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/21/19 COMPLETED: 3/21/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104723.946 EASTING: 1574305.009
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.02 ft MSL M.P. ELEV: 932.02 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 39.0 ft BGS
NOTES: Hand Auger 0-4'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Hand auger refusal @ ~4'; Mostly sandy silt with sporadic brick, concrete, gravel and wood debris. No odor, No visible impact.		4.0			
5			FILL; Brown to dark brown; brick, concrete, gravel, and wood debris in sandy silt matrix (gravel size debris) medium dense; wet; trace black discoloration on wood debris. @ 5.5' faint odor (organic).					
		CL	CLAY, lean; Grades from brown to gray with olive brown mottling below 8.3'; trace micaceous grains; medium plasticity; soft then grades to medium dense; moist; few silts, trace fine grain sand and rootlets. No odor, No visible impact.		5.3			
10		CL	CLAY, lean; Gray with sporadic orange brown mottling; trace micaceous grains; low to medium plasticity; stiff; moist; some fine to medium poorly-graded sand, trace silt and rootlets; No odor, No visible impact.					
15		SW	SAND; Trace micaceous grains and white-gray-black color; fine to medium, well-graded; dense; moist. @ 12.0'-12.2' dark orange brown discoloration. @ 12.2'-13.0' gray. @ 13.0'-15.8' various shades of orange and brownish gray. @ 13.5'-15.8' with trace to some coarse sand and trace fine to coarse gravel; No odor, No visible impact.		11.0			
			SAPROLITE; Cohesive/brittle; micaceous and sandy structure; slightly moist; mostly pulverized below 17.3'. @ 15.8'-16.2' orange/orangish brown with gray and dark purplish banding. @ 16.2'-19.0' dark purplish gray with lighter gray banding; trace light pink specks. No odor, No visible impact.	 				- VOC/SVOC sample collected  - VOC/SVOC sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T1-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/21/19 COMPLETED: 3/21/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104723.946 EASTING: 1574305.009
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.02 ft MSL M.P. ELEV: 932.02 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 39.0 ft BGS
NOTES: Hand Auger 0-4'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			SAPROLITE, Same as above; Gray with darker, lighter, and purplish gray banding, trace greenish grays and light pink specks; mostly pulverized. @ 20.0'-21.0' lighter gray color. No odor, No visible impact. (continued)		5.2			
25			Partially weathered bedrock; Easily broken with hands with harder zone from 26.0'-27.3', similar coloration to above saprolite. No odor, no visible impact.		3.0			
30			Partially weathered bedrock (gneiss structure), Same as above; Easily broken with hands; harder from 29.0'-29.5'. No odor, No visible impact.		2.2			
35			Partially weathered bedrock (gneiss structure), Same as above; Highly fractured; moderately weathered; Poor RQD (~30%), easily broken with hands; No odor, No visible impact.		3.0			
			End of Boring @ 39' below ground surface Backfilled with bentonite chips to ground surface					

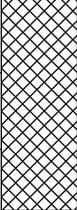
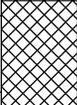
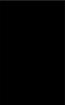
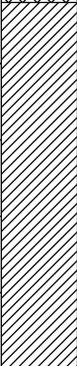
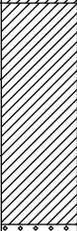
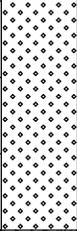
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4.ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T1-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/21/19 COMPLETED: 3/21/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104711.051 EASTING: 1574314.174
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.47 ft MSL M.P. ELEV: 931.47 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-4'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Brown and reddish brown sandy silt with sporadic brick, concrete, gravel and wood debris. Hand auger refusal at ~4'. No odor, No visible impact.					
5		ML	FILL; Brown, reddish brown; mostly sandy silt with sporadic brick, gravel, wood debris; fine to coarse grain sand, well-graded; medium dense, moist. No odor, No visible impact.		7.4			
		CL	CLAY, lean; Brown from 7.5' to 8.6' then gray; trace micaceous grains, medium plasticity; soft to medium; few silts; little fine to medium sand; trace rootlets and decaying roots/wood debris. No odor, No visible impact.					
10		CL	CLAY, lean; Gray; trace micaceous; medium plasticity decreasing with depth; stiff to medium; moist; trace to little fine sand, trace rootlets. No odor, No visible impact.					
		SW	SAND; Trace micaceous grains; white-gray-black color; fine to medium grain; well-graded with trace coarse and fine gravel; medium dense; moist. @ 11.3' - 12.1' clayey. @ 11.7' - 11.9' faint olive brown/orange discoloration. @ 11.5', 11.8', and 12': 0.25" to 0.5" seams of black NAPL staining with light sheen and hydrocarbon odor. @ 12.3' - 12.5' faint tan discoloration.		11.1		0.5	
15		SW	SAND; Same coloration as above with tan/orangish discoloration to 15.3'; fine to coarse grain, well-graded with trace fine gravel; medium dense; moist. @15.3' - 15.4' fine clayey seam. No odor, No visible impact.					
			SAPROLITE; Dark purplish gray with lighter banding; slightly moist; cohesive/brittle; micaceous and sandy structure; mostly pulverized by drilling. @ 15.8' - 16.5' orange/reddish brown discoloration No odor, No visible impact					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T2-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/22/19 COMPLETED: 3/22/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104645.792 EASTING: 1574166.698
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.12 ft MSL M.P. ELEV: 930.12 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-2.8'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Brown sandy silt with layers of brick and brick/gravel debris. No odor, No visible impact.					
			FILL; Sandy silt with fine gravel; brown; soft/loose/ wet; includes brick debris @ 3.5'-4.0'; Fain hydrocarbon odor; light sheen.					
5		CL	CLAY, lean; Gray, trace micaceous grains; varies from soft to medium and silt below 8.5'; medium plasticity that increases slightly with depth; moist; trace fine sand, silt, rootlets; trace olive brown mottling. @ above 7.0' increasing silt content. @ 7.9'-8.0' few coarse sand/fine gravel. @ 9.0' wet; soft; silty with trace fine gravel and large fibrous pieces. No odor, No visible impact.		7.6			
10		CL	CLAY, lean, Same as above; @ 9.0'-9.7' wet; soft; silty with trace fine gravel and large fibrous pieces @ 10.1' gravel size brick debris @ 10.6'-11.8' sandy clay with fine to coarse well-graded sand @ 11.8' large brick fragment (~3" by 3") No odor, No visible impact					
15		SW	SAND; Various shades of gray and tannish gray with orange hue, white-gray-black color; trace micaceous grains; fine to coarse grain with trace fine to coarse rounded gravel, well-graded; medium dense; moist. @ 13.0'-13.1' orange/reddish brown discoloration. @ 13.3'-13.6' seam with less coarse grains. @ 14.3'-15.0' lighter gray. No odor, No visible impact.		10.3			
			SAPROLITE; Gray with darker and lighter gray banding; slightly moist; cohesive/brittle; micaceous and sandy structure. @ 15.0'-15.3' orange/reddish brown/tan discoloration. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T2-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/22/19 COMPLETED: 3/22/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104658.439 EASTING: 1574189.008
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.03 ft MSL M.P. ELEV: 931.03 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-3.5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
0 - 3.5			FILL; Brown sandy silt; from 0.5' to 3.5' mostly brick debris including pieces up to 4"; Hand auger refusal at ~3.5'. No odor, No visible impact.					
3.5 - 10.1			FILL; Brown sandy silt; fine to coarse grain sand including gravel and gravel size brick debris; trace rootlets; medium dense; wet. @ 5.0'-5.5' dark gray primarily wood debris, faint hydrocarbon odor. @ 5.7'-6.0' faint hydrocarbon odor, light sheen. @ 6.0'-6.3' layered wood debris; dark gray.		1.9			
10.1 - 13.2		CL	CLAY, lean; Gray; trace micaceous grains with olive brown mottling above 10.1'; medium plasticity; stiff, moist; trace fine sand, silt, rootlets. @ 9.0'-9.25' light sheen; faint hydrocarbon odor. @ 11.2'-12.2' sandy clay then grades to clayey sand; sand fine to medium poorly-graded.					
13.2 - 16.7		SW	SAND; Tan-gray, white-gray-black color; trace micaceous grains; medium dense; moist. @ 12.8'-13.2' fine to medium well-graded. @ 13.2'-15.0' fine to coarse sand with trace fine gravel, well-graded. @ 13.5'-16.0' various shades of orange/reddish brown discoloration. @ 16.7' clayey seam. No odor, No visible impact.		11.3			
16.7 - 19.0			SAPROLITE; Dark purplish gray with lighter gray banding; cohesive/brittle; micaceous and sandy structure; slightly moist; partially pulverized. @ 16.8'-17.0' orange/reddish brown discoloration (distinct color change). No odor, No visible impact.					- Geotech Sample Collected
19.0 - 19.0			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T2-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/21/19 COMPLETED: 3/21/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104671.162 EASTING: 1574209.143
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.21 ft MSL M.P. ELEV: 931.21 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Brown sandy silt with sporadic brick, concrete, and wood debris. No odor, No visible impact.					
5		ML	FILL; Brown sandy silt with some gravel, brick and wood debris; loose; wet. @ 6.4' to 6.6' black fibrous debris; No odor, No visible impact.					
		CL	CLAY, lean; Brownish gray; grades to gray and trace olive brown mottling; low plasticity then grades to medium; moist; trace fine sand and rootlets; little silt then grades to trace silt. No odor, No visible impact.		5.8		0.0	
10		CL	CLAY, lean; Gray; trace micaceous grains with trace of olive brown mottling; medium plasticity; stiff; moist; trace fine sand, silt, and rootlets. @ 10.9' to 11.4' grades to sandy clay. No odor, no visual impact.					
		SP SC	Same as above, grades to clayey sand then to sand with a trace of clay at 13.8'. No odor, no visual impact.					
15		SW	SAND; White-gray-black; trace micaceous; medium dense; moist. @ 13.8' to 14.4' fine to medium grain, well graded sand; trace clayey seams and orangish discoloration @ 13.8' to 14.4'. @ 14.4' to 16.4' fine to coarse grain, well graded sand, mostly tan with orangish discoloration from 14.7' to 15.5', tan below 15.7' with trace small gravel. No odor, No visible impact.		10.8			- VOC/SVOC sample collected @ 15'
			SAPROLITE; Dark purplish gray with lighter gray banding; slightly moist; cohesive/brittle; micaceous/sandy structure. @ 16.4' - 17' orange and reddish brown discoloration (distinct color change) No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T3-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/22/19 COMPLETED: 3/22/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104634.152 EASTING: 1574086.229
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.98 ft MSL M.P. ELEV: 930.98 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-2.5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Sandy silt with sporadic brick and wood debris; large wood pieces at 2.5' depth. Hand auger refusal ~2.5'. Probe through wood and soft material to approx. 5' below ground surface.					
			FILL; Dark brown and gray with trace black seams; sandy silt with some brick and wood debris; soft; wet. No odor, No visible impact.					
5		CL	CLAY, lean; Gray; trace micaceous; low plasticity; soft; moist; trace fine sand and rootlets; little silt. @ 5.1'-5.5' clayey micaceous sand (fine to medium grain). @ 5.5'-7.2' predominantly brown. @ 8.5'-9.0' grades to stiff and medium plasticity with olive brown mottling. No odor, no visible impact.		7.0			
10		CL	CLAY, lean, Same as above; Stiff; gray; medium plasticity. No odor, No visible impact.					
		SP	SAND; White-gray-black color; micaceous grains; fine to medium poorly graded sand, medium dense; moist; trace rootlets; Clayey from 9.3'-11.0' with sporadic clayey seams below. No odor, No visible impact.					
15		SW	SAND; White-gray-black color, micaceous grains, fine to coarse grain, well-graded, including trace fine to coarse rounded gravel; trace seams of above clayey sand. @ 15.0'-15.1' slight orangish discoloration. No odor, No visible impact.		10.3			
			SAPROLITE; Gray with darker and lighter gray banding, trace light pink specks; cohesive/brittle; micaceous and sandy structure; slightly moist. @ 15.1'-17.3' mostly intact. @ 15.1'-15.4' orangish discoloration (distinct color change from orange). @ 17.3'-19.0' mostly pulverized by drilling and lighter gray color. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T3-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/25/19 COMPLETED: 3/25/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104611.05 EASTING: 1574093.723
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.29 ft MSL M.P. ELEV: 930.29 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-4'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL Mostly sandy silt; Many large brick and concrete pieces. Hand auger refusal at ~4' due to abundant wood debris. No odor, No visible impact.					
5			FILL; Dark brown/gray with some dark/black seams. Sandy silt with trace clay; loose; wet; abundant wood debris; sporadic brick, glass, and concrete debris including large (3" - 4") concrete fragments. No odor, No visible impact.					
		CL	CLAY, lean; Grades from dark brown to brown to gray with orangish brown mottling; grades from low plasticity to medium; moist; medium but soft from 7.4 feet to 7.7 feet and stiff below 9.7 feet; trace micaceous fine sand, silt content; grades from some to trace with depth; trace rootlets, sandy seam from 6.8 feet to 7 feet. No odor, No visible impact.		6.0			
10		CL	CLAY, lean; Same as above. Gray with orangish brown mottling. No odor, No visible impact.					
		SP SC	SAND, clayey; White-gray-black color, micaceous; fine to medium grain; poorly graded; medium dense; moist; trace of rootlets/decaying organic matter. @9' to 10.25' sandy clay, grades to trace clay by 12.1'. No odor, No visible impact.					
		SW	SAND; Tannish gray to white-gray-black color; trace micaceous grains; fine to coarse grain with trace small and large gravel; well graded; medium dense; moist. @ 12.3' to 12.4' slightly darker tan/orangish tan color. @ 13.2' to 13.6' bands of orangish brown discoloration and more fine grains. No odor, No visible impact.		8.0			
15			SAPROLITE; Dark purplish gray with lighter gray banding; cohesive/brittle; micaceous and sandy structure; partially pulverized by drilling below 14.8 feet; slightly moist. @ 14.9'-15.2' orange/reddish brown discoloration (distinct color change). No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

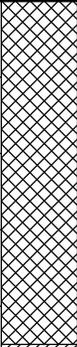
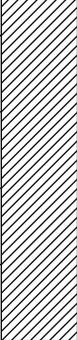
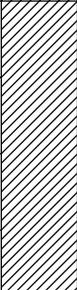
LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4.ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T3-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/25/19 COMPLETED: 3/25/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104585.73 EASTING: 1574101.421
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 929.90 ft MSL M.P. ELEV: 929.90 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES: Hand Auger 0-5.5'	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
0 - 5.5			FILL; Wet, brown sandy silt with sporadic brick, concrete, and wood debris. No odor, No visible impact.					
5.5 - 8.7		CL	FILL; Sandy silt with abundant wood, gravel, and brick debris; wet; loose. No odor, No visible impact.					
8.7 - 10.4		SP SC	CLAY, lean; Various shades of brown, gray, dark gray, low plasticity, moist, medium with trace soft seams, some silt, few fine to medium micaceous sand, trace rootlets. @8.7' color change to gray with trace olive mottling, clayey sand, fine to medium, poorly graded, medium dense, moist. No odor, no visible impact.		5.6			
10.4 - 15.0		SP SC	SAND, clayey; Same as above. @ 9.9' to 11.1' silt, lean clay, medium plasticity. @ 11.1' to 11.6' some clay. @ 11.6' to 12.3' trace clay. @ 12.3' to 12.4' sand. No odor, No visible impact.					
15.0 - 19.0		SW	SAND; White-gray-black; trace micaceous grains; fine to medium grain with trace small gravel; well-graded; medium dense. No odor, No visible impact.		10.4			
19.0			SAPROLITE; Dark purplish gray with lighter and darker gray banding; cohesive/brittle; micaceous and sandy structure; slightly moist; partially pulverized by drilling. No odor, No visible impact.					
19.0			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T4-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104473.296 EASTING: 1574021.58
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.81 ft MSL M.P. ELEV: 930.81 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 3.52 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

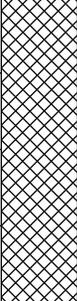
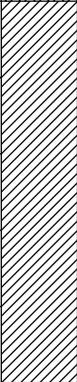
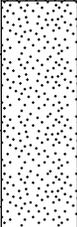
DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Lean clay with some silt; various shades of brown, gray, and reddish brown; trace micaceous grains; medium dense; occasionally stiff; low plasticity; moist; trace rootlets and gravel; sporadic brick debris; and glass shards.					
5		CL	CLAY, lean; Brown to 7.0' then gray with olive brown mottling; trace micaceous; medium plasticity; stiff; trace rootlets, silt, and fine sand; moist. No odor, No visible impact.		6.9			
10		CL	CLAY, lean; Same as above; mottling grades out @ 11.2'; soft and sandier from @ 12.1'-12.8'. No odor, No visible impact.					
15		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse well-graded; medium dense; moist; trace finer grained clayey seams. No odor, No visible impact		10.6			
			SAPROLITE; Dark gray, purplish with lighter gray mixed in; micaceous; cohesive/brittle micaceous structure, partially pulverized by drilling. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					



- @ 15.5': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T4-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/19/19 COMPLETED: 3/19/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104453.479 EASTING: 1574032.746
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.08 ft MSL M.P. ELEV: 932.08 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL; Various shades of brown, gray, and reddish brown; mostly clay with some silty; low plasticity; variable density; trace micaceous grains; fine sand and rootlets; gravel-sized brick debris, wire, and wood debris. No odor, No visible impact. Note: poor recovery.					
5		CL	CLAY, lean; Brown; grades from low-medium plasticity; trace micaceous; fine sand; moist; soft then grades to medium; some silt. No odor, No visible impact.		4.8			
10		CL	CLAY, lean; Gray; brown mottling that grades out from 12.7'-13.8'; medium plasticity; stiff; moist; trace fine micaceous sand; trace silt and rootlets. No odor, No visible impact.					
15		SP	SAND; White-gray-black; trace micaceous; medium dense; moist. - @ 14.5'-16.5' Medium grained; poorly graded; and trace clayey seams. - @ 16.5'-17.3' Medium-coarse well-graded with trace large gravel. - @ 17.0'-17.3' NAPL coated with brown staining; and hydrocarbon odor.		11.1			
			SAPROLITE; Dark purplish gray with lighter colors mixed in; slightly moist; cohesive, brittle, and micaceous structure; partially pulverized. Faint odor, No visible impact.				4.7	
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					- @ 18': VOC/SVOC sample collected

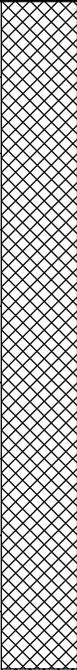
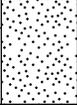
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T4-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104426.345 EASTING: 1574042.791
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.33 ft MSL M.P. ELEV: 932.33 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	<p>FILL;</p> <p>Various shades of brown, reddish brown, and gray; trace micaceous; mostly silt with some clay; medium dense; low plasticity; moist; and trace fine sand and rootlets; trace gravel and gravel-sized concrete debris.</p> <ul style="list-style-type: none"> <li>- @ 40" - 47.5" Light gray concrete.</li> <li>- @ 49" - 103" Little wood debris/rootlets, increasing clay content.</li> <li>- @ 68" - 71" Pale orange/white plastic circular debris; and black cap and glass shard.</li> <li>- @ 103" Wood debris seam.</li> </ul> <p>No odor, No visible impact.</p>		10.7			
10		CL	<p>CLAY, lean;</p> <p>Dark brown, reddish brown, then gray @ 8.0' with trace olive brown mottling; trace micaceous; trace fine sand and rootlets; medium plasticity; medium moist.</p> <p>No odor, No visible impact.</p>					
15		CL	<p>CLAY, lean;</p> <p>Same as above; mostly stiff.</p> <p>Faint hydrocarbon odor, No visible impact.</p>		11.6			
15		SW	<p>SAND;</p> <p>White-gray-black; trace micaceous grained; medium-coarse; well-graded; trace fine gravel; medium dense; moist; trace fine sand.</p> <ul style="list-style-type: none"> <li>- @ 15.1'-15.8' NAPL coated with brown staining; and hydrocarbon odor.</li> </ul>				14.1	
			<p>SAPROLITE;</p> <p>Gray with lighter gray and purplish gray banding; micaceous; cohesive, brittle, and partially micaceous structure; partially pulverized by drilling.</p> <p>Faint hydrocarbon odor, No visible impact.</p>					- @ 17': VOC/SVOC sample collected
			<p>End of Boring @ 19' below ground surface</p> <p>Backfilled with bentonite chips to ground surface</p>					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T5-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104347.518 EASTING: 1574111.27
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.38 ft MSL M.P. ELEV: 934.38 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 8.77 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	<p>FILL;</p> <p>Various shades of brown, gray, and reddish brown; trace micaceous grains; mostly silt with some clay; low plasticity; medium dense; moist; trace fine sand; few gravel and gravel-sized debris; occasional larger (2-5") concrete/brick chunks.</p> <p>- @ 3.8'-3.9' Thin metal piece; and possible fence tie.</p> <p>- @ 4.3'-7.8' More clayey and reddish.</p> <p>- @ 7.8'-9.0' Mostly wood debris in above matrix; dark brown; brick piece at 8.4'.</p> <p>Pine/woody odor, No visible impact.</p>		8.8			
10		ML	<p>FILL;</p> <p>Same as above with wood debris.</p>					
15		CL	<p>CLAY, lean;</p> <p>Gray; trace micaceous then grades to more micaceous with brown and olive brown mottling from @ 9.3'-14.0'; medium plasticity; stiff; trace fine sand and rootlets; trace silt; moist.</p> <p>- @ 11.3'-12.3' Trace tar blobs; and faint hydrocarbon odor.</p> <p>- @ 12.3'-12.4' Sandier seam.</p> <p>- @ 13.0'-16.6' Sporadic dark brown NAPL staining; hydrocarbon odor; increasing sand content with depth.</p> <p>- @ 15.9' Saturated NAPL lens; hydrocarbon odor in sand lens.</p>		10.9			
		SP	<p>SAND;</p> <p>White-gray-black; trace micaceous grains; medium poorly graded; medium dense; moist; trace clay.</p> <p>- @ 16.8'-18' NAPL coated; hydrocarbon odor.</p>				23.5	
			<p>SAPROLITE;</p> <p>Gray with dark, light, and purplish banding; micaceous; cohesive, brittle, and micaceous structure; slightly moist; mostly pulverized; faint hydrocarbon odor.</p> <p>- @ 16.6'-16.7' NAPL staining near interface with above sand.</p>				62.7	

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T5-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104347.518 EASTING: 1574111.27
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.38 ft MSL M.P. ELEV: 934.38 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 8.77 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T5-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104320.189 EASTING: 1574125.929
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.21 ft MSL M.P. ELEV: 934.21 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	FILL; Various shades of brown, reddish brown, and gray; trace micaceous grains; mostly clay with some silt; low plasticity; medium-stiff; moist; trace fine sand; few gravel; brick, concrete, and asphalt debris. - @ 4.8'-5.4' Large (3"-4") asphalt-like fragments with asphalt-like odor. No visible impact.		9.7			
			WOOD DEBRIS; Dark gray layered wood debris in above matrix. - @ 7.5'-8.7' Continuous layered wood. Woody/pine odor, No visible impact.					
10		CL	CLAY, lean; Gray; trace micaceous with olive brown mottling; medium plasticity; stiff; moist; trace fine sand; rootlets. - @ 9.5'-12.5' Sporadic millimeter scale tar blebs/seams; hydrocarbon odor.					
		SP SC	SAND, clayey; White-gray-black; micaceous grains; fine-medium poorly graded; medium dense; moist; and trace silt. - @ 12.8'-13.0' Trace dark brown NAPL staining; hydrocarbon odor.		10.1		92.8	
15		SW	SAND; White-gray-black; micaceous grains; medium-dense; and moist. - @ 14.0'-14.8' Fine-medium; poorly graded; and @ 14.0'-14.2' NAPL saturated; dark brown staining; and hydrocarbon odor; and @ 14.5'-14.7' NAPL saturated with dark brown staining; hydrocarbon odor. - @ 14.9'-16.0' Fine-coarse; well-graded with coarser grades near top of saprolite; and @ 15.4'-15.6' NAPL coated; and hydrocarbon odor; and @ 15.8'-16.0' Brown NAPL staining; hydrocarbon odor				15.9	
			SAPROLITE; Dark purplish gray with lighter gray banding; micaceous; cohesive, brittle, and micaceous structure; pulverized; slightly moist. Faint hydrocarbon odor, No visible impact.				101.7	
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface				39.2	
								- @ 17': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T5-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104291.203 EASTING: 1574142.686
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.53 ft MSL M.P. ELEV: 933.53 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 18.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown, reddish brown, and gray; trace micaceous grains; mostly silt with clay; low plasticity; moist; few gravel and gravel-sized brick, concrete, asphalt debris, and trace rootlets. - @ 2.5' Concrete fragments. No odor, No visible impact.		11.6			
			WOOD DEBRIS; Primarily layered wood pieces in above matrix. Pine/woody odor, No visible impact.					
10		CL	CLAY, lean; Gray; trace micaceous grains with brown and olive brown mottling; medium plasticity; stiff; moist; trace fine sand. - @ 10.0-10.5' Trace tar seams/blebs; black and shiny; hydrocarbon odor.					
		CL	CLAY, sandy; White-gray-black; micaceous grains; low plasticity with fine-medium poorly graded sand; medium moist. Faint hydrocarbon odor, No visible impact.					
15		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse; well-graded; medium dense; moist. - @ 14.7'-15.0' Clayey; and same as above. - @ 15.0' Coarser grains; NAPL coated with NAPL saturated from 15.6'-16.0' with dark brown staining; hydrocarbon odor.		9.2		17.4	
			SAPROLITE; Gray and light gray; trace micaceous; occasional dark olive gray; cohesive, brittle structure with few hard zones, mostly pulverized.					- @ 18': VOC/SVOC sample collected
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T6-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104279.201 EASTING: 1574079.147
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.04 ft MSL M.P. ELEV: 934.04 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown, reddish brown, and dark brown; trace micaceous grains; mostly silt with some clay; trace fine sand and rootlets; low plasticity; medium dense; moist; occasional gravel-sized brick and concrete debris; occasional larger pieces (~2-5"). - @ 3.0'-3.2' Wood piece. - @ 4.8' - 6.3' Occasional large brick pieces (up to 4"). No odor, No visible impact.		6.3			
10		CL	CLAY, lean; Gray with brown and olive brown mottling; medium plasticity; stiff; trace micaceous grains; fine sand; trace silt and rootlets; moist. - @ 9.0'-10.0' Loose; wet; silty with large wood pieces. Wood/pine odor, No visible impact.		10.8			
15		SP SC	SAND; White-gray-black; micaceous grains; fine-medium poorly graded; medium dense; moist; some clay. - @ 14.5'-15.0' NAPL coated with brown staining; and hydrocarbon odor in ~4" layer then a ~1/2" layer.				7.4	
		SW	SAND; White-gray-black; micaceous grains; lighter gray; fine-coarse; well-graded; medium dense; moist. - @ 17.2'-17.7' NAPL saturated with dark brown staining; hydrocarbon odor.				28.4	
			SAPROLITE; Dark purplish/gray with lighter banding; micaceous; cohesive, brittle. Faint hydrocarbon odor, No visible impact.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T6-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104279.201 EASTING: 1574079.147
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 934.04 ft MSL M.P. ELEV: 934.04 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			SAPROLITE; Same as above with lighter gray layers. <i>(continued)</i>		7.2			
			SAPROLITE; Light gray; trace micaceous; trace dark gray banding; trace light pink specks; mostly pulverized by drilling. No odor, No visible impact. Dry.					
25			End of Boring @ 24' below ground surface Backfilled with bentonite chips to ground surface					
30								
35								

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T6-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104250.735 EASTING: 1574097.143
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.98 ft MSL M.P. ELEV: 933.98 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	<p>FILL;</p> <p>Various shades of brown, gray, and reddish brown; mostly silt with trace micaceous fine sand and rootlets; few clay; trace gravel; occasional brick fragments up to 4" throughout; medium dense; moist.</p> <p>- @ 8.5' Large piece (4") of electrical wire.</p> <p>- @ 8.6' Dark gray; some fibrous debris.</p> <p>No odor, No visible impact.</p>		8.9			
10		CL	<p>CLAY, lean;</p> <p>Gray; trace micaceous grains with brown and olive mottling; medium plasticity; moist; stiff; trace silt and rootlets.</p> <p>- @ 9.0'-10.0' Some silt; wet; some coarse sand; soft.</p> <p>No odor, No visible impact.</p>					
15		SP SC	<p>SAND, clayey;</p> <p>White-gray-black; micaceous grains; fine-medium; poorly graded with low plasticity; medium dense; moist.</p> <p>No odor, No visible impact.</p>		10.9			
		SW	<p>SAND;</p> <p>White-gray-black; trace micaceous; fine-coarse well-graded; medium dense; moist.</p> <p>- @ 16.6'-18.0' More coarse grained.</p> <p>- @ 17.7'-18.0' Clayey sand; same as above.</p> <p>Faint hydrocarbon odor, No visible impact.</p>					
			<p>SAPROLITE;</p> <p>Dark purplish with gray, dark gray, and light gray banding; slight bluish hue with occasional pink; cohesive, brittle structure; somewhat micaceous.</p> <p>Faint hydrocarbon odor, No visible impact.</p> <p>End of Boring @ 19' below ground surface</p>					

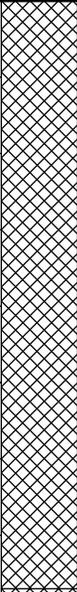
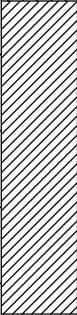
LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T6-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104250.735 EASTING: 1574097.143
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.98 ft MSL M.P. ELEV: 933.98 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			Backfilled with bentonite chips to ground surface					
25								
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4.ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T6-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/18/19 COMPLETED: 3/18/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104225.363 EASTING: 1574112.185
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.83 ft MSL M.P. ELEV: 932.83 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown, reddish brown, gray, and dark gray; trace micaceous; mostly silt with little fine sand; trace clay and rootlets; medium dense; moist; little gravel and gravel-sized debris (concrete/brick); occasional larger chunks (~2-4"). - @ 7.0'-7.2' Layer of wood.		7.4			
			WOOD DEBRIS; Dark brown in above matrix. - @ 7.9'-8.3' Bent metal piece. - @ 8.4' Solid wood. Pine/woody odor, No visible impact.					
10		CL	CLAY, lean; Gray; trace micaceous with brown and olive mottling; trace fine sand, silt, and rootlets; soft-medium from 9.3'-10.0' then grades to stiff; moist; and medium plasticity. - @ 12.2' Mottling grades out. - @ 12.4'-12.7' Occasional dark brown staining; and faint hydrocarbon odor.					
15		SW	SAND; White-gray-black; trace micaceous; medium dense; and moist. - @ 13.4'-15.2' Fine-medium poorly graded. - @ 15.2'-15.9' Fine-coarse well-graded. - @ 15.9'-16.1' Fine-medium poorly-graded; and clayey. - @ 16.1'-17.3' Fine-coarse well-graded; and trace small gravel. No odor, No visible impact.		10.9			
			SAPROLITE; Dark purplish with gray, light gray, and dark gray banding; slightly moist; cohesive, sandy. No odor, No visible impact.					- @ 17.5': VOC/SVOC sample collected
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T7-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/15/19 COMPLETED: 3/15/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104201.272 EASTING: 1574137.617
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.03 ft MSL M.P. ELEV: 933.03 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown, reddish brown, and gray; trace micaceous grains; moist; medium dense; silty with trace fine sand; trace clay; trace rootlets; little well graded angular gravel; concrete/brick debris. - @ 5.1' Asphalt debris. - @ 5.7' - 5.9' Concrete fragments. - @ 7.7' - 9.0' Mostly wood debris with brick pieces and a few white porcelain shards. No odor, No visible impact.		8.3			
10		ML CL	FILL; Same as above including larger wood debris; ~4" by 3" curved metal piece; some taffy-like black sticky material mixed in. Faint odor, Light sheen.				6.5	
		CL	CLAY, lean; Gray; trace micaceous grains with some brown mottling; medium plasticity; stiff; moist; trace fine sand and rootlets. - @ 11' - 11.8' Sporadic layers of dark purplish discoloration; slight hydrocarbon odor.				10.1	
		SP SC	SAND; White-gray-black; micaceous grains; some clay; trace rootlets; fine-medium poorly graded; medium dense; moist. - @ 12' - 12.2' NAPL coated; hydrocarbon odor. - @ 13' Seam of NAPL coated; hydrocarbon odor; in sandier seam - @ 13.4' - 13.8' Sporadic seams of NAPL coated above clayey seam; hydrocarbon odor; NAPL saturated from 13.6' - 13.8'; light sheen.		10.8		35	
15		SW	SAND; White-gray-black; trace micaceous grains; layers of sand similar to above sand mixed in; fine-coarse well graded; medium dense; moist; trace clayey seams. - @ 15' - 15.4' NAPL coated with light sheen; hydrocarbon odor within coarser grained section including well graded gravel; hydrocarbon odor. - @ 15.5' NAPL seam; same as above on top of clayey ~2" layer; hydrocarbon odor.				55	
			SAPROLITE; Gray; trace micaceous grains; dark gray, purplish and light gray banding; dense; slightly moist; and cohesive, brittle, sandy structure. No odor, No visible impact.					- @ 17': VOC/SVOC sample collected
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					- @ 18.9': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T7-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/15/19 COMPLETED: 3/15/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104184.201 EASTING: 1574150.663
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.49 ft MSL M.P. ELEV: 933.49 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Reddish brown; mostly sandy silt with little well-graded gravel and sporadic brick/concrete debris; loose; moist; and trace clay. - @ 0' - 0.8' Wet; and @ 0.5' - 0.8' Layer of broken brick pieces - @ 7.6' - 8' Rock - @ 8.1' - 9' Dark brownish gray; some wood fragments; black plastic (rubbery) piece (~3" long); and light blue plastic shard - @ 8.5' Layered green/olive colored carpet-like felt layer No odor, No visible impact.		9.0			
10		ML	FILL; Same as above with some wood debris and broken brick fragments; wet. No odor, No visible impact.					
		CL	CLAY, lean; Gray; trace micaceous grains with brown and brown mottling layers; medium plasticity; medium from 11" - 20" then grades to stiff; moist; trace fine sand and silt; trace rootlets. No odor, No visible impact.					
15		SP	SAND; White-gray-black; micaceous grains; fine-medium; poorly graded; medium dense; moist; trace clay; medium dense. No odor, No visible impact.		9.7			
		SW	SAND; White-gray-black; trace micaceous grains; fine-coarse well-graded; moist; medium dense; trace layers of above sand. No odor, No visible impact.					- @ 15.5': VOC/SVOC sample collected
			SAPROLITE; Gray; trace micaceous grains with dark gray; dark purplish and light gray banding; cohesive/brittle structure; partially pulverized by drilling. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

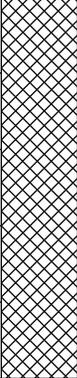
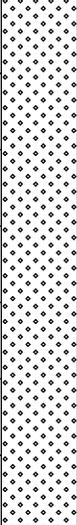
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T7-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/15/19 COMPLETED: 3/15/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104166.043 EASTING: 1574158.925
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 933.37 ft MSL M.P. ELEV: 933.37 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		ML	FILL; Various shades of brown and reddish brown; silt with trace fine micaceous sand; trace clay; some gravel and gravel-sized debris of brick, concrete, and asphalt; medium dense; moist; trace rootlets; occasional larger (2-5") pieces of debris throughout. No odor, No visible impact.		8.2			
			TIMBER DEBRIS; Layered wood debris in above matrix; dark gray. Woody/pine odor, No visible impact.					
10		CL	TIMBER DEBRIS; Same as above. No odor, No visible impact.					
			CLAY, lean; Gray; trace micaceous grains with some brown and olive brown mottling; medium plasticity; stiff; moist; trace fine sand and silt. - @ 10.4' - 11.4' Sporadic seams of dark gray/black discoloration adjacent to woody debris/rootlets. No odor, No visible impact.					
15		SW	SAND; White-gray-black; micaceous grains; trace clay; fine-medium well-graded with finer poorly graded layers mixed in. - @ 13.1' - 14' Clayey. - @ 15.6' - 15.8' Clayey. No odor, No visible impact.		10.3			
			SAND; White-gray-black; micaceous grains; medium-coarse including small gravel; well graded; loose; moist. - @ 17.2' - 17.4' Some finer sand mixed in above saprolite. No odor, No visible impact.					- @ 16': VOC/SVOC sample collected
			SAPROLITE; Gray; trace micaceous grains with dark gray; dark purplish and light gray banding; trace dark green; cohesive, brittle structure partially pulverized. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T8-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104031.912 EASTING: 1574185.892
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.27 ft MSL M.P. ELEV: 931.27 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL: Reddish brown; low plasticity; soft-medium; moist; some small and coarse gravel; trace organic matter (roots); little sand. @ 2.5' - 5' Brick and concrete fragments. No odor, No visible impact.		7.4			
5			FILL: Grayish brown; low plasticity; soft-medium; moist; trace fine sand; organic matter (roots). @ 8' - 8.5' Heavy staining; strong hydrocarbon odor; contains coal fragments and taffy-like tar material; small wood debris.				45	
10		SW	SAND; White-gray-black; micaceous grains; fine-coarse; well graded; medium dense; moist; trace clayey section and rootlets. No odor, No visible impact.		7.8			
15			SAPROLITE; White-gray-black; micaceous; dark gray and grayish purple banded; cohesive and brittle structure; slightly stiff; moist. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					

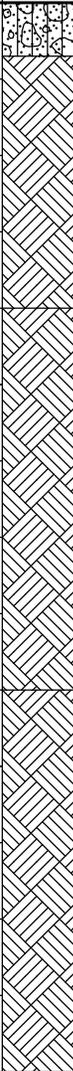
LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T8-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/12/19 COMPLETED: 3/12/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104039.42 EASTING: 1574204.891
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.31 ft MSL M.P. ELEV: 931.31 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 34.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		CL	FILL, lean clay; Various shades of light brown, brown, reddish brown; low plasticity; moist; little silt; little well graded sand and gravel; medium consistency. - @ 0.5' Cobble debris pieces, ~4" diameter. - @ 3' Porecelin debris. No odor, No visible impact.					
5		CL	FILL, lean clay; Dark brown; low plasticity; moist; little silt; trace fine sand and small gravel; timber and wood debris pieces throughout (3" to 4" long); medium consistency. - @ 4.5' Metal debris pieces (~5" by 3"). Faint hydrocarbon odor, No visible impact.		5.3			
10		CL	CLAY, lean; Dark, grayish brown; low plasticity; soft; moist; trace of fine grain sand and small gravel; few organic debris (roots). @ 9.8' - 10' Reddish brown color. @ 10.1' Grades to stiff. @ 10'-10.4' Olive color. No odor, No visible impact.				1.1	- @ 10': VOC/SVOC sample collected - @ 10' - 11': Geotechnical sample collected
		SC	SAND, clayey; Gray, micaceous grains; fine to medium grain; poorly graded; trace silt; trace organic material (roots); moist; medium dense. No odor, No visible impact.					
15		SW	SAND; White-gray-black; fine to medium grain; well graded, loose; moist; trace small and large gravel. @ 14' - 14.5' Additional coarse sand. @ 15' - 15.8' Additional coarse sand. @ 15.8' - 16.2' Clayey sand, large gravel pieces. No odor, No visible impact.		10.8			- @ 14' - 15': Geotechnical sample collected
			SAPROLITE; Gray, dark gray banded; micaceous grains; cohesive; brittle structure, stiff; slightly moist; fine to medium grain; poorly graded sand with little clay. @ 17.6' Grades to lighter gray with little small and large gravel (angular). No odor, No visible impact.					- @ 17' VOC/SVOC sample collected - @ 17' - 18': Geotechnical sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T8-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/12/19 COMPLETED: 3/12/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104039.42 EASTING: 1574204.891
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.31 ft MSL M.P. ELEV: 931.31 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 34.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			Partially Weathered Bedrock; Pulverized; loose; saprolite (Same as above). Light gray; loose; dry; heavily disturbed by drilling; micaceous; dark gray, brown, olive banding/lenses when broken apart. No odor, No visible impact.		4.9			
25			Partially Weathered Rock; Same as above. No odor, No visible impact.		7.8			
30			Partially Weathered Rock; Same as above. No odor, No visible impact.		8.2			
35			End of Boring @ 34' below ground surface Backfilled with bentonite chips to ground surface.					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T8-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/12/19 COMPLETED: 3/12/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104048.36 EASTING: 1574226.365
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.11 ft MSL M.P. ELEV: 932.11 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 6.72 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
5		CL	FILL, lean clay; Low plasticity; moist; little well graded sand and gravel; little silt. @ 0' - 1.2' Soft to medium; trace organic matter (roots); orange-brown. @ 1.2' - 1.4' Large concrete fragments. @ 1.5' - 1.8' Large brick fragments. @ 1.4' - 6.1' Mixed dark and reddish brown; stiff. No odor, No visible impact.		7.1			
		CL	FILL, lean clay; Dark grayish brown; low plasticity; soft-medium; moist. Timber and wood debris pieces throughout (3"-4"). Trace fine sand; trace small and large gravel. Slight pine/woody odor, No visible impact.					
10		SW	FILL, lean clay; Dark grayish brown; low plasticity; soft to medium; moist; little silt; trace organic material (roots); few fine sand and small gravel. No visible impact.					
		CL	FILL, sand; Dark grayish brown; well graded; medium dense; moist; trace silt; some small and coarse gravel. Hydrocarbon sheen (light) and odor, large gravel size fragments of slag and coal (archive sample).					
15		SC	CLAY, sandy; Gray; micaceous grains; medium plasticity; soft; moist; trace organic matter (roots). @11.3' - 11.4' Reddish brown banding. @11.4' - 12.8' Olive banding. No odor, No visible impact.		12.3			
		SW	SAND; White-gray-black; micaceous grains; fine to medium grain; well-graded; loose; moist. @ 16.6' - 17.2' Additional coarse gravel and trace fine gravel. No odor, No visible impact.					
			SAPROLITE, differentially weathered; White-gray-black; micaceous grains; moist. @17.2' - 18.2' Cohesive/brittle structure. @18.2' - 20.2' Loose; non-cohesive; well-graded; fine to coarse sand and gravel. No odor, No visible impact.					- @ 17': Sample collected for VOC/SVOC
			Partially Weathered Rock; Light gray to white-gray-black, and dark green; micaceous/ grains; loose; dry; heavily disturbed by drilling.					

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T8-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/12/19 COMPLETED: 3/12/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104048.36 EASTING: 1574226.365
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 932.11 ft MSL M.P. ELEV: 932.11 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 6.72 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
25			No odor, No visible impact. End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					
30								
35								

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T9-SB1</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104429.476 EASTING: 1574181.299
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 931.15 ft MSL M.P. ELEV: 931.15 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Various shades of brown, reddish brown, greenish brown, dark gray; well graded sand and gravel; loose moist; some rootlets and fibrous materials; few silt in top 4". No odor, No visible impact.					
			FILL; Lean clay; same color as above; low plasticity; stiff; moist; some well graded sand and gravel; few silt. - @ 4' - 4.5' Crushed rock pieces. No odor, No visible Impact.		9.6			
5			FILL, timber debris; Layered, large wood debris within dark, gray silt matrix; trace fine sand and gravel. - @ 5.5' Long brick fragment.					
		CL	CLAY, sandy; Gray; micaceous in spots; layers of brown olive coloring and mottling; medium plasticity; moist; some fine sand; trace rootlets; occasional NAPL discoloration; hydrocarbon odor. - @ 7.4' NAPL discoloration within sandier layer; and hydrocarbon odor. - @ 8.8' NAPL discoloration within sandier layer; and hydrocarbon odor.					
10		SC	SAND, clayey; White-gray-black; micaceous grains; layers of olive brown mottling; fine-medium poorly graded; medium dense; moist; trace NAPL blebs, occasional spots and seams of dark brown residual of NAPL staining; hydrocarbon odor. - @ 10.5' - 12' Grades to less clayey.				8	
		SW	SAND; White-gray-black; micaceous grains; brown spots mixed in, fine-medium; well graded; medium dense; moist. @ 12.3' - 12.7' NAPL coated grains (dark brown staining); hydrocarbon color (strong).				33.7	
		SW	SAND; White-gray-black; micaceous grains; fine-coarse; well graded with little large and small gravel; loose; moist. - @ 13.7' - 13.8' NAPL coated, dark brown staining (spot); hydrocarbon odor. - @ 13.9' - 14.5' NAPL saturated, dark brown staining; hydrocarbon odor (strong).		11.0		175	
15			SAPROLITE; White-gray-black, dark gray, light gray, and dark purplish banded; micaceous grains; trace light pink specks; cohesive; brittle structure that is increasingly pulverized with depth; slightly moist; stiff. No odor, No visible impact.					
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.					- @ 18': VOC/SVOC sample collected

LOG.D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T9-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104401.42 EASTING: 1574195.406
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.83 ft MSL M.P. ELEV: 930.83 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			FILL; Lean clay, various shades of brown, reddish brown, grayish brown; low plasticity; medium; moist; some fine-medium sand and gravel; trace rootlets; some silt. - @ 0' - 1.5' Well-graded sand and less fines. No odor, No visible impact.		9.4			
5			FILL, timber debris; Layered large wood debris within sandy silt matrix; dark brown. Slight pine/wood odor, No visible impact.					
		CL	Lean Clay; Gray; micaceous in spots; low-medium plasticity; medium moist; trace fine sand; silt and rootlets/fibrous debris; some brown and olive layers. - @ 6.2' - 6.3' Light staining near interface with timber debris; sporadic layers of NAPL coating within clay matrix; strong hydrocarbon odor.				90	
		CL	Lean Clay; Gray with brown mottling; micaceous grains; medium plasticity; stiff; moist; trace fine sand and silt. No odor, No visible impact.				135	
10		SC	SAND, clayey; White-gray-black; micaceous grains; fine-medium; poorly graded; low plasticity and medium consistency; trace silt; moist; grades to less clayey. - @ 10.5' - 11.5' Sporadic residual NAPL with darker discoloration; continuous 5-inch layer @ 11'; and strong hydrocarbon odor.					
		SP	SAND; White-gray-black; micaceous grains; fine-medium; poorly graded; medium dense; moist. No odor, No visible impact.		12.3			
15		SW	SAND; White-gray-black; micaceous grains; fine-coarse; well-graded with small and large gravel (some); loose; moist. - @ 14.8' - 15.5' NAPL coating grains; strong hydrocarbon odor; dark brown discoloration; light sheen.				100	- @ 13' - 16': Geotechnical sample collected
			SAPROLITE; Gray; micaceous grains; dark gray, light gray, and dark purplish banding throughout; cohesive and brittle structure; partially pulverized by drilling; slightly moist. No odor, No visible impact.					- @ 19': VOC/SVOC sample collected

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4.ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T9-SB2</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104401.42 EASTING: 1574195.406
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.83 ft MSL M.P. ELEV: 930.83 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: N/A ft TOC TOTAL DEPTH: 24.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
			SAPROLITE; Gray; micaceous grains; dark gray, light gray, and dark purplish banding throughout; cohesive and brittle structure; partially pulverized by drilling; slightly moist. No odor, No visible impact. (continued)		6.8			- @ 22': VOC/SVOC sample collected
25			End of Boring @ 24' Backfilled with bentonite chips to ground surface.					
30								
35								

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19

PROJECT: Former Bramlette Road MGP Site	WELL / BORING NO: <b>T9-SB3</b>
PROJECT NO: 1026.800	STARTED: 3/13/19 COMPLETED: 3/13/19
DRILLING COMPANY: Cascade Drilling	NORTHING: 1104374.97 EASTING: 1574207.841
DRILLING METHOD: Rotary Sonic	G.S. ELEV: 930.72 ft MSL M.P. ELEV: 930.72 ft MSL
BOREHOLE DIAMETER: 6 IN	DEPTH TO WATER: 3.19 ft TOC TOTAL DEPTH: 19.0 ft BGS
NOTES:	LOGGED BY: J. Conzelmann/T. King CHECKED BY: M. Mastbaum/A. Brey

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (FT)	VISUAL IMPACTS	PID (ppm)	WELL CONSTRUCTION
		SW SM	FILL; Various shades of brown, dark gray, gray, reddish brown; moist; medium dense; mostly well graded sand with gravel; pieces of asphalt and concrete. - @ 2.3' - 4.5' More silt/clay. No odor, No visible impact.					
5			BRICK; Reddish brown. No odor, No visible impact. FILL, timber debris; Layered large wood debris within dark gray silt matrix within trace fine sand; moist. No odor, No visible impact.		5.9			
			No Recovery. Poor recovery due to wood.					
10		SC	SAND, clayey; White-gray-black; micaceous grains; fine-medium; poorly graded; moist; medium dense; trace dark brown NAPL blebs; occasional seams of dark brown NAPL staining; hydrocarbon odor.					
		SP	SAND; White-gray-black; micaceous grains; medium poorly graded; moist; medium dense; occasional dark brown NAPL staining seams. - @ 12.7' - 13.1' Cluster of larger dark brown NAPL stained seams; strong hydrocarbon odor.				36.3	
15		SW	SAND; White-gray-black; micaceous grains; medium-coarse; well-graded within some small gravel; medium dense; moist. - @ 13.5' - 13.7' Dark brown NAPL coated grains; strong hydrocarbon odor. - @ 14.2' Dark brown NAPL saturated, separated by ~2" unimpacted layer of sand containing finer grains. - @ 14.5' - 15.5' Dark brown NAPL saturated strong hydrocarbon odor. - @ 15.5' - 15.7' Sandy clay layer with NAPL saturated grains where coarse grain layers mix including at interface with saprolite; strong hydrocarbon odor.		11.3		88.5	
			SAPROLITE; White-gray-black with dark gray, light gray, and dark purplish banding; micaceous grains; cohesive brittle structure; increasing pulverized with depth. No odor, No visible impact.				203.7	
			End of Boring @ 19' below ground surface Backfilled with bentonite chips to ground surface.				46.5	

LOG D - VI DEC BRAMLETTE NAPL V2.GPJ GINT STD A4 ASTM LAB.GDT 5/15/19







# Water Well Record Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

Note: Personal information provided on this document is subject to public scrutiny or release

**1. WELL OWNER INFORMATION:**

Name Synterra (last) (first)  
Address 148 River street #220  
City Greenville State S.C. Zip 29601  
Telephone Work 1864-421-9999 Home

**2. LOCATION OF WELL:**

NAME Swamp Rabbit Trail COUNTY: Greenville  
Street Address 400 East Bramlett Rd.  
City Greenville S.C. Zip 29601  
Latitude Longitude

**3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:**

MW295

**4. ABANDONMENT:**  Yes  No

Give Details Below

Grouted Depth from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
Sand	5'	5'
clay	7'	12'
Sand	3'	15'

\*Indicate Water Bearing Zones

(Use a 2nd sheet if needed)

**5. REMARKS:**

- 6. TYPE:**  Mud Rotary  Jetted  Bored  
 Dug  Air Rotary  Driven  
 Cable tool  Other

**7. PERMIT NUMBER:**

**8. USE:**

- Residential  Public Supply  Process  
 Irrigation  Air Conditioning  Emergency  
 Test Well  Monitor Well  Replacement

**9. WELL DEPTH (completed)**

Date Started 2-22-19

15 ft.

Date Completed 2-22-19

**10. CASING:**  Threaded  Welded

Diam 2 inch Height Above/Below Surface 3 ft.  
 Type  PVC  Galvanized  Steel  Other  
2 in to 1005 ft depth  
 Drive Shoe?  Yes  No

**11. SCREEN**

Type PVC Diam 2 inch  
 Slot/Gauge .010 Length 10 ft  
 Set Between 5 ft and 15 ft NOTE: MULTIPLE SCREENS USE SECOND SHEET  
 Sieve Analysis  Yes (please enclose)  No

**12. STATIC WATER LEVEL**

ft below land surface after 24 hours

**13. PUMPING LEVEL Below Land Surface**

ft after \_\_\_\_\_ hrs Pumping \_\_\_\_\_ GPM  
 Pumping test  Yes (please enclose)  No  
 Yield \_\_\_\_\_

**14. WATER QUALITY**

Chemical Analysis  Yes  No Bacterial Analysis  Yes  No  
 Please enclose lab results

**15. ARTIFICIAL FILTER (filter pack)**  Yes  No

Installed from 4 ft to 15 ft  
 Filter size 1A Uniformly Coefficient

**16. WELL GROUTED?**  Yes  No

Neat Cement  Bentonite  Bentonite/Cement  Other  
 Depth from 0 ft to 4 ft

**17. NEAREST SOURCE OF POSSIBLE CONTAMINATION:**

Type \_\_\_\_\_ direction \_\_\_\_\_  
 Well Disinfected  Yes  No Type \_\_\_\_\_ Amount \_\_\_\_\_

**18. PUMP:** Date installed \_\_\_\_\_

Not installed

Mfr Name \_\_\_\_\_ Model No \_\_\_\_\_  
 HP \_\_\_\_\_ Volts \_\_\_\_\_ Length of drop pipe \_\_\_\_\_ ft Capacity \_\_\_\_\_ gpm  
 Type  Submersible  Jet (shallow)  Turbine  
 Jet (deep)  Reciprocating  Centrifugal

**19. WELL DRILLER** Ray Whit

CERT. NO 2223

Address (Print) 825 N. Main Street Level A B C  (circle one)  
New Ellenton S.C.  
29809

Telephone No \_\_\_\_\_ Fax No \_\_\_\_\_

**20. WATER WELL DRILLER'S CERTIFICATION:** (This well was drilled under

my direction and this report is true to the best of my knowledge and belief

Signed [Signature] Date 2-22-19

If D Level Driller provide supervising driller's name



Water Well Record  
Bureau of Water

2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

Note: Personal information provided on this document is subject to public scrutiny or release

1. WELL OWNER INFORMATION:

Name *synterra*  
Address *148 River St. #220*  
City *Greenville* State *S.C.* Zip *29601*

Telephone Work *864-421-9999* Home

2. LOCATION OF WELL: COUNTY: *Greenville*

Name  
Street Address *400 East Bramlett Rd.*  
City *Greenville* Zip *29601*  
Latitude Longitude

3. PUBLIC SYSTEM NAME: PUBLIC SYSTEM NUMBER:

*MW 2972*

4. ABANDONMENT:  Yes  No

Give Details Below

Grouted Depth from ft to ft

Formation Description	Thickness of Stratum	Depth to Bottom of Stratum
<i>Sand</i>	<i>5'</i>	<i>5'</i>
<i>Clay</i>	<i>7'</i>	<i>12'</i>
<i>Sand</i>	<i>3.5'</i>	<i>15.5'</i>
<i>Sapelite</i>	<i>10.5'</i>	<i>26'</i>
<i>Flint</i>	<i>2'</i>	<i>31'</i>
<i>Bedrock</i>	<i>3'</i>	<i>34'</i>

\*Indicate Water Bearing Zones

(Use a 2nd sheet if needed)

5. REMARKS

7. PERMIT NUMBER:

8. USE:

- Residential
- Irrigation
- Test Well
- Public Supply
- Air Conditioning
- Monitor Well
- Process
- Emergency
- Replacement

9. WELL DEPTH (completed):

*31* ft

Date Started *2-22-19*

Date Completed *2-22-19*

10. CASING:  Threaded  Welded

Diam *2 inch*  
Type  PVC  Galvanized  
 Steel  Other  
*2* in to *26* ft depth  
*in* to *ft* depth

Height Above/Below

Surface *3* ft

Weight lb/ft

Drive Shoe?  Yes  No

11. SCREEN

Type *PVC* Diam *2 inch*  
Slot Gauge *10/10* Length *5 foot*  
Set Between *26* ft and *31* ft

NOTE: MULTIPLE SCREENS  
USE SECOND SHEET

Seve Analysis  Yes (please enclose)  No

12. STATIC WATER LEVEL

ft below land surface after 24 hours

13. PUMPING LEVEL Below and Surface

ft after hrs Pumping GPM

Pumping Test  Yes (please enclose)  No

Yield

14. WATER QUALITY

Chemical Analysis  Yes  No Bacteria Analysis  Yes  No

Please enclose lab results

15. ARTIFICIAL FILTER (after pack)  Yes  No

Installed from *24* ft to *31* ft

Effective size *19* Uniformity Coefficient

16. WELL GROUTED?  Yes  No

Neat Cement  Bentonite  Bentonite/Cement  Other

Depth From *0* ft to *21* ft

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION

Type direction

Well Disinfected  Yes  No Type Amount

18. PUMP: (Date installed)

Not installed

Mfr Name Model No

H.P. Volts Length of drop pipe ft Capacity gpm

TYPE  Submersible  Jet (shallow)  Turbine

Jet (deep)  Reciprocating  Centrifugal

19. WELL DRILLER: *Ray White*

CERT. NO. *2223*

Address (Print) *825 North Main Street* Level: A B C  (circle one)

*New Ellenton S.C.*  
*29809*

Telephone No Fax No

20. WATER WELL DRILLER'S CERTIFICATION

This well was drilled under my direction and this report is true to the best of my knowledge and belief

Signed

Date *2-22-19*

If Direct Driller provide supervising driller's name

6. TYPE:  Mud Rotary  Jetted  Spud  
 Dug  Air Rotary  Driven  
 Cable tool  Other



















































































































