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Mr. Greg Cassidy
 State Voluntary Cleanup Section
 Bureau of Land and Waste Management
 South Carolina Department of Health and Environmental Control
 2600 Bull Street
 Columbia SC 29201

SITE ASSESSMENT,
 REMEDIATION &
 REVITALIZATION

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**RE: Groundwater Monitoring Report – June 2017 Event
 SCE&G Huger Street Former MGP
 Columbia, South Carolina**

Dear Mr. Cassidy:

On behalf of SCANA Services, Inc., (SCANA) and their primary subsidiary, South Carolina Electric & Gas Company Inc. (SCE&G), enclosed, please find one hard copy and one CD of the Groundwater Monitoring Report – June 2017 Event for the Former Manufactured Gas Plant (MGP) located at 1409 Huger Street in Columbia, South Carolina. The Huger St. MGP is being administratively managed by the South Carolina Department of Health and Environmental Control (SCDHEC) under the Responsible Party Voluntary Cleanup Contract (VCC) #02-5295-RP, signed on August 19, 2002.

The June 2017 monitoring event was the sixth comprehensive, site-wide groundwater monitoring event conducted in support of the implementation of the Effectiveness Monitoring Plan (EMP) submitted to the South Carolina Department of Health and Environmental Control (SCDHEC) on April 24, 2013 and subsequently approved on August 2, 2013.

As currently planned and in accordance with the EMP, the next groundwater monitoring event will be completed in March 2018.

Should you have any questions, please contact either Paul Biery of SCANA at (803) 465-7736 or me at (412) 829-9650.

Sincerely,
Apex Companies, LLC

William J. Zeli, P.E.
 Senior Program Manager

Enclosures

cc: P. Biery - SCANA – w/ Encl.
 M. Ferlin, T. Wolf - Apex – w/o Encl.



**GROUNDWATER MONITORING REPORT
JUNE 2017 EVENT**

**HUGER STREET FORMER MGP SITE
COLUMBIA, SOUTH CAROLINA**

September 2017

Prepared for:

SCANA Services, Inc.
220 Operation Way
Cayce, South Carolina 29033

Prepared by:

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1.0 INTRODUCTION

On behalf of SCANA Services, Inc. (SCANA), this report presents the findings of the June 2017 groundwater monitoring event at the South Carolina Electric & Gas (SCE&G) Huger Street former Manufactured Gas Plant (MGP) site located in Columbia, South Carolina. The June 2017 monitoring event was the sixth comprehensive, site-wide groundwater monitoring event conducted in accordance with the Effectiveness Monitoring Plan (EMP) submitted to the South Carolina Department of Health and Environmental Control (SCDHEC) on April 24, 2013 and subsequently approved on August 2, 2013.

The Huger Street former MGP site is currently managed under the SCDHEC Responsible Party Voluntary Cleanup Contract (VCC) #02-5295-RP. The contract provides for assessment and remediation of the site by SCE&G with oversight from SCDHEC. Previous work completed at the site has included a multi-phased remedial investigation and three separate Interim Removal Actions (IRA), as described below.

1.1 Background Information

For investigation and remediation purposes, the Huger Street site was divided into three separate parcels. The Parcels are shown on Figure 1 and are referred to as:

- Parcel “A”;
- Parcel “B”; and
- Parcel “C”.

For various reasons, each parcel was investigated and/or remediated via separate removal actions, and a summary of relevant information is provided below. Based on the successful completion of these removal activities, a significant quantity of MGP-impacted source material was removed from the site. It is anticipated that these removal activities will have a positive effect on groundwater quality at the site, which will be confirmed by continued implementation of the EMP.

Parcel “A”

The former MGP operations were generally situated on a city block (Parcel “A”), which is approximately 5.88 acres in size and bounded by Huger Street to the east, Washington Street to the south, Williams Street to the west, and Hampton Street to the north (Figure 1). Properties surrounding the site include a mix of industrial, residential and currently undeveloped properties. Previous structures relating to both the former MGP operations and the former bus maintenance facility on Parcel “A” are shown on Figure 1. A buried 72-inch diameter concrete stormwater drainage culvert passes through the site and discharges to the Congaree River at an outfall area located directly south of Gervais Street.

The former MGP operated from 1906 through 1954. There was a total of three above-grade gasholders at the site along with tar tanks, pressure vessels, purifiers and other apparatus (Figure 1). After 1954, MGP operations were terminated and the site was redeveloped to the current day grade and utilized for bus transit and maintenance operations by SCE&G and subsequently the Columbia Area Regional Transit Authority (CARTA). The CARTA operations were moved to a different location in May 2008. After CARTA vacated the site, the above-grade bus maintenance facility structures were demolished in preparation for the Interim Removal Action (IRA).

Mobilization of personnel and equipment to conduct the Parcel “A” IRA began in November 2009 and the IRA was completed in June 2011. The primary objective of the IRA was to remove known source material from the subsurface of the site. During the project, approximately 125,000 tons of MGP-impacted soil and debris was excavated and properly disposed. Following excavation to the required depth, each section was backfilled using clean backfill material. Backfill material within the saturated zone was amended with an oxygen-releasing product used to promote aerobic biodegradation of residual constituents in groundwater. A total of 2,375 pounds of EHC-O™ was utilized throughout the project. The removal activities were documented in greater detail in the Interim Removal Action Report – Parcel “A” submitted to SCDHEC on February 20, 2013 and approved on April 26, 2013.

Parcel “B”

Parcel “B” is located directly south of Parcel “A”, across Washington Street (Figure 1). No historical MGP-related operations occurred on this property. An electrical substation currently exists in the western corner of the lot. SCE&G’s former public transportation division used the central and eastern portions of the property for parking and storage of disabled or wrecked buses. A Phase I Environmental Site Assessment (Phase I ESA) conducted on Parcel “B” in preparation for sale of the property identified surface soil staining and residual impacts from the bus storage operations. An investigation and removal action were undertaken to address these impacts and a total of 951.71 tons of soil and 23.47 tons of debris were removed. Some of the removed material consisted of metal slag and paint waste material attributed to the former operations on the adjacent Klein Steel property. The primary constituents of interest (COI) that were addressed by the removal action included; chromium, cadmium, lead, zinc, benzo(a)pyrene and benzo(b)fluoranthene.

Post-excavation, confirmation soil samples illustrated achievement of residential and industrial regional screening levels (RSLs). SCDHEC provided concurrence on February 2, 2007 that no restrictions would be required on soil for future use of Parcel “B”. SCE&G subsequently divested the property to the developers of the former Kline Steel property.

Parcel “C”

The SCE&G Williams Street Substation, also referred to as Parcel “C”, is located to the west of Parcel “A”, as shown on Figure 1. An apparent tar-like material (TLM) was visually observed at ground surface near the center of Parcel “C” in the general vicinity of the utility trench and buried concrete structure (BCS) (Figure 1). Although no MGP-related activities are known to have occurred on this parcel, the presence of the TLM suggests some correlation.

To gain a better understanding of the potential extent of TLM, SCE&G completed numerous investigative activities at the site, which included installation of soil borings and monitoring wells, excavation of test trenches and collection of groundwater and soil samples. The Parcel “C” removal action was conducted in September and October 2012 to remove the majority of a relatively small BCS that contained tar-like material and resulted in the excavation and off-site disposal of approximately 1,100 tons of impacted material. Figure 1 provides the location and extent of the removal activities. A relatively small amount of visually stained/dischored and/or odiferous soil had to be left in place under the BCS to maintain the structural integrity of the fiber optic conduit that bisects the excavation area. SCDHEC concurred with the decision to leave this material in place and additional soil sampling was conducted to document the

remaining impacts. The removal action activities were documented in the Parcel “C” Removal Action Report, which was submitted on December 13, 2012 and approved on January 29, 2013.

1.2 Conceptual Approach to Remediation

SCE&G has developed a conceptual approach to remediation, based on experience in managing similar sites impacted by MGP-related constituents that generally consists of source removal via excavation and subsequent monitoring of groundwater quality for effectiveness. The groundwater monitoring is intended to assess the effectiveness of remediation and the (anticipated) subsequent natural attenuation of dissolved-phase constituents. As currently envisioned and following a sufficient period of monitoring, a Focused Feasibility Study (FFS) will be prepared, if required, to address alternatives for further remediation of groundwater. The FFS will be prepared as a contingency, should natural attenuation alone appear to be inadequate to address the remaining impacts to groundwater.

Successful completion of the removal actions on all three parcels was the first step in the overall approach to remediation. The September 2013 site-wide groundwater monitoring event was the first post-removal action monitoring event intended to gauge the effectiveness of the remediation activities and the anticipated ongoing natural attenuation processes. It is important to note that baseline groundwater sampling events were completed prior to conducting the Parcel “A” and Parcel “C” removal actions. This baseline data is a critical component of the effectiveness monitoring program because it provides pre-removal action groundwater data for comparison with the recently collected data. The baseline data is further discussed in Section 5.0 of this report.

2.0 POST REMOVAL SITE-WIDE GROUNDWATER MONITORING

2.1 Post Removal Action Replacement Monitoring Well Installation

During completion of the IRA activities on Parcel “A”, a total of six monitoring wells (MW-2, MW-4, MW-9, MW-12, MW-15 and MW-17) and one piezometer (PZ-01) located within the excavation area were abandoned with SCDHEC approval. More recently, in 2012 monitoring wells MW-6 and MW-8 located on the State Museum property were also abandoned, with SCDHEC approval, in support of ongoing building renovations on that property. Figure 1 shows the locations of the abandoned wells and the piezometer and Table 1 provides a list of existing and abandoned monitoring wells and their locations. Some wells located within the shallower IRA excavation areas were successfully protected from damage during the removal action. Other wells, located in the deeper excavation areas, were abandoned as the excavation progressed. These wells were either abandoned by a licensed South Carolina driller in accordance with R.61-71 or by complete physical removal with the excavator. The monitoring well locations on Parcels “B” and “C” were not impacted by removal activities and are still available for gauging and/or sampling activities.

The approved EMP included installation of new or replacement monitoring wells based on the following criteria:

1. General replacement of abandoned/removed monitoring wells with a recent history of elevated detections of constituents of potential concern (COPC);

2. Provide locations representative of the baseline Geoprobe Screen Point Sampling (GSPS) locations (GP-02 through GP-04 on Figure 1);
3. Install new wells in areas known to previously contain significant impacts and/or potential low areas in the sub-surface bedrock where residual DNAPL may potentially accumulate, should it exist; and
4. Provide adequate spatial distribution to accurately assess groundwater flow patterns and overall site-wide groundwater quality.

The primary objective of satisfying criteria 1 and 2 above is to obtain current site-wide groundwater quality data that can be directly correlated to historical concentrations at specific locations to determine the effectiveness of the removal actions. Over time, the data is anticipated to demonstrate the subsequent natural attenuation of residual impacts to groundwater. Criteria number 3 provides data at new locations where the excavation operations identified significant impacts such as in the former retort house area. The fourth criterion provides a means to monitor groundwater flow patterns over time.

The approved EMP designated four new/replacement monitoring locations. These locations were installed in early September 2013 and properly developed prior to being sampled during the initial post-removal action September 2013 event. The locations included the following wells:

- MW-19 was installed near the former GP-02, MW-4 and MW-12 locations and is also located directly downgradient of the former gasholder #1.
- MW-20 was installed near the former retort house area, which was found to contain a significant amount of impacted material during completion of the removal action. MW-20 is also situated in the general vicinity of MW-2, which was removed during excavation activities and exhibited some historical detections of COPCs.
- MW-21 was installed near the former GP-04 location.
- MW-22 was intended to replace abandoned monitoring wells MW-9 and MW-15 and provide groundwater quality data downgradient of the former process area and the former underground storage tanks (USTs).

2.2 Monitoring Locations

In accordance with the EMP, all 26 site wide monitoring wells and piezometers are gauged during each event to determine the depth to groundwater (groundwater elevations), flow directions and to check for the presence of both light and dense non-aqueous phase liquids (NAPL). Eighteen locations, including three off-site wells, were proposed for sampling in the approved EMP. Table 1 provides a summary of the monitoring locations. For Parcels “A” and “B”, these included the four proposed new/replacement monitoring wells (MW-19 through MW-22) and seven existing monitoring locations (MW-3, MW-5S, MW-5M, MW-5D, MW-13, MW-14 and MW-16).

For Parcel “C”, any location that previously exhibited detections of constituents were retained in the post removal action monitoring program. These six locations include CMW-01 through CMW-04, CMW-07, and CMW-08. In addition, downgradient sentinel well location CMW-12 (which did not exhibit previous detections of COPCs) is included in the program.

2.3 Analytical Parameters and Methods

Groundwater samples collected during the June 2017 event were analyzed for the same constituents as in the remedial investigation and baseline groundwater monitoring events. These analyses include benzene, ethylbenzene, toluene, and total xylenes (BTEX) via EPA Method 8260B, and polynuclear aromatic hydrocarbons (PAHs) via EPA Method 8270D. Samples from monitoring locations in the vicinity and downgradient of the former UST locations shown on Figure 1 (MW-5D, MW-5M, MW-5S, MW-16 and MW-22) were also analyzed for methyl tert-butyl ether (MTBE) via EPA Method 8260B. The groundwater analytical parameters, methods, detection limits and screening levels are provided in Table 2. Field measurements include pH, specific conductance, temperature, redox potential, dissolved oxygen, and turbidity. Observations of groundwater color are also recorded.

2.4 Groundwater Screening Values

For data comparison and discussion purposes, the June 2017 groundwater analytical data was compared to published groundwater screening levels. The groundwater screening levels consisted of the SCDHEC Maximum Contaminant Levels (MCLs) in drinking water (R.61-58, 2009). If a SCDHEC drinking water standard was not available for a particular constituent, the U.S. EPA Region 9 Regional Screening Level (RSL) for tap water where carcinogens are based on a 1×10^{-6} risk and non-carcinogens are based on a hazard quotient of 1 (June 2017) was utilized as a groundwater screening level. The screening levels are provided in Table 2 and are included in the analytical summary Tables 6 through 8 and Figures 3 and 4. Exceedences of the screening value are highlighted on the tables and figures.

3.0 FIELD ACTIVITIES

In summary, field activities performed during the June 2017 groundwater sampling event included obtaining depth to groundwater level measurements, evaluating the presence/absence of NAPL, purging and sampling a total of 17 monitoring wells.

3.1 Groundwater Level Measurements

Groundwater level measurements were obtained at 26 accessible monitoring well and piezometer locations on June 13, 2017. A check for the occurrence of both light and dense NAPL was also evaluated at each monitoring well and piezometer location. The groundwater level measurements and NAPL evaluation was made using an electronic interface probe.

Table 3 provides the depth to groundwater level measurements, associated groundwater elevations, and findings from the NAPL evaluation. NAPL was not observed at any monitoring well location during this event.

3.2 Groundwater Sampling

Groundwater samples were collected from the 18 wells specified in the EMP on June 13 and 14, 2017. Purging and sampling was conducted using a portable peristaltic pump. The polyethylene and silicon tubing used for the purging and sampling was dedicated to each well. The wells were purged at a slow rate to minimize turbidity and the potential introduction of particles into the samples. The total volume of

groundwater purged from each well was dependent on field indicator parameter stabilization (pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential [redox], and turbidity). Table 4 provides the final groundwater field indicator parameter measurements for each well and Appendix A provides the complete data set.

The groundwater samples were collected following stabilization of the field indicator parameters. The samples were collected in the appropriate, pre-preserved sample containers provided by the laboratory, placed in coolers with ice, retained under chain-of-custody protocol, and hand delivered to Shealy Environmental Services, Inc. (Shealy) in West Columbia, South Carolina for laboratory analyses. Water generated during purging and groundwater sampling was placed in a 55-gallon drum and stored in the former radio repair/storage building located on-site.

3.3 QA/QC Sample Collection

QA/QC samples collected included one equipment blank (EB061317), one field duplicate (FD061317) collected at well MW-5S and one trip blank (TB061317) that was analyzed for BTEX and MTBE. Additional sample volume was collected at MW-5M for Matrix Spike/Matric Spike Duplicate (MS/MSD) purposes.

4.0 GROUNDWATER FLOW CHARACTERISTICS

4.1 Groundwater Monitoring Network

The groundwater monitoring network used to determine groundwater elevations consists of 25 monitoring wells and one piezometer located on Parcels “A”, “B” and “C” (Table 3 and Figure 2).

4.2 Hydrogeologic Setting

In summary, both Parcel “A” and Parcel “C” were originally characterized as complex geologic settings where unconsolidated sedimentary deposits overlaid weathered saprolite and non-weathered igneous rocks (Columbia granite). These unconsolidated sedimentary deposits were interpreted to have been deposited unconformably in several geologic environments that include fluvial, marine, and anthropogenic fill. As a result of the removal actions, a large portion of the Parcel “A” geology was disturbed and replaced with clean backfill that may be characterized as fine sand and silt. The removal action, completed from 2009 to 2011, consisted of excavating approximately 125,000 tons of material from 2 feet to 30 feet below ground surface (bgs) over most of Parcel “A”. For Parcel “C”, approximately 1,100 tons of material was removed in 2012.

Since no specific geologic unit is designated as the shallow groundwater bearing unit, shallow groundwater is characterized by saturated conditions to the point of refusal in the underlying saprolite or granite. Generally, the well screening strategy was to screen the entire saturated zone. This saturated interval was then referred to as shallow groundwater, which is monitored at Parcel “A” and Parcel “C”.

4.3 Groundwater Contour and Flow Patterns

4.3.1 Horizontal

The shallow groundwater contour and flow pattern developed for Parcels “A” and “C” are shown on Figure 2. Groundwater flow is generally directed from northwest to southeast. Semi-radial groundwater flow is observed on the western portion of Parcel “C” with groundwater flow generally directed from southwest to southeast. A 72-inch culvert is located on Parcel “A” and groundwater converges along the southern limits of this buried structure. The overall site-wide groundwater contour pattern for this event is similar to that observed historically.

The groundwater linear velocity is calculated by estimating horizontal hydraulic gradients, hydraulic conductivity (K) and assumption of porosity. The assumed porosity is 0.30. Two hydraulic gradients are determined along groundwater flowpaths in the western portions of Parcel “A” and Parcel “C” and are estimated at 5.0×10^{-2} feet/feet and 3.7×10^{-2} feet/feet, respectively. The hydraulic gradient in the vicinity of MW-16 and the 72-inch culvert is estimated at 3.2×10^{-2} feet/feet.

Slug tests were performed during the Parcel “A” RI at a total of six wells with varying lithologies to determine hydraulic conductivity (K). Slug tests were not performed on the Parcel “C” wells. Review of the boring logs suggest a lithologic comparison exists between MW-13 and generally Parcel “C”. Therefore, the estimated K (0.5 feet/day) from MW-13 is used to estimate groundwater linear velocity on Parcel “C”. The majority of Parcel “A” was excavated and backfilled with clean fill (silt and fine sand). Slug tests were not performed in the recently installed wells screened in backfill material and saprolite (MW-19 through MW-22) and therefore, the backfill and saprolite K is not known. By inference, the MW-14 lithology may be sufficiently comparable enough that the K estimated from this well may be representative of the backfill and saprolite. The MW-14 well screen straddled lithologies comprised of silt, sand, and saprolite and the estimated K = 9.5 feet/day. The estimated K from MW-16 located near the 72-inch culvert is 82.7 feet/day.

Based on the above, the estimated groundwater linear velocity in the western portion of Parcel “A” is 1.6 feet/day and in the western portion of Parcel “C” is 0.06 feet/day. Near the 72-inch culvert, groundwater linear velocity is estimated at 8.8 feet/day and is attributed to the higher estimated K value at MW-16.

4.3.2 Vertical

The vertical hydraulic gradient was assessed at well nest MW-5S (shallow), MW-5M (middle), and MW-5D (deep). The groundwater elevations differed by 0.03 feet between each interval monitored. The middle had the highest groundwater elevation, and the shallow and deep wells had lower groundwater elevations, indicating groundwater flow was directed from the middle to the upper and deep intervals during this event.

5.0 GROUNDWATER ANALYTICAL RESULTS

A discussion of the June 2017 monitoring event results is provided in this section along with a comparison of the results with the previous post-removal action and pre-removal action concentrations. The June 2017 groundwater analytical data is provided in Appendix B.

5.1 Data Evaluation

Following receipt of the data package from Shealy, the data was evaluated in accordance with the U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review (EPA, 2017). The analytical data was reviewed with respect to sample preservation, holding times, equipment blank, field duplicate, trip blanks (volatiles only) and other laboratory control samples. The data was determined to be acceptable; however, it should be noted that the laboratory reported elevated detection limits due to laboratory sample dilutions for samples collected at well locations CMW-03, CMW-04 and MW-13. A memorandum discussing the analytical data evaluation is provided in Appendix C.

5.2 Equipment and Trip Blanks

Analytical results for the equipment blank and trip blank samples indicate that constituents were not detected. The equipment blank was analyzed for BTEX, MTBE and PAHs, while the trip blank was analyzed for BTEX and MTBE. The results are summarized in Table 5.

5.3 Parcel “A” Monitoring Wells

Eight monitoring wells associated with Parcel “A” were sampled during the June 2017 monitoring event. Table 6 and Figure 3 provide a summary of the analytical results. Similar to previous events, no constituents were detected above laboratory detection limits at four of the seven locations. These locations included wells MW-3, MW-14, MW-21 and MW-22 located in the northern and south-central portions of the completed excavation area. A minimal detection of acenaphthene (11 µg/L), below the applicable screening value, was present in the sample collected from MW-16 located in the southwestern corner of the site.

The final three monitoring locations produced results above the screening levels for naphthalene at MW-13 (2,200 µg/L), MW-19 (340 µg/L) and MW-20 (13 µg/L) and benzene at MW-19 (15 µg/L) and MW-20 (90 µg/L). MW-13 and MW-19 also exhibited low-level detections for other volatile and semi-volatile constituents below the applicable screening levels.

In summary and like previous events, the June 2017 exceedances of the screening levels for Parcel “A” were limited to three locations for naphthalene (MW-13, MW-19 and MW-20) and two locations for benzene (MW-19 and MW-20). These wells are located in the approximate central portion of the completed excavation area.

Previous baseline groundwater sampling events were conducted to provide pre-removal action groundwater data for comparison to post-removal action groundwater data. Appendix D provides a summary of the historical groundwater data for the Huger Street site. For illustrative purposes, Figure 4 provides benzene, naphthalene and in some cases MTBE concentrations from the pre-removal action baseline events and the post-removal action effectiveness monitoring events. Review of this data and Figure 4 provides the following information:

- The MW-3, MW-14 and MW-15/MW-22 locations continue to produce non-detect results.
- The detection of only one constituent (acenaphthene) at low concentrations is typical for monitoring well MW-16 and the June 2017 concentration is the lowest to date.

- The GP-02/MW-19 location continues to exhibit a reduction in benzene concentration from the 2009 pre-removal action baseline event concentration of 1,400 µg/L to 15 µg/L for the June 2017 event. This is second lowest concentration to date, which was seen during the previous (September 2016) event. Naphthalene concentrations at this location are also still well below the pre-removal action baseline concentration of 4,000 µg/L, and the June 2017 concentration of 340 µg/L was the lowest to date.
- The GP-04/MW-21 location continues to show a significant reduction in benzene and naphthalene concentrations from pre-removal action concentrations of 590 µg/L and 59 µg/L, respectively, to below laboratory detection limits in the post-removal action monitoring events.
- The naphthalene concentrations at MW-13 for the post-removal action monitoring events appear to be range bound. However, an overall decrease in naphthalene concentration from pre-removal action levels is still apparent at this location.
- The benzene and naphthalene concentrations at MW-20 continue to exhibit a steadily decreasing trend. No historical pre-removal action data is available for comparison at this location.

5.4 Parcel “B” Monitoring Wells

The wells associated with Parcel “B” include MW-5S, MW-5M and MW-5D, which are located south of Washington Street near the SCE&G substation. These wells were included in the post-removal action effectiveness monitoring program because of historical detections of MTBE, which has typically been the only constituent detected at these locations. The historical analytical results for these locations are summarized in Appendix D and the June 2017 results are provided in Table 7 and Figure 3. For the first time since inception of the monitoring program, MW-5S was the only well that exhibited a detection of MTBE. The June 2017 concentration (33 µg/L), is the lowest to date and a continuation of a downward trend in MTBE concentrations at this location. This was the first event where MTBE was not detected at well MW-5M and MW-5D continues to produce non-detect results.

5.5 Parcel “C” Monitoring Wells

As specified in the EMP, seven of the 12 monitoring wells associated with Parcel “C” were sampled during the June 2017 event. Table 8 provides the analytical results for the June 2017 event and Figure 3 provides a summary of the benzene and naphthalene concentrations. Six of the locations were included in the monitoring program because they exhibited historical detections of COPCs. The final well (CMW-12) is a downgradient sentinel location that has not exhibited historical detections.

No constituents were detected above laboratory detection limits at two Parcel “C” monitoring locations (CMW-01 and downgradient CMW-12). Four of the remaining five wells produced naphthalene results above the screening level: CMW-02 (420 µg/L), CMW-03 (2,400 µg/L), CMW-04 (2,000 µg/L), and CMW-08 (11 µg/L). In addition, three locations exhibited results above the screening level for benzene, CMW-02 (6.9 µg/L), CMW-03 (130 µg/L) and CMW-07 (7.1 µg/L). Lower level volatile and semi-volatile concentrations (below screening values) were also noted at three locations (Table 8).

Review of the historical data for the Parcel “C” wells in Appendix D and the pre- and post-removal benzene and naphthalene concentration comparison on Figure 4 provides the following information:

- Consistent with the other post-removal action monitoring events, CMW-01 continues to produce results below laboratory detection limits for all constituents.

- Sentinel well CMW-12 also continues to produce non-detect results for all constituents.
- Benzene concentrations at CMW-07 appear to be developing a trend of range bound low-level results that are either below (non-detect) or slightly above the screening level. Naphthalene continued the trend of non-detect results for this location.
- At the CMW-08 location, benzene was not detected for the third straight event and the naphthalene concentration continues an established downward trend with the June 2017 concentration (11 µg/L) being the lowest since inception of the program.
- The benzene concentration at the CMW-04 location was non-detect at an elevated detection limit of 25 µg/L for this event. Recent benzene results for this location have been near this detection limit with the lowest being 24 µg/L in December 2015. The naphthalene concentrations continue to fluctuate and the June 2017 result of 2,000 µg/L is the second lowest, a significant decrease from the previous two events and a return to concentrations that are below the pre-removal action levels.
- The benzene and naphthalene concentrations at the CMW-02 and CMW-03 locations appear to be range bound and fluctuating slightly from event to event. The naphthalene concentration of 2,400 µg/L at CMW-03 is significantly lower than the last event and breaks the trend of increasing concentrations of naphthalene at this location.

6.0 SUMMARY

NAPL was not identified at any of the monitoring well locations. This event's groundwater contour pattern, flow directions, and hydraulic gradients were similar to historically observed patterns. The highest estimated groundwater linear velocity is in the vicinity of the 72-inch buried culvert and is attributed to the K measured at this site area. The groundwater elevations at the MW-5 well nest suggests divergent flow from the middle to upper and deep intervals.

For Parcel "A", four of the eight monitoring locations continue to produce results below laboratory detection limits. A fifth, MW-16, exhibited only a minimal semi-volatile detection that was well below the screening level. These monitoring locations (MW-3, MW-14, MW-16, MW-21 and MW-22) are located in the northern, central and southwestern portions of the site. Of the remaining three locations, three exhibited naphthalene concentrations above the screening level and two locations exceeded the screening level for benzene. A decrease in concentrations from pre-removal action conditions continues to be observed at all locations with comparable historical data. MW-20 produced the lowest concentrations to date and MTBE continues to be non-detect at the Parcel "A" monitoring wells analyzed for this constituent.

MTBE is the primary COPC for Parcel "B" and was not detected in two of the three locations, MW-5M and MW-5D, located in the middle and deep intervals. MW-5S (shallow) produced an MTBE concentration that exceeded the screening level, but was the lowest concentration to date for this location. The MTBE concentration for MW-5M (middle) was non-detect for the first time since inception of the program and is the result of a steady decline in concentrations of MTBE at this location. MW-5D (deep) continues to exhibit non-detect results for MTBE. The middle and deep locations appear to exhibit a trend of low or non-detect concentrations while the shallow location appears to be steadily decreasing in concentration.

No constituents were detected above laboratory detection limits at two Parcel "C" monitoring locations. One location is the sentinel location CMW-12, and the second (CMW-01) previously exhibited results

above the screening level for naphthalene, but has produced non-detect results since inception of the post-removal action monitoring program.

For benzene at Parcel “C”, results continue to be relatively low, when detected. CMW-08 continues the non-detect trend established during the December 2015 event and CMW-02 and CMW-07 continue the trend of low level/non-detect results. CMW-03, located directly downgradient of the former excavation area, continues to produce the highest results for this portion of the site. CMW-03 is the only location that consistently produces benzene concentrations that are higher than pre-removal action levels. This is likely due to its location, which is downgradient and very close to the former source area.

Naphthalene has been historically detected at four of the seven Parcel “C” monitoring locations. At three of these locations, CMW-03, CMW-04 and CMW-08, the June 2017 naphthalene concentrations were lower than the previous event. The concentration at CMW-02 was slightly higher but within the historical range. With the exception of CMW-03, an overall decrease in naphthalene concentrations as compared to pre-removal action concentrations is evident at all of the locations with detections. Similar to the benzene concentrations observed at CMW-03, the increase from pre-removal action concentrations is likely due to being downgradient and very close to the former source area. It is also important to note that the increasing trend in naphthalene concentrations that appeared to be occurring at the CMW-03 and CMW-04 locations following the last event was broken during this event with significant decreases in concentrations observed for naphthalene at these locations.

Surfer 10, a groundwater contouring and three-dimensional surface mapping program, was utilized to develop Figures 5 and 6, which approximately illustrate the pre- and post-removal action groundwater isoconcentrations for benzene and naphthalene, respectively. It is important to note that the spatial distribution of monitoring points directly affects the capability of the program to develop an accurate model of groundwater conditions. For example, more monitoring well locations would most likely produce plumes of smaller size since the edge of the plume is extended to the locations with non-detect results. However, this software will be utilized to graphically illustrate the change in the respective plumes as the monitoring program is continued in the future.

Review of the benzene figure shows a significant reduction in concentration and extent of the benzene plume following completion of the IRA. The June 2017 benzene plume for Parcel “A” appears similar in areal extent to the most recent previous events (December 2015 and September 2016) but illustrates the lower concentrations seen at the MW-20 location. The benzene plume for Parcel “C” is smaller due to the non-detect result (at an elevated detection limit) for the CMW-04 location.

The naphthalene figure shows the reduction in concentration but relatively similar aerial extent of naphthalene between the pre- and post-excavation monitoring events. The reduction in naphthalene concentrations at the MW-19 location is apparent when comparing the most recent events to historical illustrations.

7.0 CONCLUSIONS

Benzene, naphthalene and MTBE continue to be the primary COPCs for the Huger Street site. They continue to be the only constituents detected above the screening levels for the June 2017 event. For Parcel “A”, the June 2017 monitoring event results continue to support the current hypothesis that source removal via excavation and augmentation of backfill material in the saturated zone with an oxygen-releasing product followed by natural attenuation will achieve a significant improvement in site-related groundwater quality. The Parcel “A” monitoring wells when compared to historical data continue to produce post-removal action results below the pre-removal action concentrations. A steady to slowly decreasing trend in constituent concentration is apparent at most of the monitoring locations.

Consistent with previous monitoring events, MTBE was the only constituent detected at Parcel “B” and a decreasing trend in MTBE concentrations is apparent with MW-5M being non-detect for the first time since inception of the program and continued reduction in concentrations at the MW-5S location.

With the exception of CMW-03, which is located downgradient and directly adjacent to the former source removal area, downward trends in concentrations are also becoming apparent at Parcel “C”. The apparent increasing trend in naphthalene concentrations at the CMW-03 and CMW-04 locations following the last event did not continue this event, with significant decreases observed. More time and additional monitoring events will provide a better basis for trend determination on Parcel “C”. Based on SCE&G’s experience at similar sites, the desired effect of reducing constituent groundwater concentrations is dependent upon several site-specific factors. Consistent reductions may be observed relatively soon after source removal or may require years to achieve the desired groundwater restoration goals.

8.0 RECOMMENDATIONS

As specified in the approved EMP, groundwater samples are to be collected on a nine-month sampling frequency. This frequency was proposed to provide data to account for seasonal variations in groundwater quality. Therefore, the next nine-month event will take place in March 2018.

TABLES

TABLE 1

SITE-WIDE GROUNDWATER MONITORING WELLS AND SAMPLING LOCATIONS

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Well ID	Location	Status	Included or Excluded for Sampling	Rationale for Inclusion or Exclusion
MW-1	Parcel "A"	Existing	Excluded	Non-detect in previous three events and near MW-16
MW-2	Parcel "A"			Abandoned
MW-3	Parcel "A"	Existing	Included	Upgradient locations
MW-4	Parcel "A"			Abandoned
MW-5S	Parcel "B" SCE&G Substation	Existing	Included	Previous detections of MTBE
MW-5M	Parcel "B" SCE&G Substation	Existing	Included	Previous detections of MTBE
MW-5D	Parcel "B" SCE&G Substation	Existing	Included	Previous detections of MTBE
MW-6	Off-Site - Museum Parking Lot			Abandoned - based on development
MW-7	Parcel "B"			Abandoned
MW-8	Off-Site - Museum Parking Lot			Abandoned - based on development
MW-9	Parcel "A"			Abandoned
MW-10	Parcel "B" SCE&G Substation			Abandoned
MW-11	Off-Site - Museum Parking Lot			Abandoned
MW-12	Parcel "A"			Abandoned
MW-13	Parcel "A"	Existing	Included	Previous detections of benzene and naphthalene
MW-14	Parcel "A"	Existing	Included	Downgradient of the deep excavation area
MW-15	Parcel "A"			Abandoned
MW-16	Parcel "A"	Existing	Included	Previous detection of benzene and naphthalene
MW-17	Parcel "A"			Abandoned
MW-18	Parcel "A"	Existing	Excluded	Non-detect in previous three events and near MW-16
MW-19	Parcel "A"	Existing	Included	New monitoring location
MW-20	Parcel "A"	Existing	Included	New monitoring location
MW-21	Parcel "A"	Existing	Included	New monitoring location
MW-22	Parcel "A"	Existing	Included	New monitoring location
GP-02	Parcel "A"			Abandoned
GP-03	Parcel "A"			Abandoned
GP-04	Parcel "A"			Abandoned
PZ-01	Parcel "A"			Abandoned
PZ-02	Parcel "A"	Existing	Excluded	Piezometer location - not previously sampled
CMW-01	Parcel "C"	Existing	Included	Previous detections
CMW-02	Parcel "C"	Existing	Included	Previous detections
CMW-03	Parcel "C"	Existing	Included	Previous detections
CMW-04	Parcel "C"	Existing	Included	Previous detections
CMW-05	Parcel "C"	Existing	Excluded	Non-detect in previous three events
CMW-06	Parcel "C"	Existing	Excluded	Non-detect in previous three events
CMW-07	Parcel "C"	Existing	Included	Previous detections
CMW-08	Parcel "C"	Existing	Included	Previous detections
CMW-09	Parcel "C"	Existing	Excluded	Non-detect in previous three events
CMW-10	Parcel "C"	Existing	Excluded	Non-detect in previous three events
CMW-11	Parcel "C"	Existing	Excluded	Included if sufficient water present for sample
CMW-12	Parcel "C"	Existing	Included	Downgradient sentinel well

Note:

GP-02 through GP-04 were temporary Geoprobe Screen Point Sampling (GSPS) locations installed during the Parcel "A" baseline event to provide data in previously inaccessible locations.

TABLE 2

SUMMARY OF GROUNDWATER ANALYTICAL PARAMETERS, METHODS AND SCREENING LEVELS

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Constituent	Analytical Method	Detection Limit (µg/L)	MCL ⁽¹⁾ (µg/L)	Region 9 Regional Screening Level ^(2,3,4,5) (µg/L)
<u>Volatile Organic Compounds</u>				
Benzene	8260B	5	5	--
Ethylbenzene	8260B	5	700	--
Toluene	8260B	5	1,000	--
Xylenes, Total	8260B	5	10,000	--
MTBE ⁽⁷⁾	8260B	5	-- ⁽⁶⁾	14
<u>PAH Constituents</u>				
Acenaphthene	8270C	5	--	530
Acenaphthylene	8270C	5	--	NL ⁽⁸⁾
Anthracene	8270C	5	--	1,800
Benzo(a)anthracene	8270C	5	--	0.03
Benzo(a)pyrene	8270C	5	0.2	--
Benzo(b)fluoranthene	8270C	5	--	0.25
Benzo(g,h,i)perylene	8270C	5	--	NL
Benzo(k)fluoranthene	8270C	5	--	2.5
Chrysene	8270C	5	--	25
Dibenzo(a,h)anthracene	8270C	5	--	0.025
Fluoranthene	8270C	5	--	800
Fluorene	8270C	5	--	290
Indeno(1,2,3-cd)pyrene	8270C	5	--	0.25
Naphthalene	8270C	5	--	0.17
Phenanthrene	8270C	5	--	NL
Pyrene	8270C	5	--	120

Notes:

Field measurements included pH, specific conductance, temperature, dissolved oxygen, turbidity and redox potential.

Quality assurance/quality control (QA/QC) samples included one equipment blank, one trip blank per sample delivery group (VOCs only) and one blind field duplicate.

(1) MCL - maximum contaminant level from South Carolina State Primary Drinking Water Regulation: R.61-58.

(2) Represents the June 2017 U.S. EPA Region 9 Regional Screening Levels (RSL, [formerly PRG]) for tapwater and utilizes the target risk (TR) = 1×10^{-6} and hazard quotient (HQ) = 1 table.

(3) For acenaphthene, anthracene, fluoranthene, fluorene, and pyrene, only a non-carcinogenic level exists and therefore, the value in the non-carcinogenic screening level (SL) HI = 1 column is shown.

(4) For benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, only a carcinogenic level exists and therefore, the level in the carcinogenic SL TR = 1×10^{-6} column is shown.

(5) The carcinogenic TR = 1×10^{-6} is shown for MTBE and naphthalene since both a carcinogenic and non-carcinogenic level is provided in the Region 9 RSL for tapwater.

(6) -- indicates a level is not provided or is superseded by the MCL for this project.

(7) Only wells MW-5S, MW-5M, MW-5D, MW-16 and MW-22 were analyzed for MTBE.

(8) NL - indicates neither an MCL or Region 9 RSL for tapwater level exists for this constituent.

TABLE 3

GROUNDWATER ELEVATIONS AND NAPL MEASUREMENTS - JUNE 13, 2017

**SCE&G Huger Street Former MGP Site
Columbia, South Carolina**

Well	Top of Casing Elevation (feet)⁽¹⁾	Depth to Groundwater (feet)⁽²⁾	Groundwater Elevation (feet)⁽¹⁾	NAPL Results⁽³⁾
MW-1	182.53	19.43	163.10	NP
MW-3	200.47	15.42	185.05	NP
MW-5S	182.47	22.21	160.26	NP
MW-5M	182.50	22.21	160.29	NP
MW-5D	182.65	22.38	160.27	NP
MW-13	189.62	8.91	180.71	NP
MW-14	187.58	13.37	174.21	NP
MW-16	182.12	19.19	162.93	NP
MW-18	187.52	22.01	165.51	NP
MW-19	190.05	11.78	178.27	NP
MW-20	189.77	11.25	178.52	NP
MW-21	189.59	15.48	174.11	NP
MW-22	187.55	21.35	166.20	NP
PZ-02	183.58	21.26	162.32	NP
CMW-01	197.02	13.36	183.66	NP
CMW-02	195.23	11.81	183.42	NP
CMW-03	195.28	12.90	182.38	NP
CMW-04	197.03	13.34	183.69	NP
CMW-05	193.50	14.73	178.77	NP
CMW-06	191.54	18.67	172.87	NP
CMW-07	192.72	14.11	178.61	NP
CMW-08	195.13	14.02	181.11	NP
CMW-09	196.94	14.23	182.71	NP
CMW-10	197.96	16.16	181.80	NP
CMW-11	192.07	20.50	171.57	NP
CMW-12	192.85	18.11	174.74	NP

Notes:

- (1) Elevation referenced to NGVD '29.
- (2) Depth to groundwater measured from top of PVC casing.
- (3) NAPL includes both light and dense non-aqueous phase liquids and NP represents not present.

TABLE 4

FINAL GROUNDWATER FIELD MEASUREMENTS - JUNE 2017

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Well I.D.	Sampling Date	pH (S.U.)	Specific Conductance (μS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Color
MW-3	06/14/17	3.29	1,063	23.8	0.26	480	4	Clear
MW-5S	06/13/17	5.97	371	23.2	2.98	-121	9	Clear
MW-5M	06/13/17	5.17	218	22.0	1.62	242	11	Clear
MW-5D	06/13/17	5.13	215	22.4	2.87	289	1	Clear
MW-13	06/14/17	5.16	326	24.5	0.25	43	3	Clear
MW-14	06/14/17	3.59	1,356	24.0	0.94	30	4	Clear
MW-16	06/14/17	6.63	1,144	21.8	1.96	-120	10	Clear
MW-19	06/14/17	6.05	632	24.8	1.21	-183	5	Clear
MW-20	06/14/07	5.43	425	24.1	0.28	536	2	Clear
MW-21	06/14/17	5.25	525	24.5	1.22	-186	5	Clear
MW-22	06/14/17	6.51	891	22.5	2.85	-34	1	Clear
CMW-01	06/14/17	5.12	208	21.9	0.44	324	0	Clear
CMW-02	06/14/17	5.24	152	21.6	0.93	-67	3	Clear
CMW-03	06/14/17	3.58	359	21.1	0.28	428	3	Clear
CMW-04	06/14/17	5.68	76	22.3	0.49	97	0	Clear
CMW-07	06/14/17	5.08	428	21.5	0.34	232	2	Clear
CMW-08	06/14/17	4.15	291	22.1	1.06	37	1	Clear
CMW-12	06/14/17	5.51	392	19.8	7.15	4	1	Clear

TABLE 5

SUMMARY OF EQUIPMENT AND TRIP BLANK ANALYTICAL RESULTS - JUNE 2017

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Constituent	Units	Screening Level	EB061317	TB061317
Volatiles				
Benzene	µg/L	5	5 U	5 U
Ethylbenzene	µg/L	700	5 U	5 U
Toluene	µg/L	1,000	5 U	5 U
Xylenes, Total	µg/L	10,000	5 U	5 U
MTBE	µg/L	14	5 U	5 U
Semi-Volatiles				
Acenaphthene	µg/L	530	10 U	NA
Acenaphthylene	µg/L	NL	10 U	NA
Anthracene	µg/L	1,800	10 U	NA
Benzo(a)anthracene	µg/L	0.03	10 U	NA
Benzo(a)pyrene	µg/L	0.2	10 U	NA
Benzo(b)fluoranthene	µg/L	0.25	10 U	NA
Benzo(g,h,i)perylene	µg/L	NL	10 U	NA
Benzo(k)fluoranthene	µg/L	2.5	10 U	NA
Chrysene	µg/L	25	10 U	NA
Dibenz(a,h)anthracene	µg/L	0.025	10 U	NA
Fluoranthene	µg/L	800	10 U	NA
Fluorene	µg/L	290	10 U	NA
Indeno(1,2,3-cd)pyrene	µg/L	0.25	10 U	NA
Naphthalene	µg/L	0.17	10 U	NA
Phenanthrene	µg/L	NL	10 U	NA
Pyrene	µg/L	120	10 U	NA

Notes:

1. NL - Not Listed
2. NA - Not Analyzed
3. U - Indicates that the constituent was not detected at the reported detection limit.
4. Groundwater screening values are the SCDHEC Maximum Contaminant Levels (MCL) in drinking water (R.61-58, 2009). If a SCDHEC drinking water standard is not available for a particular constituent, the groundwater screening level is the U.S. EPA Region 9 Regional Screening Level (RSL [June 2017]) for tapwater where carcinogens are based on a 1×10^{-6} risk and non-carcinogens are based on a hazard quotient of 1.

TABLE 6

SUMMARY OF PARCEL "A" WELL SAMPLES GROUNDWATER ANALYTICAL RESULTS - JUNE 2017

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Constituent	Units	Screening Level	MW-3	MW-13	MW-14	MW-16	MW-19	MW-20	MW-21	MW-22
Volatiles										
Benzene	µg/L	5	5 U	5 U	5 U	5 U	15	90	5 U	5 U
Ethylbenzene	µg/L	700	5 U	53	5 U	5 U	13	5 U	5 U	5 U
Toluene	µg/L	1,000	5 U	120	5 U	5 U	9	5 U	5 U	5 U
Total Xylenes	µg/L	10,000	5 U	420	5 U	5 U	47	5 U	5 U	5 U
MTBE	µg/L	14	NA	NA	NA	5 U	NA	NA	NA	5 U
Semi-Volatiles										
Acenaphthene	µg/L	530	10 U	40 U	10 U	11	28	10 U	10 U	10 U
Acenaphthylene	µg/L	NL	10 U	40 U	10 U	10 U	57	10 U	10 U	10 U
Anthracene	µg/L	1,800	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Benzo(a)anthracene	µg/L	0.03	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Benzo(a)pyrene	µg/L	0.2	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Benzo(b)fluoranthene	µg/L	0.25	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	µg/L	NL	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Benzo(k)fluoranthene	µg/L	2.5	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Chrysene	µg/L	25	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	µg/L	0.025	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Fluoranthene	µg/L	800	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Fluorene	µg/L	290	10 U	40 U	10 U	10 U	19	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	µg/L	0.25	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U
Naphthalene	µg/L	0.17	10 U	2,200	10 U	10 U	340	13	10 U	10 U
Phenanthrene	µg/L	NL	10 U	45	10 U	10 U	21	10 U	10 U	10 U
Pyrene	µg/L	120	10 U	40 U	10 U	10 U	8 U	10 U	10 U	10 U

Notes:

1. NL - Not Listed
2. NA - Not Analyzed
3. NS - Not Sampled. MW-16 was not sampled because it was buried due to erosion that occurred at the site and was unable to be located during sampling activities.
4. U - Indicates that the constituent was not detected at the reported detection limit.
5. Groundwater screening values are the SCDHEC Maximum Contaminant Levels (MCL) in drinking water (R.61-58, 2009). If a SCDHEC drinking water standard is not available for a particular constituent, the groundwater screening level is the U.S. EPA Region 9 Regional Screening Level (RSL [June 2017]) for tapwater where carcinogens are based on a 1×10^{-6} risk and non-carcinogens are based on a hazard quotient of 1.
6. Indicates constituent exceeds the Screening Level.

TABLE 7

SUMMARY OF PARCEL "B" WELL SAMPLES GROUNDWATER ANALYTICAL RESULTS - JUNE 2017SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Constituent	Units	Screening Level	MW-5S	MW-5S Dup	MW-5M	MW-5D
Volatiles						
Benzene	µg/L	5	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	5 U	5 U	5 U	5 U
Toluene	µg/L	1,000	5 U	5 U	5 U	5 U
Total Xylenes	µg/L	10,000	5 U	5 U	5 U	5 U
MTBE	µg/L	14	33	37	5 U	5 U
Semi-Volatiles						
Acenaphthene	µg/L	530	10 U	10 U	10 U	10 U
Acenaphthylene	µg/L	NL	10 U	10 U	10 U	10 U
Anthracene	µg/L	1,800	10 U	10 U	10 U	10 U
Benzo(a)anthracene	µg/L	0.03	10 U	10 U	10 U	10 U
Benzo(a)pyrene	µg/L	0.2	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	µg/L	0.25	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	µg/L	NL	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	µg/L	2.5	10 U	10 U	10 U	10 U
Chrysene	µg/L	25	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	µg/L	0.025	10 U	10 U	10 U	10 U
Fluoranthene	µg/L	800	10 U	10 U	10 U	10 U
Fluorene	µg/L	290	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	µg/L	0.25	10 U	10 U	10 U	10 U
Naphthalene	µg/L	0.17	10 U	10 U	10 U	10 U
Phenanthrene	µg/L	NL	10 U	10 U	10 U	10 U
Pyrene	µg/L	120	10 U	10 U	10 U	10 U

Notes:

- NL - Not Listed
- U - Indicates that the constituent was not detected at the reported detection limit.
- Groundwater screening values are the SCDHEC Maximum Contaminant Levels (MCL) in drinking water (R.61-58, 2009). If a SCDHEC drinking water standard is not available for a particular constituent, the groundwater screening level is the U.S. EPA Region 9 Regional Screening Level (RSL [June 2017] for tapwater where carcinogens are based on a 1×10^{-6} risk and non-carcinogens are based on a hazard quotient of 1.
- Indicates constituent exceeds the Screening Level.

TABLE 8

SUMMARY OF PARCEL "C" WELL SAMPLES GROUNDWATER ANALYTICAL RESULTS - JUNE 2017

SCE&G Huger Street Former MGP Site
Columbia, South Carolina

Constituent	Units	Screening Level	CMW-01	CMW-02	CMW-03	CMW-04	CMW-07	CMW-08	CMW-12
Volatiles									
Benzene	µg/L	5	5 U	6.9	130	25 U	7.1	5 U	5 U
Ethylbenzene	µg/L	700	5 U	5 U	35	26	5 U	5 U	5 U
Toluene	µg/L	1,000	5 U	5 U	450	210	5 U	5 U	5 U
Total Xylenes	µg/L	10,000	5 U	18	550	400	5 U	5 U	5 U
Semi-Volatiles									
Acenaphthene	µg/L	530	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Acenaphthylene	µg/L	NL	10 U	38	55	40 U	10 U	10 U	10 U
Anthracene	µg/L	1,800	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Benzo(a)anthracene	µg/L	0.03	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Benzo(a)pyrene	µg/L	0.2	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Benzo(b)fluoranthene	µg/L	0.25	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	µg/L	NL	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Benzo(k)fluoranthene	µg/L	2.5	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Chrysene	µg/L	25	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	µg/L	0.025	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Fluoranthene	µg/L	800	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Fluorene	µg/L	290	10 U	21	40 U	46	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	µg/L	0.25	10 U	8 U	40 U	40 U	10 U	10 U	10 U
Naphthalene	µg/L	0.17	10 U	420	2,400	2,000	10 U	11	10 U
Phenanthrene	µg/L	NL	10 U	34	40 U	55	10 U	10 U	10 U
Pyrene	µg/L	120	10 U	8 U	40 U	40 U	10 U	10 U	10 U

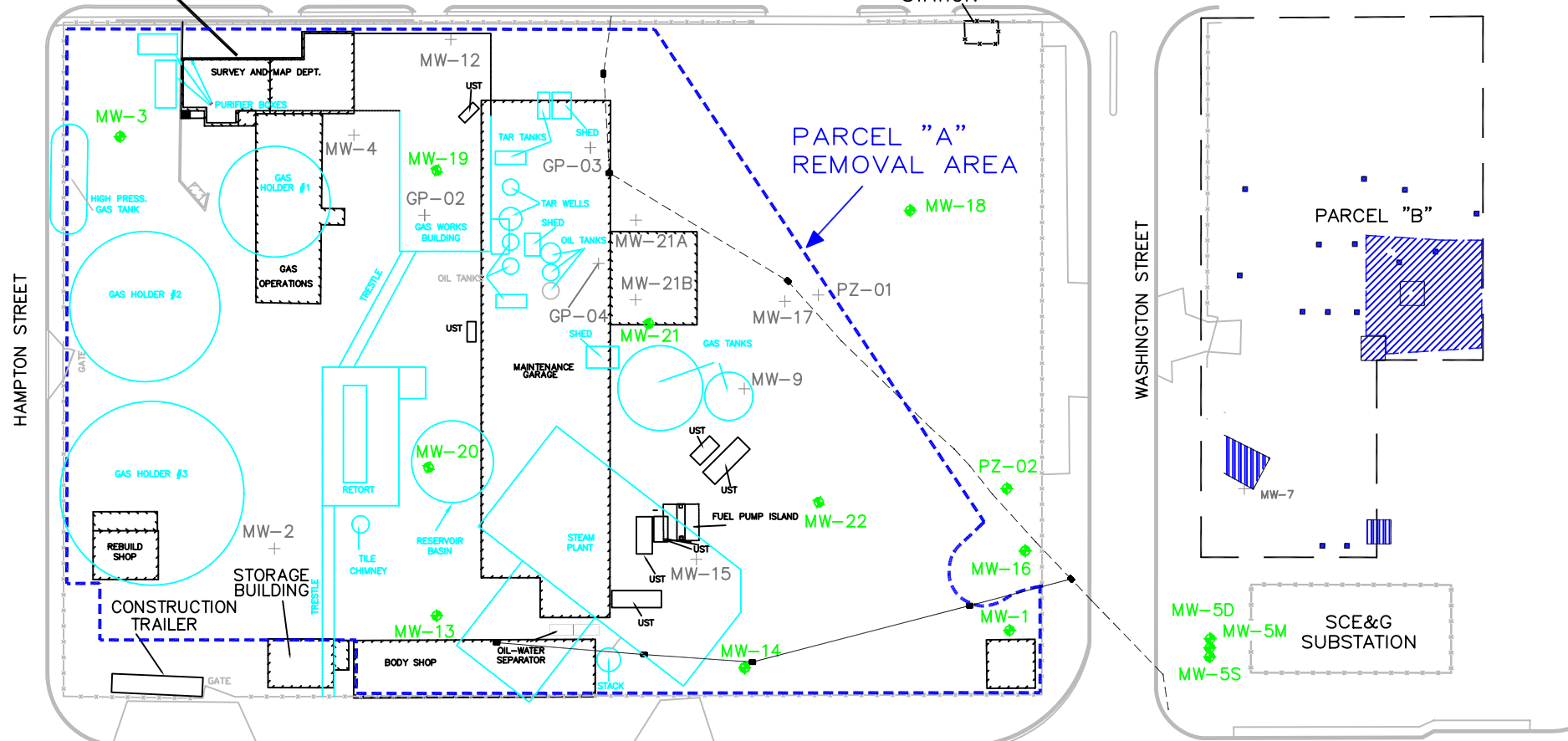
Notes:

- NL - Not Listed
- U - Indicates that the constituent was not detected at the reported detection limit.
- J - Indicates an estimated value. The constituent was positively identified. However, based on data evaluation the associated result is an approximate concentration of the constituent in the sample.
- Groundwater screening values are the SCDHEC Maximum Contaminant Levels (MCL) in drinking water (R.61-58, 2009). If a SCDHEC drinking water standard is not available for a particular constituent, the groundwater screening level is the U.S. EPA Region 9 Regional Screening Level (RSL [June 2017]) for tapwater where carcinogens are based on a 1×10^{-6} risk and non-carcinogens are based on a hazard quotient of 1.
- Indicates constituent exceeds the Screening Level.

FIGURES

HUGER STREET FORMER MGP SITE - PARCEL 'A'

GAS REGULATOR STATION
HUGER STREET



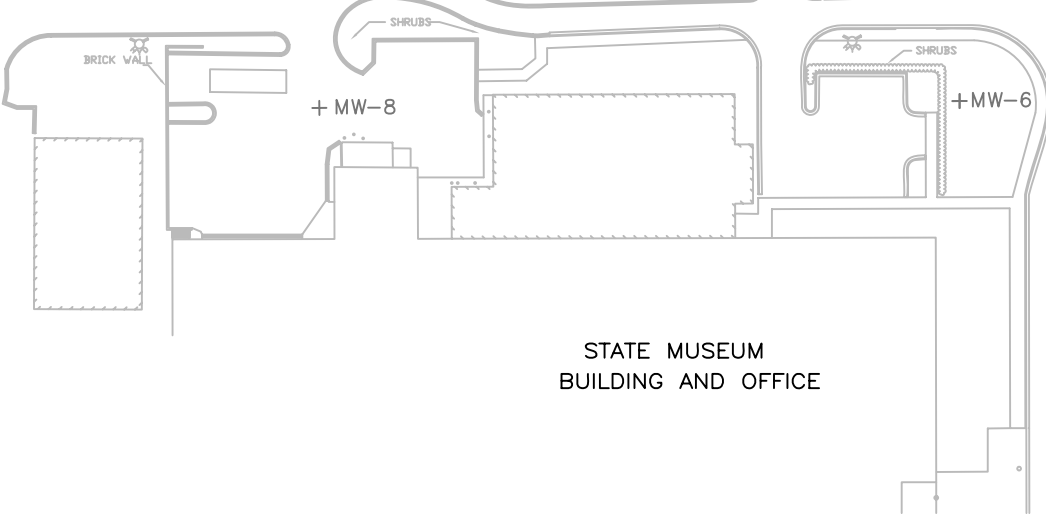
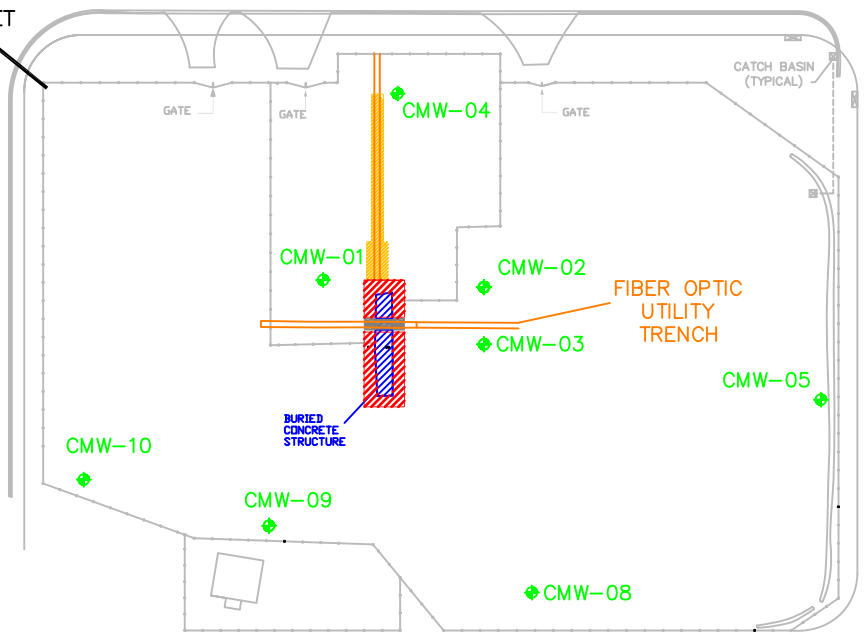
- LEGEND**
- FORMER MGP STRUCTURE, OUTLINE OR FEATURE
 - FORMER BUS MAINTENANCE STRUCTURE, OUTLINE OR FEATURE
 - EXISTING MONITORING WELL (MW) OR PIEZOMETER (PZ)
 - ABANDONED WELL/PIEZOMETER/SOIL BORING/DIRECT PUSH LOCATION
 - CATCH BASIN
 - 72-INCH BURIED STORM DRAIN CULVERT
 - APPROXIMATE EXTENT OF PARCEL "A" EXCAVATION
 - PARCEL "B" REMOVAL OF VISUALLY STAINED SURFACE SOIL EXCAVATION DEPTH 1-FOOT
 - PARCEL "B" EXTENT OF SHALLOW EXCAVATION AT SS-3 AND SS-5 EXCAVATION DEPTH 2- FEET
 - PARCEL "B" EXTENT OF DEEPER EXCAVATION AT TEST PIT LOCATIONS TP-1 AND TP-3, EXCAVATION DEPTH OF 5 TO 8 FEET
 - BURIED CONCRETE STRUCTURE
 - PARCEL "C" UTILITY TRENCH AND PIPES
 - PARCEL "C" APPROXIMATE EXCAVATION AREA
 - PARCEL "C" ADDITIONAL PIPE REMOVAL EXCAVATION AREA
 - PARCEL "C" PORTION LEFT IN PLACE TO SUPPORT FIBER OPTIC CONDUIT



SCALE: 1" = 100'
0 25' 50' 100' 150' 200'

PARCEL "C"
WILLIAMS STREET
SUBSTATION

WILLIAMS STREET



STATE MUSEUM
BUILDING AND OFFICE

FIGURE 1
SOUTH CAROLINA ELECTRIC & GAS COMPANY
MONITORING WELL LOCATION MAP
HUGER STREET
FORMER MANUFACTURED GAS PLANT SITE
COLUMBIA, SOUTH CAROLINA
DATE: 12/20/13 FILE NAME: HUG016
APEX COMPANIES, LLC

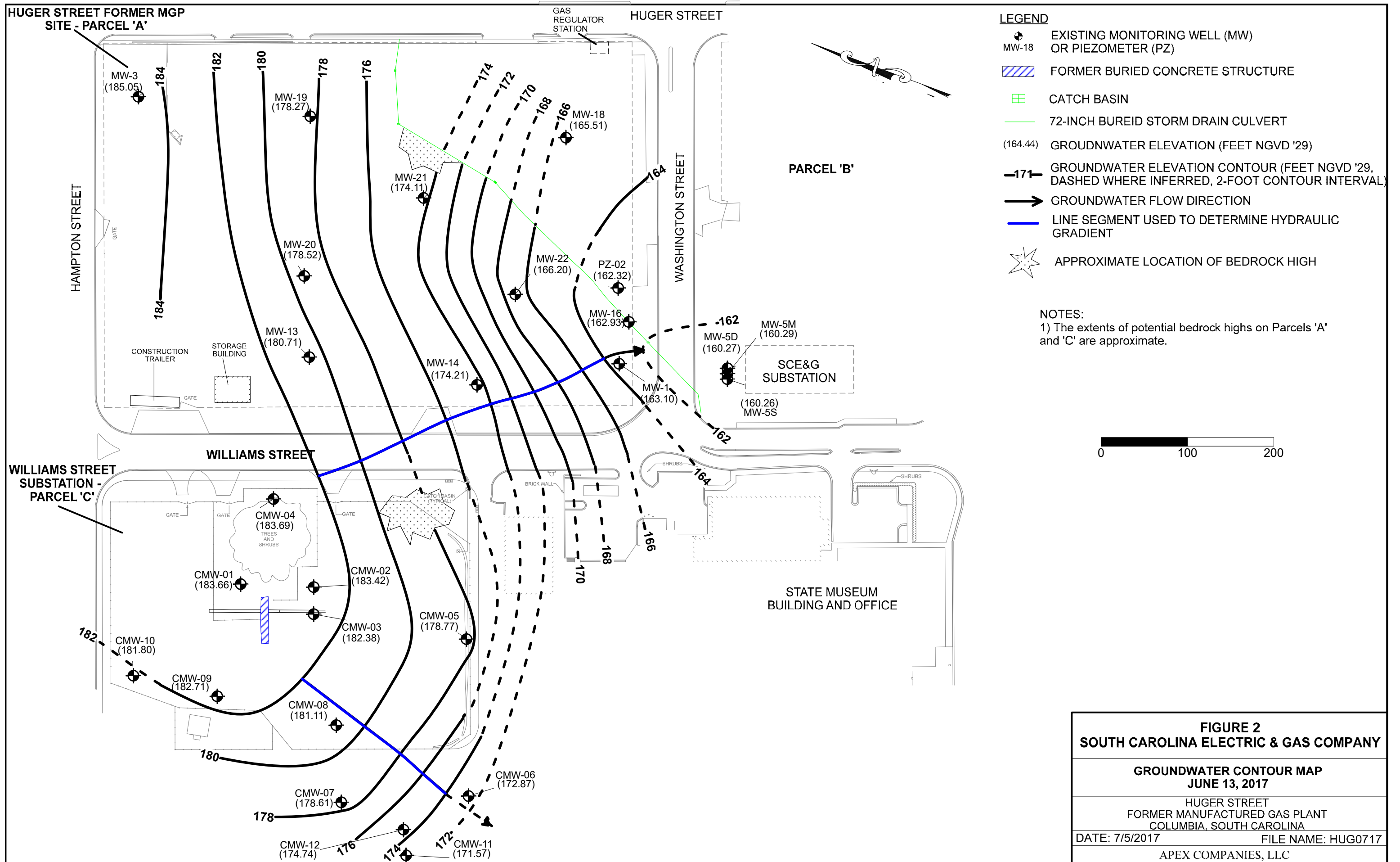


FIGURE 2
SOUTH CAROLINA ELECTRIC & GAS COMPANY
GROUNDWATER CONTOUR MAP
JUNE 13, 2017
 HUGER STREET
 FORMER MANUFACTURED GAS PLANT
 COLUMBIA, SOUTH CAROLINA
 DATE: 7/5/2017 FILE NAME: HUG0717
 APEX COMPANIES, LLC

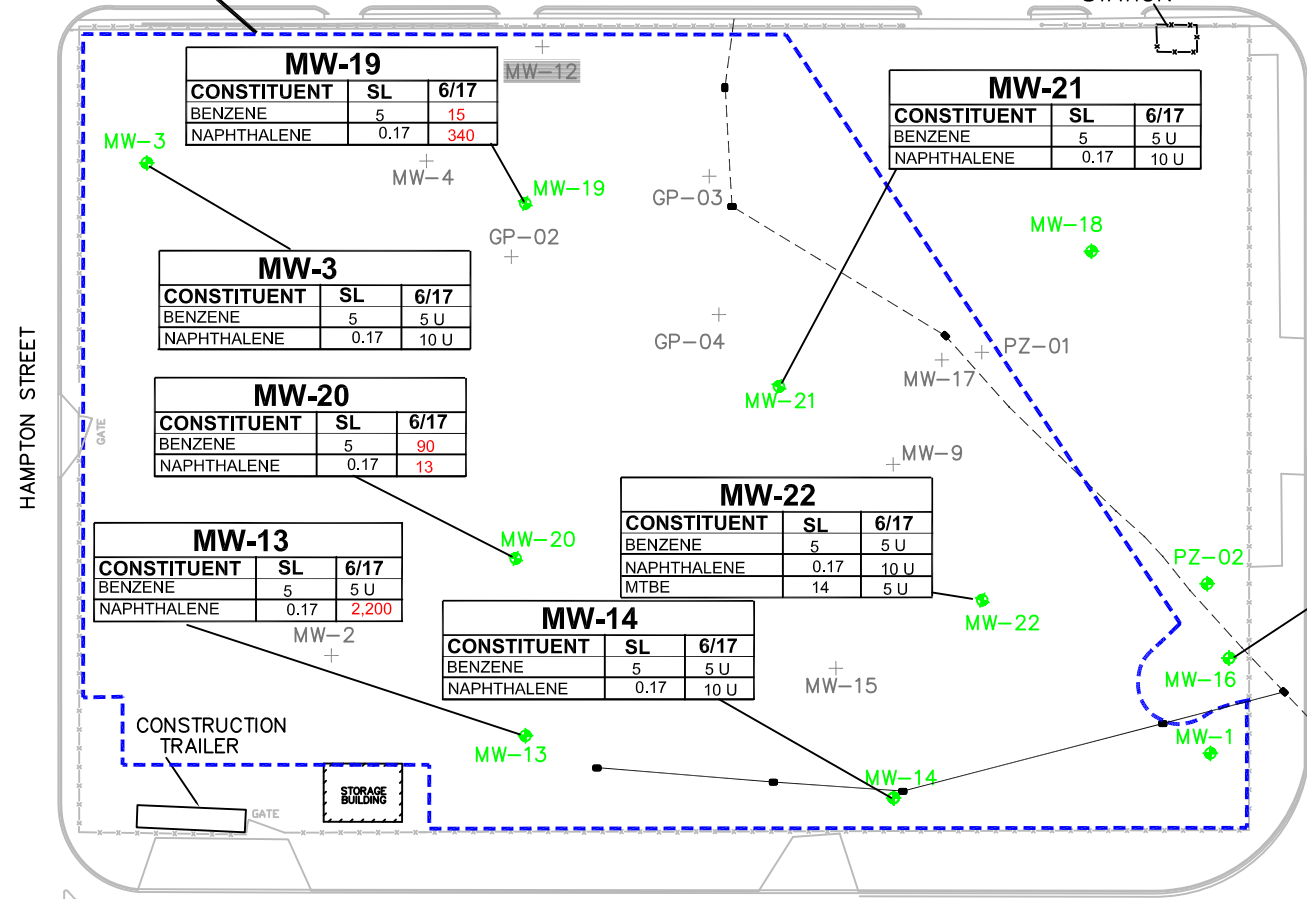
HUGER STREET FORMER MGP SITE - PARCEL 'A'

GAS REGULATOR STATION
HUGER STREET

LEGEND

- EXISTING MONITORING WELL (MW) OR PIEZOMETER (PZ)
- ABANDONED WELL/PIEZOMETER/SOIL BORING/DIRECT PUSH LOCATION
- CATCH BASIN
- 72-INCH BURIED STORM DRAIN CULVERT
- PARCEL "A" APPROXIMATE EXCAVATION AREA
- BURIED CONCRETE STRUCTURE
- PARCEL "C" UTILITY TRENCH AND PIPES
- PARCEL "C" APPROXIMATE EXCAVATION AREA
- PARCEL "C" ADDITIONAL PIPE REMOVAL EXCAVATION AREA
- PARCEL "C" PORTION LEFT IN PLACE TO SUPPORT FIBER OPTIC CONDUIT

- NOTES:**
- 1) ALL RESULTS ARE IN UG/L.
 - 2) MTBE - METHYL TERT-BUTYL ETHER
 - 3) SL - SCREENING LEVEL
 - 4) NA - NOT ANALYZED
 - 5) GROUNDWATER SCREENING VALUES ARE THE SCDHEC MAXIMUM CONTAMINANT LEVELS (MCL) IN DRINKING WATER (R.61-58, 2009). IF A SCDHEC DRINKING WATER STANDARD IS NOT AVAILABLE FOR A PARTICULAR CONSTITUENT, THE GROUNDWATER SCREENING LEVEL IS THE U.S. EPA REGION 9 REGIONAL SCREENING LEVEL (RSL [JUNE 2017]) FOR TAPWATER WHERE CARCINOGENS ARE BASED ON A 1 X 10⁻⁶ RISK AND NON-CARCINOGENS ARE BASED ON A HAZARD QUOTIENT OF 1.



MW-16

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U
MTBE	14	5 U

MW-5D

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U
MTBE	14	5 U

MW-5M

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U
MTBE	14	5 U

MW-5S

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U
MTBE	14	33

PARCEL "C"
WILLIAMS STREET
SUBSTATION

WILLIAMS STREET

CMW-04

CONSTITUENT	SL	6/17
BENZENE	5	25 U
NAPHTHALENE	0.17	2,000

CMW-01

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U

CMW-02

CONSTITUENT	SL	6/17
BENZENE	5	6.9
NAPHTHALENE	0.17	420

CMW-03

CONSTITUENT	SL	6/17
BENZENE	5	130
NAPHTHALENE	0.17	2,400

CMW-08

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	11

CMW-07

CONSTITUENT	SL	6/17
BENZENE	5	7.1
NAPHTHALENE	0.17	10 U

CMW-12

CONSTITUENT	SL	6/17
BENZENE	5	5 U
NAPHTHALENE	0.17	10 U

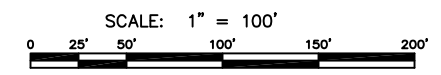


FIGURE 3
SOUTH CAROLINA ELECTRIC & GAS COMPANY
ANALYTICAL RESULTS - JUNE 2017
HUGER STREET
FORMER MANUFACTURED GAS PLANT SITE
COLUMBIA, SOUTH CAROLINA
DATE: 8/18/17 FILE NAME: HUG080
APEX COMPANIES, LLC

HUGER STREET FORMER MGP SITE - PARCEL 'A'

GAS REGULATOR STATION
HUGER STREET

PARCEL 'B'

LEGEND

- EXISTING MONITORING WELL (MW) OR PIEZOMETER (PZ)
- ABANDONED WELL/PIEZOMETER/SOIL BORING/DIRECT PUSH LOCATION
- CATCH BASIN
- 72-INCH BURIED STORM DRAIN CULVERT
- PARCEL 'A' APPROXIMATE EXCAVATION AREA
- BURIED CONCRETE STRUCTURE
- PARCEL 'C' UTILITY TRENCH AND PIPES
- PARCEL 'C' APPROXIMATE EXCAVATION AREA
- PARCEL 'C' ADDITIONAL PIPE REMOVAL EXCAVATION AREA
- PARCEL 'C' PORTION LEFT IN PLACE TO SUPPORT FIBER OPTIC CONDUIT
- INTERIM REMOVAL ACTION (2009 - 2011)

GP02/MW-19

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	1400	R	50 U	32	25	17	6.6	15
NAPHTHALENE	0.17	4000	A	900	900	1,100	1,400	470	340

GP-04/MW-21

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	590	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	59	A	10 U	10 U	10 U	10 U	10 U	10 U

MW-15/MW-22

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.1 U	A	10 U	10 U	10 U	10 U	10 U	10 U
MTBE	14	NA		5 U	5 U	5 U	5 U	5 U	5 U

MW-3

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	7.8	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.1 U	A	10 U	10 U	10 U	10 U	10 U	10 U

MW-20

CONSTITUENT	SL	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	290	230	260	170	130	90
NAPHTHALENE	0.17	85	78	62	44	28	13

MW-13

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	25 U	R	25 U	50 U	5 U	NA	25 U	5 U
NAPHTHALENE	0.17	4200	A	2,300	2,400	3,100	2,200	2,900	2,200

MW-16

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.1 U	A	10 U	10 U	10 U	10 U	10 U	10 U
MTBE	14	16		8.2	5.3	5.9	5.0	5 U	5 U

MW-5D

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.2 U	A	10 U	10 U	10 U	10 U	10 U	10 U
MTBE	14	13		5 U	5 U	5 U	5 U	5 U	5 U

MW-5M

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.2 U	A	10 U	10 U	10 U	10 U	10 U	10 U
MTBE	14	16		20	8.8	7.2	6.7	5.4	5 U

MW-5S

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.1 U	A	10 U	10 U	10 U	10 U	10 U	10 U
MTBE	14	49		90	90	58	58	42	33

MW-14

CONSTITUENT	SL	8/09	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	5.1 U	A	10 U	10 U	10 U	10 U	10 U	10 U

CMW-04

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	83	R	100 U	44	57	24	36	25 U
NAPHTHALENE	0.17	2,800	A	2,400	2,100	1,700	3,300	3,100	2,000

CMW-02

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	66	R	25 U	9.9	6.9	9.7	5 U	6.9
NAPHTHALENE	0.17	810	A	640	400	490	680	400	420

CMW-03

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	95	R	97	100	120	110	160	130
NAPHTHALENE	0.17	1,900	A	2,000	2,300	2,800	2,900	3,100	2,400

CMW-08

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	130	R	64	7.6	6.4	5 U	5 U	5 U
NAPHTHALENE	0.17	1,200	A	810	130	170	20	26	11

CMW-12

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	10 U	A	10 U	10 U	10 U	10 U	10 U	10 U

CMW-01

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	5 U	R	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.17	27	A	10 U	10 U	10 U	10 U	10 U	10 U

CMW-07

CONSTITUENT	SL	7/12	I	9/13	6/14	3/15	12/15	9/16	6/17
BENZENE	5	8	R	16	19	26	5 U	6.7	7.1
NAPHTHALENE	0.17	10 U	A	46	10 U	10 U	10 U	10 U	10 U

- NOTE:
- 1) ALL RESULTS ARE IN UG/L.
 - 2) MTBE - METHYL TERT-BUTYL ETHER
 - 3) SL - SCREENING LEVEL
 - 4) NA - NOT ANALYZED
 - 5) THE MOST RECENTLY AVAILABLE DATA WAS USED AS THE "PRE-REMOVAL" DATA. DATA IS PRESENTED IN APPENDIX B.
 - 6) GROUNDWATER SCREENING VALUES ARE THE SCDHEC MAXIMUM CONTAMINANT LEVELS (MCL) IN DRINKING WATER (R.61-58, 2009). IF A SCDHEC DRINKING WATER STANDARD IS NOT AVAILABLE FOR A PARTICULAR CONSTITUENT, THE GROUNDWATER SCREENING LEVEL IS THE U.S. EPA REGION 9 REGIONAL SCREENING LEVEL (RSL [JUNE 2017]) FOR TAPWATER WHERE CARCINOGENS ARE BASED ON A 1 X 10⁻⁶ RISK AND NON-CARCINOGENS ARE BASED ON A HAZARD QUOTIENT OF 1.

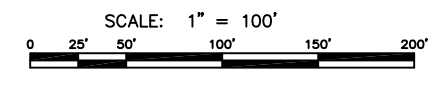


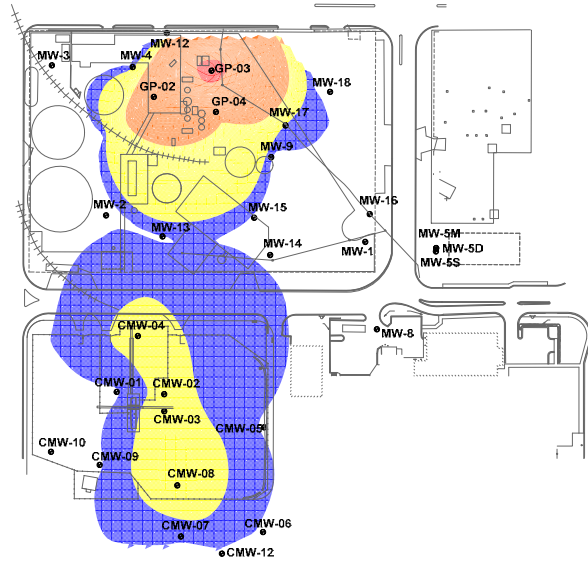
FIGURE 4
SOUTH CAROLINA ELECTRIC & GAS COMPANY
SUMMARY OF PRE- AND POST-REMOVAL ACTION
GROUNDWATER ANALYTICAL RESULTS
HUGER STREET
FORMER MANUFACTURED GAS PLANT SITE
COLUMBIA, SOUTH CAROLINA
DATE: 8/17/17 FILE NAME: HUG081
APEX COMPANIES, LLC

LEGEND

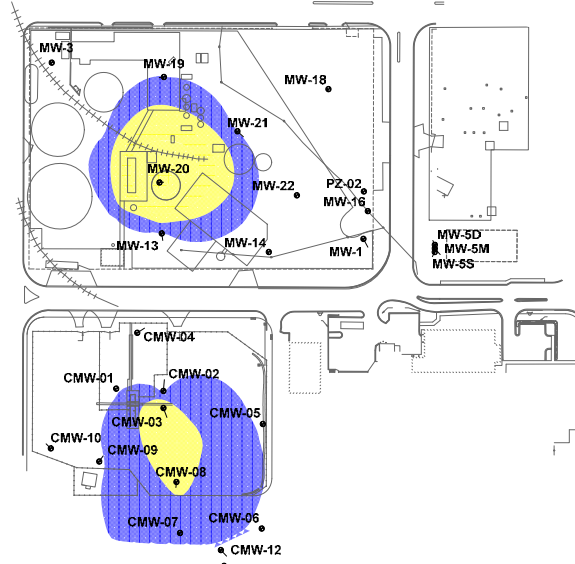
Concentration Ranges:



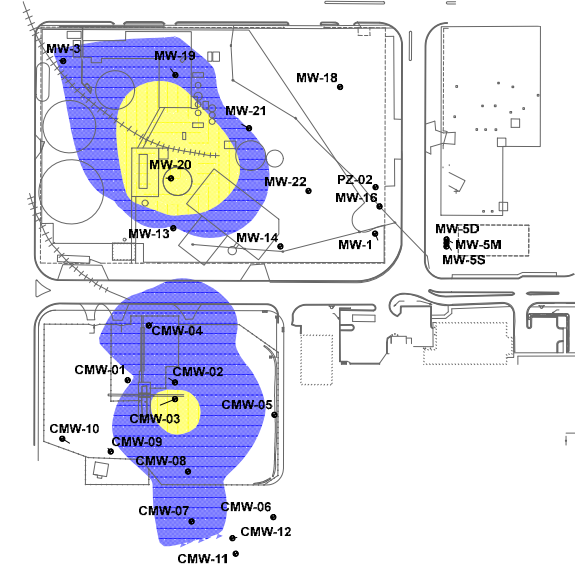
Note: Due to "numeric dispersion" the boundary extent shown may be overstated.



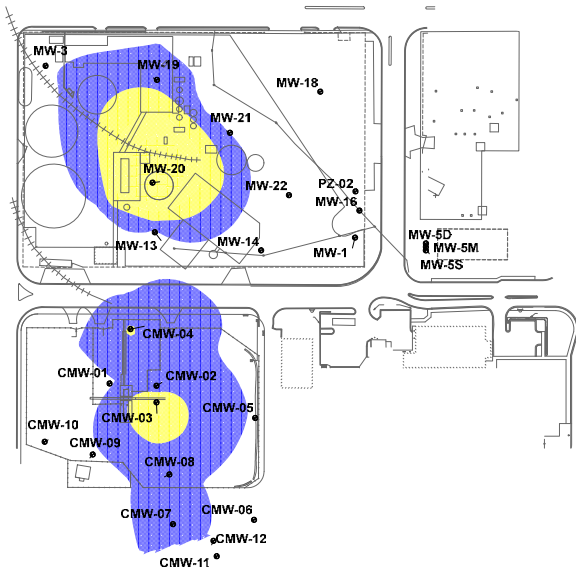
PRE-EXCAVATION (PARCEL "A" - AUGUST 2009 AND PARCEL "C" - JULY 2012)



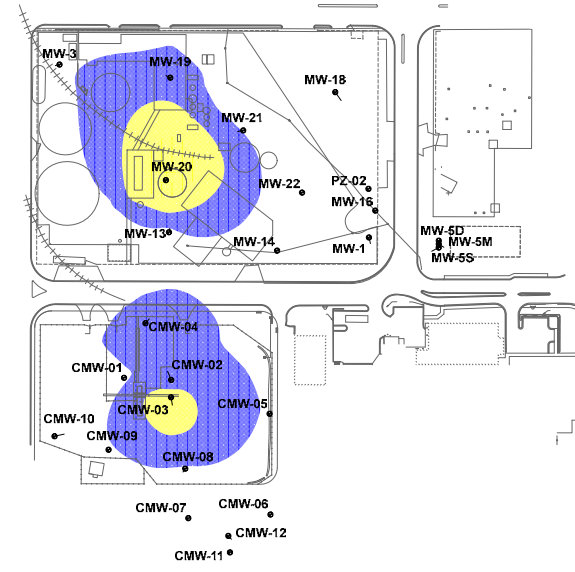
POST-EXCAVATION (SEPTEMBER 2013)



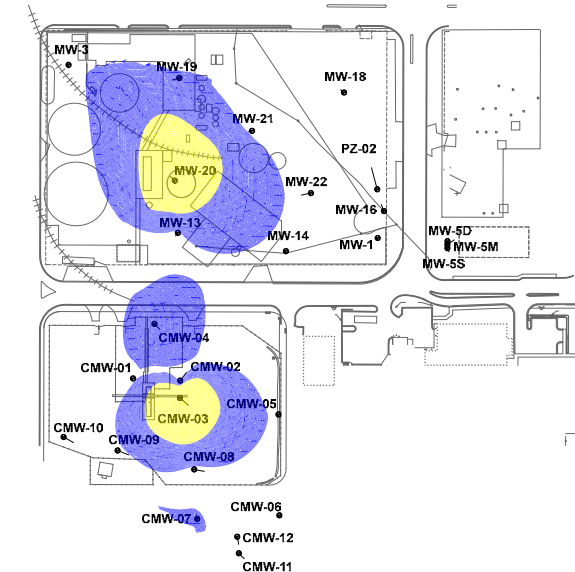
POST-EXCAVATION (JUNE 2014)



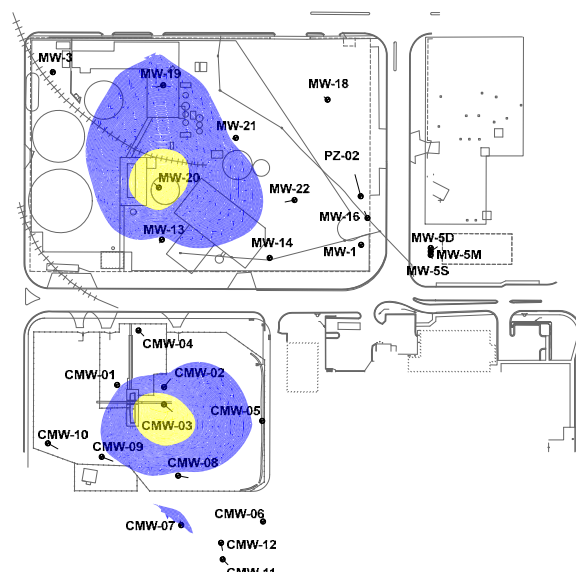
POST-EXCAVATION (MARCH 2015)



POST-EXCAVATION (DECEMBER 2015)



POST-EXCAVATION (SEPTEMBER 2016)



POST-EXCAVATION (JUNE 2017)

FIGURE 5
SOUTH CAROLINA
ELECTRIC & GAS COMPANY
ILLUSTRATION OF PRE- AND
POST-EXCAVATION BENZENE
CONCENTRATIONS
HUGER STREET
FORMER MANUFACTURED GAS PLANT
COLUMBIA, SOUTH CAROLINA
 DATE: 8/17/2017 FILE NAME: BENZENE 0617
 APEX COMPANIES, LLC