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Good morning Jan,

The June 2020 pilot-remediation interim report for the Woven Electronics site is available via the following link. A hard-copy has been sent to you via priority mail.

Report:
https://www.dropbox.com/s/jbngy2qppgb180b/BEA%20414-26%202020%2006%20Pilot%20Scale%20Remediation%20Report.pdf?dl=0

The reference articles on biogenic iron from the reference section are available in the link below.
References:
https://www.dropbox.com/sh/je9ony1ncrklj3t/AAAcYi38JWOOuRXWyDBQI3vVa?dl=0

Please don't hesitate to contact me to discuss the report.

Rob

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SITE ASSESSMENT,
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PILOT-SCALE REMEDIATION
INTERIM REPORT

WOVEN ELECTRONICS CORPORATION
1001 OLD STAGE ROAD
SIMPSONVILLE, SOUTH CAROLINA 29681

VCC #13-6203-RP
BLWM TECHNICAL FILE #418096

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JUNE 23, 2020

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PILOT-SCALE REMEDIATION
INTERIM REPORT

WOVEN ELECTRONICS CORPORATION
1001 OLD STAGE ROAD
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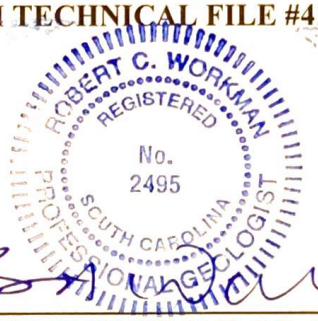

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JUNE 23, 2020

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1.0 INTRODUCTION

This Pilot Study Interim Report (the "Pilot-Study") was prepared by CRB Geological & Environmental Services, Inc. (CRB) on behalf of B/E Aerospace, Inc. (BEA) for the Woven Electronics Corporation (WEC) manufacturing facility located at 1001 Old Stage Road, in Simpsonville, Greenville County, South Carolina (the "Site"). This document was prepared in accordance with the requirements of the Voluntary Cleanup Contract (VCC), signed on May 19, 2014 between BEA and the South Carolina Department of Health & Environmental Control (SCDHEC).

A description of the pilot-scale remediation implementation was previously presented in the *Pilot-Scale Remediation Interim Report, December 20, 2019*. Additional groundwater sampling results were presented in *Pilot-Scale Remediation Interim Report, March 25, 2020.* This interim report summarizes the pilot-scale remediation outcome and results from sampling on April 15, 2020.

The objective of pilot-scale remediation at the Site was to determine and evaluate technical aspects of remediation technologies as part of recommendations in a Feasibility Study (FS) for the Site. This report summarizes the effectiveness of the pilot-scale sub-slab soil vapor extraction (SVE) and in-situ bioremediation through enhanced reductive dichlorination (ERD).

This report is organized into five (5) sections. Figures, tables, charts, and the appendix are included after the report text. Section 1.0 provides the introduction and summary of results. Section 2.0 describes the results from monitoring and sampling during pilot-scale remediation. An overview of abiotic reductive dechlorination and the geology at the Site is presented in Section 3.0 and the interim conclusions and recommendations from pilot-scale remediation can be found in in Section 4.0. Literature references are included as Section 5.0.

1.1 INTERIM PILOT-SCALE REMEDIATION SUMMARY

The primary contaminant of concern was confirmed as tetrachloroethene (PCE) in groundwater and soil vapor, and no other contaminants were measured above cleanup or screening limits during the monitoring period. Summaries of the remedial trends for the pilot-scale Sub-Slab SVE and In-Situ Bioremediation are presented below. A Site map is presented as Figure 1, followed by a Site diagram showing pilot scale remediation areas as Figure 2.

Sub-Slab SVE Results

Based on the April 2020 sampling results, operation of the pilot-scale sub-slab SVE achieved rapid reduction of sub-slab soil vapor concentrations of PCE below the Vapor Intrusion Screening Level (VISL) and exerted pressure control over a large footprint to mitigate vapor intrusion concerns. Single SVE well ZOI was demonstrated to be more than thirty (30) feet and combined well ZOI extended to the building perimeter.

Corresponding decreases in groundwater concentrations were not observed in the sub-slab monitoring wells MW-10S, MW-10I and MW-17, suggesting that continued operation of SVE with additional vapor extraction wells should be considered until the removal of all sub-slab source material is completed.

In-Situ Bioremediation Results

The pilot-scale remediation demonstrated sustained remediation of PCE in the groundwater treatment zone to concentrations below the MCL from a one-time, low-cost bioremediation injection. Geochemical parameters in the pilot-scale bioremediation area were indicative of long-lasting reducing conditions that resulted from the one-time bioremediation injection. Strongly anaerobic conditions and elevated concentrations of ferrous iron continued to be observed in monitoring wells MW-4 and MW-4T, and negative oxidation reduction potential (ORP) in MW-4 are favorable indicators of reducing conditions.

The geochemical and analytical results support bioremediation via biogenic reduced iron as a feasible approach for lasting plume treatment. A detailed discussion of the abiotic mechanisms and supporting geological findings is presented in Section 3.0.

Favorable results were sustained in the pilot-scale bioremediation area near MW-4 through April 2020. Concentrations of PCE in groundwater decreased and remained at a concentration of 1.0 ug/L, below the MCL, in the shallow and intermediate depth interval near MW-4. No accumulation of the partial degradation compounds trichloroethene (TCE), vinyl chloride or cis-1,2-dichloroethene were detected, indicating that complete and sustained dechlorination of PCE has occurred in this area.

The concentration of PCE in the aquifer transition zone above the bedrock MW-4T decreased from 65.3 ug/L to 21.2 ug/L through April 2020, and is consistent with the previous finding that the bioremediation injection zone marginally influenced the screened interval at MW-4T. No contaminants were detected in the bedrock water-bearing zone near MW-4D.

The pilot-scale remediation revealed the technical requirement to target the transition zone water-bearing zone using controlled vertical spacing over the injection interval. The use of temporary injection points as opposed to injection wells was validated as a lower cost option through the pilot-study.

Groundwater Plume Trend

The overall extent and magnitude of groundwater concentrations across the Site decreased through April 2020, and the downgradient areas of the plume continued to attenuate. and the plume margins remained delineated. Concentrations in the sub-slab source area remained generally unchanged with PCE in the range of 300 ug/L. Downgradient from the pilot-scale injection area, concentrations of PCE decreased in the intermediate depth interval of monitoring well MW-6I. The decreasing trend at MW-6I was attributed to the arrival of migrating reducing conditions from the upgradient pilot-study remediation area near MW-4.

1.2 SITE DESCRIPTION

The Site is located in an industrial area northwest of Simpsonville, South Carolina. The property consists of one (1) 16.4-acre parcel identified by the Greenville County Property Assessor as Parcel Number 0303000100300. A Site Location Map using the Mauldin, SC and Simpsonville, SC USGS topographic base maps is included as Figure 1. The Site was developed in 1963 from vacant

land and has been used for weaving and electronics manufacturing processes since that time. The area surrounding the facility is characterized by industrial or manufacturing facilities and vacant, undeveloped land. The interior of the facility consists of offices, a shipping area, storage, assembly, and weaving. A Site Map showing the areas of pilot-scale remediation is included as Figure 2.

1.3 PILOT-SCALE REMEDIATION WORKPLAN

In a letter dated October 31, 2017, CRB and WEC proposed pilot-scale remediation at the Site consisting of three (3) field technology applications as follows:

- Soil Vapor Extraction (SVE) - Sub-Slab Source Area treatment evaluation
- Enhanced Reductive Dechlorination (ERD) – Groundwater plume treatment evaluation
- Air Sparging / Soil Vapor Extraction (AS/SVE) – Downgradient plume treatment evaluation

The pilot-scale remediation was approved by SCDHEC in a letter dated May 9, 2018. A permit to operate for the UIC Permit was provided in correspondence dated July 31, 2018, and a one-time bioremediation injection event was initiated. Startup of air sparging and soil vapor extraction (AS/SVE) pilot-scale remediation was deferred to evaluate bioremediation in the downgradient area of the Site. A diagram of the pilot-scale remedial system is shown as Figure 2.

A summary of the pilot-scale implementation was presented in the report prepared by CRB *Pilot-Scale Remediation Interim Report, December 20, 2019*. Groundwater sampling results from January 2020 were presented in the report prepared by CRB *Pilot-Scale Remediation Interim Report, March 25, 2020*. This report was prepared in response to SCDHEC correspondence (Appendix I) reviewing the previous report.

2.0 PILOT-SCALE REMEDIATION RESULTS

The effectiveness of the pilot-scale remediation was evaluated based on soil vapor analytical results, groundwater analytical results, and geochemical parameters since the last groundwater sampling event prior to system startup. A discussion of the remedial system performance is presented below.

2.1 SUB-SLAB SOIL VAPOR SAMPLING AND EVALUATION

Sub-slab vapor samples were collected from the SVE system for laboratory analysis in September 2018, November 2018, March 2019, January 2020, and April 2020. Sub-slab soil vapor measurements are presented in Table 1, and a diagram of the SVE layout and Zone of Influence (ZOI) is presented as Figure 3. A cross-section diagram of the SVE pilot-scale system is shown as Figure 4. A summary of analytical results and field screening readings for the sub-slab SVE system are included in Table 1.

2.1.1 SVE Operation Parameters

The pilot-scale SVE operates using an electric regenerative blower at a nominal vacuum of approximately 42 inches of water column (INW) in four (4) vadose zone vapor extraction wells (SVE-1 through SVE-4), with a combined flow rate of approximately 28 cubic feet per minute (CFM). The wells are screened from eight to eighteen (8-18) feet below the building slab. During operation, no extraction of entrained water or particulates was observed until May 2020 when moisture was identified in the inlet particulate filter.

As previously reported, operation of the SVE system exerts vacuum of 0.1 INW to a distance more than 30-feet from each of the vapor wells. The combined pressure field extends to the southern and western building edges.

2.1.2 Soil Vapor Sampling

The field vapor screening was performed using a portable Organic Vapor Analyzer (OVA) equipped with a Photoionization Detector (PID) and a 10.6 electron volt (eV) lamp calibrated for detection of chlorinated VOCs. Soil vapor sampling using an OVA/PID is subject to error resulting from humidity, which is considered in the system performance evaluation. Sampling with the OVA/PID involves collecting a vapor sample directly from the vapor well inlet piping. After closing the SVE vacuum blower valve to the vapor well, a sample valve from the piping is opened allowing the OVA/PID to extract vapor from the inlet. A reading is collected in volumetric parts per million (ppmV) after a stabilized measurement is observed.

Laboratory analytical samples were collected using sealed canister sampling protocol. Sampling was through an in-line, three-way tee-valve was installed in the gas pump inlet line with one (1) connection to a 1.4-liter pre-cleaned SUMMA® canister. The canisters were equipped with a 0.2 LPM flow regulator that was opened when the three-way valve was closed to the atmosphere. Once the canister vacuum was exhausted the sampling valve was closed and resealed.

After sampling, the sample canisters were delivered under chain of custody to Analytical Environmental Services in Atlanta, Georgia for laboratory analysis of VOCs by EPA method TO-15. The results of the sampling are included in Table 1. Laboratory analytical reports and chains of custody records are included as Appendix II.

2.1.3 Soil Vapor Analytical Results

Below follows a summary of sub-slab vapor reductions during the pilot-scale remediation operation. As of April 2020, PCE was reduced below the Commercial VISL of 1,570 micrograms per cubic meter (ug/m^3). Chart 1 shows PCE concentrations in each of the four SVE wells from installation to April 2020.

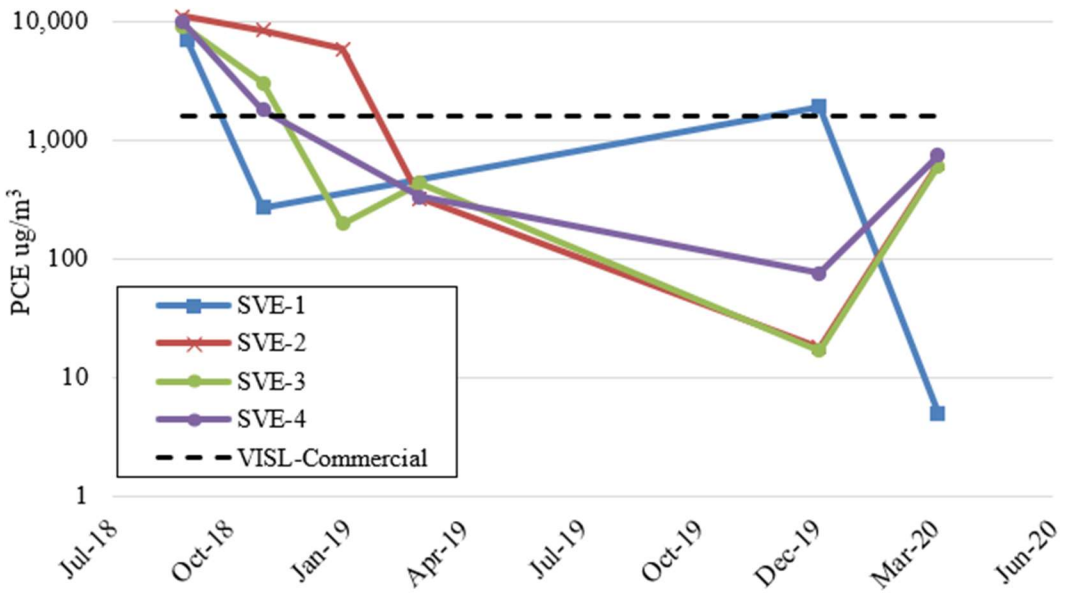

Chart 1 – Soil Vapor Extraction Concentrations - PCE

SVE-1 – SVE-1 is a perimeter extraction point located approximately 30-feet west of the area of highest sub-slab soil vapor concentrations.

> The concentration of PCE in SVE-1 decreased below the laboratory detection limit of 6.8 ug/m^3 in April 2020, down from 270 ug/m^3 in November 2018. The previously reported concentration of PCE at 1,900 ug/m^3 in January 2020 was inconsistent with historic conditions. Within the first month of operation the OVA measurements in SVE-1 decreased from 7.4 ppmV to the instrument detection limit of 0.1 ppmV.

SVE-2 – SVE-2 is located near the former exterior building wall and dock door in the area of highest soil vapor concentration and is nearest to an unidentified sub-slab source of PCE in the soil.

Based on sub-slab soil vapor sampling and SVE sampling, OVA measurements decreased from 13 ppmV to 0.3 ppmV, and PCE decreased 94% from 11,000 ug/m^3 to 18 ug/m^3 between September 2018 and January 2020. The rate of OVA reduction in SVE-2 was more gradual than in the other vapor extraction wells. These observations are consistent with the close proximity to source material in the vadose zone.

The reported concentration of PCE in SVE-2 increased from 18 ug/m^3 to 630 ug/m^3 between January 2020 and April 2020, although OVA measurements decreased during the same period. Similar results were observed in SVE-3 and SVE-4, and the increase in PCE was not consistent with the overall decreasing trend at the Site.

SVE-3 – SVE-3 is located near the former exterior building wall and dock door approximately 30-feet south of SVE-1.

Since startup, PCE decreased 80% from 3,000 ug/m^3 on November 2, 2018 to 17 ug/m^3 as of January 2020. Based on the reduction pattern, SVE-3 was estimated to be distant from source material.

The reported concentration of PCE in SVE-3 increased from 17 ug/m^3 to 600 ug/m^3 between January 2020 and April 2020, although OVA measurements decreased during the same period. Similar results were observed in SVE-2 and SVE-4, and the increase in PCE was not consistent with the overall decreasing trend at the Site.

SVE-4 – SVE-4 is located along the former exterior building wall approximately 60-feet south of SVE-1. Based on the relatively lower concentrations reported, SVE-4 is a perimeter extraction well.

Since SVE startup, PCE decreased from 1,800 ug/m^3 on November 2, 2018 to 75 ug/m^3 as of April 2020 and is below the VISL. Based on the reduction pattern, SVE-4 is estimated to be more distant from source material than SVE-1 or SVE-3. Operation of SVE-4 demonstrated capture of sub-slab vapors and depressurization to the eastern boundary of the building footprint.

The reported concentration of PCE in SVE-4 increased from 75 ug/m^3 to 740 ug/m^3 between January 2020 and April 2020, although OVA measurements decreased during the same period. Similar results were observed in SVE-2 and SVE-3, and the increase in PCE was not consistent with the overall decreasing trend at the Site.

2.1.4 SVE Evaluation

During the pilot-scale remediation period, the sub-slab blower operated continuously from August 2018 through April 2020 and demonstrated effective vapor removal and vapor control. Vapor concentrations were reduced below the commercial VISL within 180-days of operation, and near or below detection limits as of April 2020.

The extent of SVE influence was measured through sub-slab vacuum measurements under operating conditions and demonstrated an ZOI of at least 30-feet during pilot-scale remediation and sub-slab depressurization. The combined ZOI from four (4) SVE wells covered the footprint of the contaminated zone.

Based on the favorable removal of PCE mass and control of the soil vapor over a large area, the pilot-scale SVE system demonstrated feasibility for source removal and mitigation of any exposure hazard from vapor intrusion.

2.2 GROUNDWATER SAMPLING AND EVALUATION

This section summarizes field measurements and groundwater analytical results from samples collected through April 2020. The groundwater analytical results from this event are discussed relative to historical groundwater concentrations observed at the Site.

Groundwater sampling was performed in April 2020. A summary of monitoring well construction details is included as Table 2. Groundwater elevation measurements through April 2020 are included as Table 3. Groundwater elevations increased by up to four (4) feet due to increased seasonal precipitation. Groundwater laboratory analytical results through April 2020 are presented as Table 4.

2.2.1 Groundwater Elevation Measurement

Depth to water measurements were collected using an electronic gauge prior to sample collection at each monitoring well. Groundwater elevations were calculated based on the well casing elevation survey as shown in Table 3. Groundwater flows in the direction of topographic relief to the southwest towards the creek discharge zone. Groundwater elevations in April 2020 increased by up to four (4) feet since January 2020.

2.2.2 Groundwater Sampling

CRB personnel collected groundwater samples from select on-site monitoring wells after purging at least one (1) well volume of groundwater using a peristaltic pump. The wells were purged using USEPA Region IV low-flow sampling protocol until physical parameters including pH, temperature, turbidity, dissolved oxygen, and conductivity stabilized. Field measurements of ORP, sulfate, and ferrous iron were also collected during sampling. After purging, groundwater samples were collected through new, disposable polyethylene tubing with a peristaltic pump. Groundwater sampling worksheets are included in Appendix III.

Groundwater samples were collected for analysis of Volatile Organic Compounds (VOCs) and Total Organic Carbon (TOC) and microbiology analysis for reducing bacteria were collected following groundwater purging. Chemical analytical samples were submitted to Pace National Laboratory of Mt. Juliet, Tennessee using EPA Method 8260 and EPA Method 9060 respectively. Copies of VOC and TOC laboratory analytical reports and chains of custody are included as Appendix IV. Microbiology analytical samples were submitted to Microbial Insights, Inc. in Knoxville, TN for quantitative Polymerase Chain Reaction (qPCR) of target DNA molecules. Microbiology laboratory analytical reports and chain of custody are included as Appendix V.

2.2.3 Groundwater Analytical Results

The following discussion presents the observations and evaluation of changes in contaminant concentrations for specific areas of the Site. A summary of current and historical groundwater concentrations is presented in Table 4. Geochemical analytical results, including field parameter measurements and TOC laboratory analysis are summarized in Table 5. A detailed evaluation of geochemistry, microbiology, and contaminant trends is discussed in Section 3.4.

Source Area

The source area at the Site is approximated based on an area of elevated soil vapor and groundwater concentrations near the monitoring well MW-10 cluster and former exterior wall loading door. No known spill or source material was identified. Chart 2 shows the concentration trend of PCE in the source area wells over time.

MW-10S – Sampling from MW-10S represents the capillary fringe or water table interface sample. Concentrations of PCE increased from 196 µg/L in January 2020 to 323 µg/L in April 2020.

MW-10I – PCE concentrations in this intermediate zone well increased from 248 µg/L in January to 308 µg/L in April 2020.

MW-10T – PCE remained BDL through April 2020 in this transition zone well that defines the vertical extent of concentrations below the building slab.

Plume Area

The Plume Area defines the horizontal and vertical extent of concentrations near the building perimeter and includes the MW-4 cluster. Bioremediation injections were performed in this area on August 9, 2018. Chart 3 shows the trend of PCE concentrations in the plume area wells over time.

MW-1 – The MW-1 cluster includes shallow well MW-1S and transition zone well MW-1T located near the northwest corner of the building. PCE concentrations remained BDL in both wells in January 2020 and defines the northern extent of PCE concentrations.

MW-2 – PCE concentrations in low-flow samples collected at a depth of 20 feet decreased to 2.5 µg/L in January 2020, while PCE in samples collected at 40 feet decreased to 1.4 µg/L.

MW-3 – PCE concentrations remained BDL in January 2020 and defined the southern plume boundary.

MW-4 – Shallow to intermediate depth interval, PCE concentrations remained relatively unchanged at 1.0 µg/L through April 2020 and remained below the MCL since September

2018. The sustained decrease in concentrations is consistent with anaerobic reducing conditions. The concentration of TOC, representing the bioremediation substrate, decreased from 2,430 mg/L to 29.1 mg/L between March 2019 and April 2020, which is not unexpected as untreated groundwater flushes through the treatment zone.

MW-4T – Transition zone interval, PCE decreased from 65.3 µg/L in January 2020 to 21.2 µg/L in April 2020. No TOC was detected in MW-4T

MW-4D – Bedrock well, PCE remained BDL through March 2019 and defined the vertical extent of PCE downgradient from the building.

MW-5 – Shallow well, PCE decreased from 31.4 µg/L in January to 21.7 µg/L in April 2020.

MW-23S – Shallow well, PCE remained relatively unchanged along the southern building footprint at 4.7 µg/L in January 2020.

Downgradient Area

The downgradient groundwater plume represents the area of PCE concentrations near the property boundary and creek discharge area. This area includes the vertical definition cluster wells at MW-6 and MW-9. Chart 4 and Chart 5 show the PCE concentrations in the downgradient and boundary wells over time.

MW-6S – PCE concentrations decreased from 30.4 µg/L in January 2020 to 16.5 µg/L in April 2020. Ferrous iron increased from 0.75 mg/L in January to 1.0 mg/L in April 2020 and was considered an indicator of the arrival of upgradient bioremediation influence.

MW-6I – PCE concentrations decreased from 216 µg/L in January 2020 to 122 µg/L in April 2020, continuing an overall downward trend. Ferrous iron was increasing and was measured at 1.0 mg/L in April 2020. The increasing ferrous iron concentrations was considered an indicator of upgradient bioremediation conditions migration.

MW-6T – PCE concentrations decreased from 186 µg/L in January 2020 to 181 µg/L in April 2020. Ferrous iron was detected at 1 mg/L in both January and April 2020.

MW-6D – Bedrock concentrations of PCE were measured at 29 µg/L in April 2020. Ferrous iron decreased from 3.0 mg/L in January 2020 to 1.5 mg/L in April 2020.

MW-9S – PCE concentrations decreased from 39 µg/L in January 2020 to 21 µg/L in April 2020.

MW-9T – PCE concentrations decreased from 45.6 µg/L in January 2020 to 13.4 µg/L in April 2020.

MW-9D – Bedrock concentrations of PCE were measured at 31.5 µg/L in April 2020.

MW-13 – PCE concentrations remained BDL in April 2020.

MW-14 – PCE concentrations were measured at 10.3 µg/L in April 2020 at this northern plume definition well.

MW-15 – PCE concentrations remained near the MCL and increased to 7 µg/L in January 2020 in this downgradient definition well.

2.2.4 Microbiology Analytical Results

A summary of microbiological analysis comparing the qPCR results from April 2019 and April 2020 is included as Table 6. The results were reviewed in consideration that no bioaugmentation was performed as part of the pilot-scale remediation. The results reflect changes in native microbe populations in response to the bioremediation substrate injection at MW-4 in 2018. The observed increase in *methanogen* populations is favorable as it shows the geochemical conditions exist that support for abiotic dechlorination by biogenic reduced iron (Heimann et al 2006).

Treatment Area at MW-4 - Shallow to Intermediate Depth Interval
Population counts of the sulfate reducers increased slightly from $1.9x10^4$ cells per milliliter (ct/mL) to $3.6\ x10^4$ ct/mL. Methanogens decreased slightly from $9.6x10^4$ ct/mL to $4.9x10^4$ ct/mL. Based on an analytical database maintained by Microbial Insights, sulfate reducers and methanogens were above average concentrations in the 59th and 88th percentile, respectively. The stable populations of these native reducing bacteria were consistent with favorable anaerobic reducing conditions and sustained ferrous iron observed in the treatment area.

The population of *DHC* decreased from $7.2x10^1$ ct/mL to $5x10^{-1}$ ct/mL, while *Geobacter* decreased from $2.1\ x10^3$ ct/mL to $1.1x10^0$ ct/mL. The low populations of *DHC* and *Geobacter* were not considered to be viable populations for biological reductive dechlorination.

Treatment Area at MW-4T – Transition Zone Depth Interval
Sulfate reducers increased substantially from $1.9x10^1$ cells per milliliter (ct/mL) to $2.1\ x10^4$ ct/mL, and were reported to be above average in the 54th percentile of similar samples. Methanogens increased from $1.0x10^{-1}$ ct/mL to a marginal population of $1.2x10^1$ ct/mL. The observed population growth of native reducing bacteria supported the increasing ferrous iron measured at MW-4T, although the onset of anaerobic reducing conditions was not observed.

The population of *DHC* and *Geobacter* measured in MW-4T reported near the detection limits and were not considered to be viable populations for biological reductive dechlorination. A marginal increase in *Geobacter* was reported from $5.0x10^{-1}$ ct/mL to $2.2x10^1$ ct/mL.

Upgradient Source Area at MW-10I – Intermediate Zone Depth Interval
Sulfate reducers increased from below the detection limit of $4.5x10^0$ ct/mL to a marginal population of $3.8x10^3$ ct/mL. No other reducing bacteria were measured in MW-10I.

Downgradient Area at MW-6I – Intermediate Zone Depth Interval

No reducing bacteria were measured in MW-6I. The absence of detectable reducing bacteria populations in not unexpected considering the aerobic and oxidized geochemistry in the downgradient area.

3.0 ABIOTIC REDUCTIVE DECHLORINATION

In this section abiotic reductive dechlorination and indicator parameters are discussed as an evaluation a mechanism for groundwater remediation observed at the Site. The discussion presents a review of literature and Site observations as updates the Site Conceptual Model (SCM) in terms of iron mineralogy, geochemical reducing conditions, and biological factors.

3.1 REDUCTIVE DECHLORINATION PATHWAYS

The bioremediation injections performed as part of the pilot-remediation was proposed with two (2) anticipated mechanisms, biological reduction and abiotic reduction that are described below.

3.1.1 Biological Reductive Dechlorination

The widely recognized pathway of reductive dechlorination involves a bacterial metabolism under anaerobic conditions whereby chlorine is stripped from the ethene molecules as an energy source and replaced with a hydrogen ion. The process of *dehalorespiration* is a chlorine exchange that is evidenced through a progression of chlorinated ethenes from tetrachloroethene to trichloroethene, dichloroethene, chloroethene, and then ethene. Although bacteria-facilitated reductive dechlorination remains viable for the Site, and has been demonstrated at many similar cleanup projects, the results of the pilot-scale remediation did not provide sufficient evidence of *dehalorespiration*. Bioaugmentation with the dehalogenating bacteria *dehalococcoides* would be required to achieve effective treatment through this approach.

3.1.2 Abiotic Reductive Dechlorination by Biogenic Reduced Iron

The second mechanism that was presented in the pilot-study proposal abiotic reductive dechlorination via *biogenic reduced iron*. Biogenic reduced iron is bioremediation that consists of a biological start with an abiotic ending. The biogenic iron pathway begins with the same bioremediation injection substrate used in biological reductive dechlorination that leads to bacterial iron mineral reduction, followed by the abiotic chemical reduction of chlorinated ethenes.

In the abiotic mechanisms, methanogens, sulfate, and iron reducing bacteria are activated through bioremediation injections and fermentation of the electron donor. Native populations of reducing bacteria modify available iron minerals to active state including ferrous iron (Fe^{2+}), iron sulfate (FeS), green rust (GR), and magnetite capable of reductive degradation pathways (He et al., 2015). The chlorinated ethenes are degraded by contact with iron as opposed to bacterial metabolism. The abiotic reductive dechlorination pathways and application to the Site conditions are described in detail in the subsequent sections.

3.1.3 Abiotic Reductive Dechlorination by Zero Valent Iron

The familiar application of Zero Valent Iron (ZVI) for in-situ remediation functions through the same abiotic reductive dechlorination as biogenic reduced iron. A key difference is that the biogenic iron mechanism modifies the iron minerals that are already present in the aquifer, as opposed to artificial placement of zero valent iron. The abiotic chemical degradation processes facilitated in both biogenic reduced iron and ZVI remediation are discussed in detail in Section 3.3.

Since the late 1990s, researchers have gained knowledge of the abiotic reduced iron mechanism and a general order of reducing strength for different iron species has been shown as:

- Ferrous sulfide (FeS) > ZVI (Fe (0) > iron sulfide (pyrite) > ferrous iron (Fe^{2+}) > magnetite = green rust > biotite = vermiculite

The implementation of ZVI normally involves injection or placement of small particles or nano-scale elemental iron into the aquifer, usually as a permeable barrier fence. The iron particles are introduced as a strong reducing agent that reacts to quickly degrade elevated concentrations of PCE, TCE and other chlorinated ethenes through the process of beta-elimination under very strong reducing conditions and the less efficient process of hydrogenolysis under weaker reducing conditions (Gavaskar et al., 2005).

During ZVI injection, oxidation reduction potential (ORP) in groundwater is designed to reach the range of -400 mV. The effect of microbial facilitated reduced iron is similar, although the ORP ranges more typically into the -100 to -200 mV range. In CRB's experience, it is not uncommon to measure ORP as low as -250 mV where abundant electron donor material has been injected. Stronger reducing conditions are necessary to treat source concentrations of PCE and TCE in ranges above 10 milligrams per liter (mg/L), while the mildly reducing conditions of biogenic reduced iron have been shown to successfully achieve degradation of lower concentrations of PCE and TCE in the microgram per liter range, including the concentrations observed at the Site in the range of 10 ug/L to 400 ug/L.

The technical feasibility and cost of placing ZVI, whether nanoscale or raw material, is high and disruptive due to the close injection spacing or trenching required. The comparative cost is lower using liquid electron donor substrate versus ZVI. Additionally, placement at deeper treatment intervals is more feasible using a liquid injection substrate.

3.2 IRON MINERAL EVALUATION

This section presents a description of iron mineralogy at the Site from published geological information, research literature, and CRB's Site observations that supports the mechanism of abiotic reductive dechlorination via biogenic reduced iron.

Based on a review of South Carolina Geological Survey information, Geology at the Site is comprised of Cambrian to Neoproterozoic-age bedrock of the Six Mile thrust sheet and the Laurens thrust stack. The Site is located on the southeast margin of the Six Mile thrust sheet near the contact with the Laurens thrust stack. Lithologies from both structural units are present at the Site, with an upper biotite gneiss underlain by sillimanite-mica schist, as shown in Figure 12. Other formations described in the vicinity of the Site include granite gneiss and amphibolite (Maybin, 2003). Based on drilling log observation and creekbank exposures, the overburden has been observed as saprolite with distinct foliation and metamorphic structures that are relict weathered featured of the parent gneiss.

The mineralogy of amphibolite at the Site is of interest regarding the potential of abiotic degradation of chlorinated solvents due to the abundant iron content and secondary alteration products of the unit. The amphibolite is comprised of amphibole group minerals including plagioclase feldspar, and biotite with accessory quartz and magnetite. Although magnetite was determined to be present in small quantities (see Section 3.2.1), there is abundant available iron in the clay complex biotite present in the amphibolite.

The biotite, hydrobiotite, and vermiculite contain structural iron and have a high cation exchange capacity that sorb ferrous iron to mineral surfaces using electrostatic forces. The high cation exchange is essential in the yield of adequate reduced iron for reductive dechlorination. When evaluated based on surface area, it was found that biotite and vermiculite had greater reactivity than magnetite and less reactivity than pyrite (He et al. 2009). Rate constants of chlorinated solvent degradation on biotite and vermiculite reported by Kreigman-King and Reinhard (1992) and Neumann et al. (2009) showed that when concentrations of structural iron were normalized the reactivity of structural iron that comprises the lattice of biotite and vermiculite was comparable to the reactivity of structural iron found in magnetite and pyrite.

Lee and Batchelor (2004) reported that chlorinated ethene degradation rate constants increased up to two times higher in the presence of 0.15 to 4.28 millimoles/gram of ferrous iron. This finding suggests that the degradation rate constants increased with the concentration of ferrous iron, although the rates for sorbed ferrous iron are lower than other reduced iron species.

3.2.1 Laboratory Analysis for Magnetic Susceptibility in Soil

Magnetite is a common iron ore mineral that exhibits ferrimagnetic characteristics. Magnetite is a primary source of available iron in some settings, and has been reviewed in literature as a source of biogenic reduced iron and abiotic reductive dechlorination. To evaluate the weathered soil at the Site for the magnetite content, CRB collected and submitted two (2) soil samples collected from the on-site creek bank exposure for analysis of magnetic susceptibility. The samples were collected using hand core equipment in the eroded saprolite cliff exposure at the western property boundary. The samples were submitted to Microbial Insights in Knoxville, Tennessee for analysis of magnetic susceptibility using a proprietary laboratory method.

The results of the magnetic susceptibility indicated little to no magnetite present in the saprolite and is not unexpected. A copy of the laboratory report is included in Appendix VI. The determination that magnetite is not a primary iron species at the Site indicates that the observed ferrous iron and biogenic reduced iron mechanism is more likely attributed to iron-rich clay minerals, including the abundant biotite present in the saprolite.

3.3 ABIOTIC DEGRADATION BY REACTIVE IRON MINERALS

When adequate reducing conditions are present in the aquifer, minerals such as magnetite and biotite facilitate the abiotic reduction of chlorinated solvents (He 2015). Studies have shown that by promoting this in-situ remediation method, environmental impacts such as greenhouse gas emissions can be decreased, cost of operation and maintenance can be minimized, and overall investment is lower (Wiedemeier et al. 2017).

There are two (2) major pathways in which abiotic degradation can occur: reductive elimination and hydrogenolysis. Hydrogenolysis occurs when a carbon-chlorine bond is broken and the chlorine is replaced with hydrogen, and two electrons are added to the molecule. Reductive elimination is the most common pathway for chlorinated solvents and involves two (2) electrons being transferred and two (2) chlorine atoms being eliminated from the target molecule.

Reductive elimination is the preferred pathway because it reaches the end product of ethene without the accumulation of harmful intermediate compounds TCE, DCE and vinyl chloride (He et al. 2009). The following diagram summarizes abiotic pathways facilitated by ZVI an biogenic reduced iron.

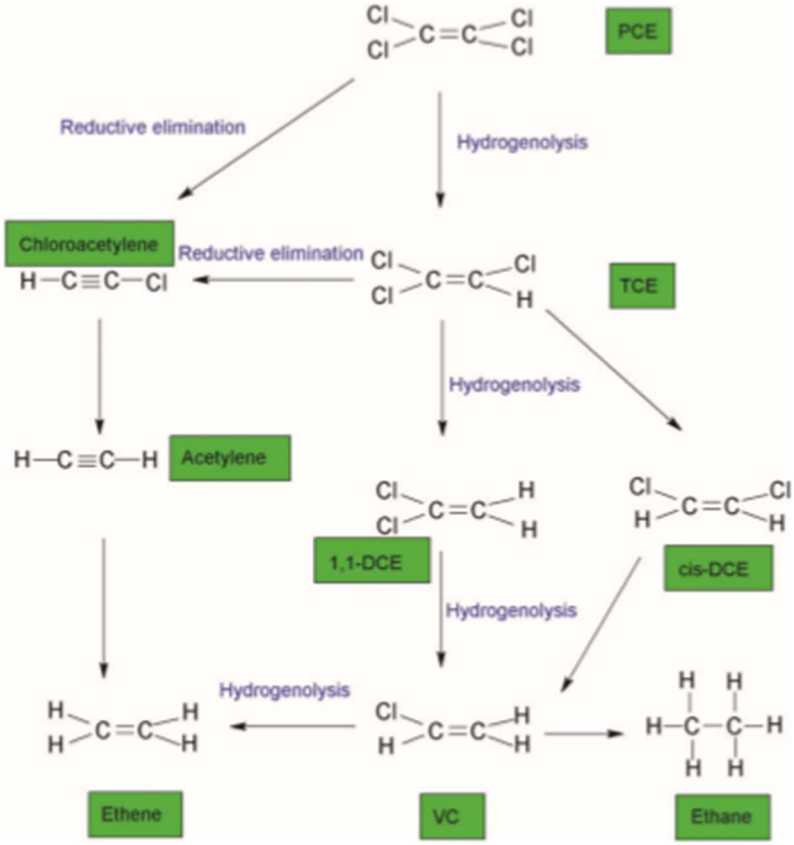

Diagram of chlorinated ethene degradation pathways and products (from He et al. 2009)

The observed increase in *methanogen* populations at the Site as described in Section 2.2.4 is favorable since this demonstrates that geochemical conditions exist to support abiotic dechlorination by biogenic reduced iron (Heimann et al 2006).

In summary, the iron-rich clay minerals present at the Site are conducive to an abiotic reductive dechlorination mechanism described in the literature, most likely by reductive elimination of PCE to acetylene and ethene. The increasing concentrations of ferrous iron in dissolved groundwater samples following bioremediation injections, together with the observed and sustained degradation of PCE with no intermediate ethene compounds is consistent with biogenic reduced iron chemistry.

3.4 GEOCHEMISTRY INDICATOR PARAMETERS

Geochemical parameters were evaluated through the pilot-study including pH, dissolved oxygen (DO), oxidation reduction potential (ORP), ferrous iron, nitrate, and sulfate. When the current Site geochemical conditions are evaluated together with groundwater contaminant elimination, the results are indicative of the abiotic degradation pathway through biogenic reduced iron. Below is a summary of indicator parameters for reductive dechlorination with a description of observations in bioremediation pilot-scale wells.

pH - After a pH buffered electron donor has been added to the groundwater, it would be expected to see an increased pH level where naturally acidic conditions prevail. The bioremediation substrate used in the pilot-scale injection was NewmanZone™, a buffered substrate with a pH of 7.0 and injected using anoxic tap water. which should increase the pH of the groundwater and as this increase occurs, it allows for higher rates of abiotic reductive dechlorination due to the increase in deprotonated iron species that are present at higher pH levels (Butler et al 2009). Conway et al. (1980) showed that at higher pH levels, electron transfer can happen at a faster rate.

*Dissolved Oxyge*n - Oxygen is an abundant electron acceptor that buffers reductive dechlorination. Decreasing concentrations of dissolved oxygen indicate the onset of anaerobic conditions. Below 0.5 mg/L anaerobic groundwater conditions favor abiotic and biological reductive dechlorination.

ORP - Measurements of ORP prior to injections and post injection is important because a decrease from positive to negative values indicates more reductive conditions and an abundance of electrons. A more negative ORP favors reducing conditions.

Ferrous Iron - An increase in ferrous iron, the soluble form of reduced iron, is a favorable measurement of induced iron reducing conditions. The presence of ferrous iron is a fundamental indicator of biogenic reduced iron available from the formation and confirms the availability of in-situ reactive iron species.

Sulfate and Nitrate - A decrease in sulfate demonstrates stronger reducing conditions. This decrease indicates that sulfate in the groundwater is being reduced and including possible production of hydrogen sulfide, which facilitates conditions for solvent reduction (Butler 1999). Similarly, decreasing nitrate is favorable from the baseline because this indicates that the reducing chemistry for denitrification is occurring.

3.5 PILOT-SCALE REMEDIATION EVALUATION

This section presents a comprehensive review of reductive dechlorination indicators over time beginning with the one-time pilot-scale bioremediation injection upgradient from MW-4 in August 2018. The evaluation includes geochemical field parameters, geological factors, and laboratory analysis of contaminant concentrations over time. The overall trends are consistent with abiotic reductive dechlorination.

MW-4 – Screened across the shallow and intermediate depth zones

- PCE decreased and remained below USEPA MCL Standards, and no accumulation of intermediate compounds has been observed. Upgradient concentrations of PCE in the source area remained generally unchanged in the 300 ug/L range and presumably migrate into the pilot-scale remediation area. Therefore, the sustained remediation of PCE show favorable plume-cutoff treatment from a one-time bioremediation injection.
- pH increased from 4.7 prior to injections, to 6.1 after injection, consistent with the distribution of buffered neutral substrate in the formation. The higher pH values are more conducive to abiotic reductive dechlorination.
- DO decreased and remained at 0.0 since December 2018, and demonstrate stable, long-lasting anaerobic conditions were established from a one-time injection. Background oxygen at the Site is strongly aerobic, and the lasting anaerobic zone demonstrates adequate consumption of oxygen demand stimulated by the bioremediation substrate injection in August 2018.
- Sulfate remained BDL, indicating that background sulfate reducing demand was consumed in the pilot-study treatment zone.
- Ferrous iron increased from <0.5 mg/L prior to injections to 7.0 mg/L in April 2020, which is indicative of strong microbial activity and production of biogenic reduced iron from background iron clay minerals such as biotite.
- Microbial sulfate reducers increased by 16,900 cell counts/mL from April 2019 to April 2020. This increase is consistent with the increase in ferrous iron and demonstrates that activation of a strong microbial population through bioremediation injections.

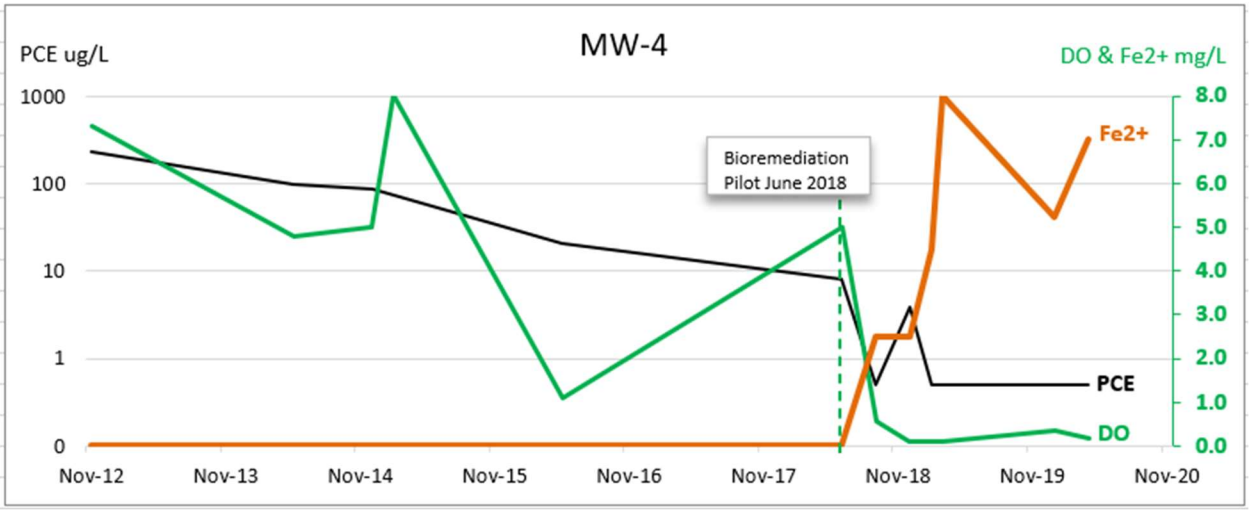

Chart 6 – Groundwater Geochemical Parameters

MW-4T – Screened across the transition depth zone

- PCE exhibited an overall decreasing trend from 74.4 µg/L in September 2018 to 21.2 µg/L in April 2020, and no accumulation of intermediate compounds have been observed. Although the bioremediation injections did not migrate into the transition zone depth interval, the effects of reductive dechlorination are evident.
- pH increased from 5.7 to 6.0 since August injection, which is an indication that bioremediation injections influenced this depth interval.
- DO remained aerobic, decreasing only to 5 mg/L shortly after the bioremediation injection. The fluctuation in DO is consistent with upgradient background groundwater migration into the treatment zone.
- Sulfate decreased from 4.8 mg/L in May 2016 to <1 mg/L in April 2020, which is a strong indication that reducing conditions are increasing near the pilot-scale treatment zone.
- Ferrous iron increased to 2.0 mg/L. This delayed increase may be related to vertical migration of reducing conditions into the transition zone water-bearing zone. The presence of ferrous iron confirms availability of iron clay minerals in this zone.
- Sulfate reducers increased by 20,700 cell counts/mL from April 2019 to April 2020, consistent with the ferrous iron increase and an expanding, sustained effect of biological reducing conditions.

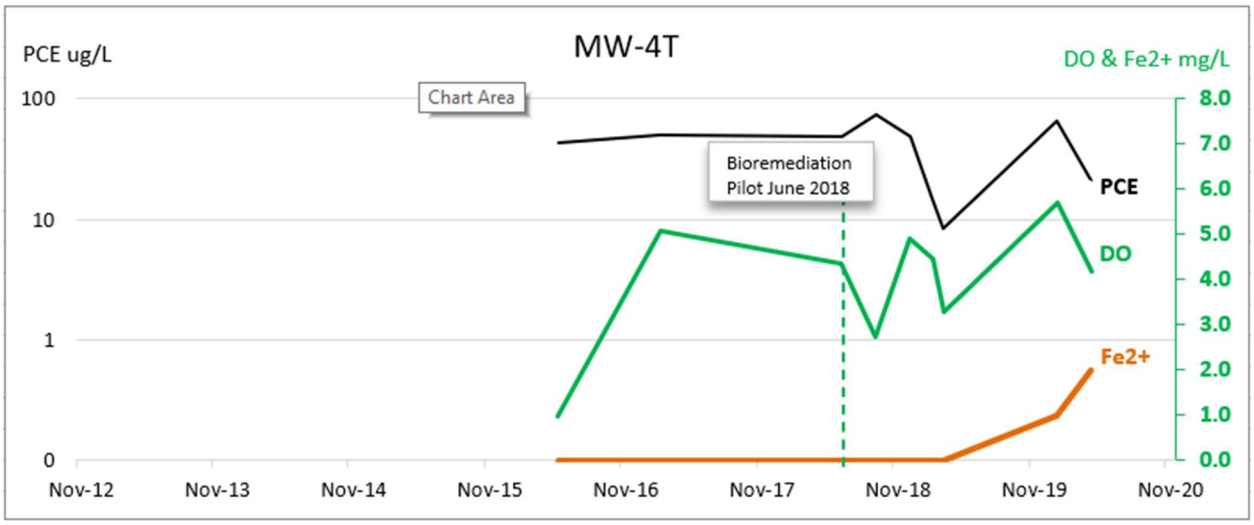

Chart 6 – Groundwater Geochemical Parameters

MW-6I – Screened across the intermediate depth zone

- PCE decreased from 259 µg/L in May 2016 to 122 µg/L in April 2020. During the same period, the concentration of PCE did not decrease in the upgradient source area wells at MW-10, and in the downgradient well cluster at MW-9. Considering the overall plume conditions, the decrease in PCE at MW-6I was attributed to upgradient PCE remediation in the pilot-scale remediation area at MW-4.
- pH remained relatively stable since the August 2018 injection, with no indication of bioremediation substrate migration from the upgradient pilot-scale injection.
- DO decreased following the injections but increased to 6.9 ppm in April 2020.
- Sulfate remained BDL.
- Ferrous iron increased in January 2020, and as of April 2020 was measured at 1.0 mg/L, suggesting the onset of reducing conditions may be arriving at the MW-6 cluster, consistent with travel time for groundwater migration at the Site.
- No concentrations of reducing bacteria were measured at MW-6I. As the treated groundwater migrates from the injection area, it is expected to see an increase in sulfate reducers and in response, a greater increase in ferrous iron.

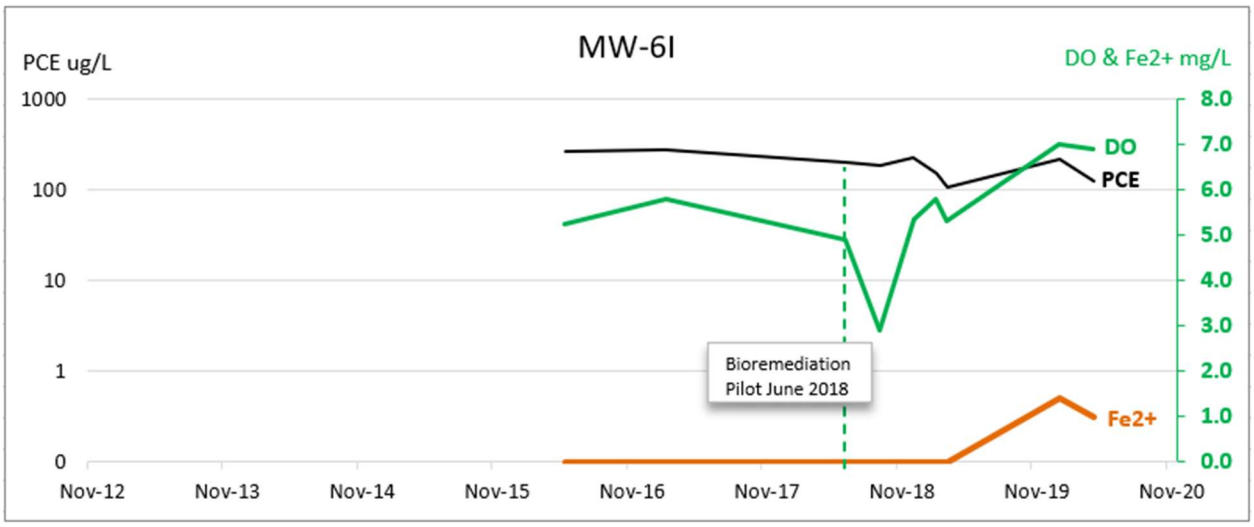

Chart 6 – Groundwater Geochemical Parameters

4.0 CONCLUSIONS AND RECOMMENDATIONS

Groundwater and soil vapor sampling performed in April 2020 was performed to evaluate sub-slab SVE and in-situ bioremediation performed as part of pilot-scale remediation at the Site. A discussion of the result and recommendations are presented below.

4.1 SUB-SLAB SVE

The pilot-scale SVE system demonstrated effective operation to control vapor intrusion and reduce sub-slab concentrations of PCE. Based on the favorable removal of PCE mass and control of soil vapors over a large area, the pilot-scale SVE system demonstrated feasibility for source removal and mitigation of vapor intrusion concerns.

With regard to vadose zone source material removal, vapor phase mass removal was nearly complete in the area of the four (4) SVE wells. Placement of additional SVE wells should be considered to ensure removal of any other areas of residual PCE in the vadose zone, particularly across the capillary fringe.

It is recommended that the use of SVE should continue to operate to control sub-slab soil vapor concentrations until a permanent groundwater remediation plan is approved and implemented. Vapor intrusion is controlled, and a staged approach for any additional SVE well placement is recommended to minimize business disruption.

4.2 GROUNDWATER BIOREMEDIATION

The pilot-scale bioremediation injections demonstrated sustained reduction of PCE in the groundwater treatment zone to concentrations below the MCL. Elimination of PCE with no accumulation of TCE, DCE or vinyl chloride indicate that complete and sustained dechlorination of PCE occurred in pilot-scale remediation area near MW-4 even though upgradient source area concentrations remained elevated.

4.2.1 Abiotic Reductive Dechlorination via Biogenic Reduced Iron

The geochemical and laboratory analytical results from the pilot-scale remediation support a finding that abiotic reductive dechlorination bioremediation is occurring at the Site via biogenic reduced iron. As discussed in Section 3.0, the pathway of biogenic reduced iron is bioremediation that has a biological start with an abiotic ending.

A review of numerous research publications provides the rationale that the iron-rich clay minerals present at the Site are conducive to abiotic reductive dechlorination, most likely by reductive elimination of PCE to acetylene and ethene. In this mechanism, the use of biogenic reduced iron facilitates the same abiotic remediation that is achieved by the more familiar, but also more costly implementation of ZVI for in-situ abiotic reductive dechlorination.

4.2.2 Injection Interval Control

Injected bioremediation fluid did not migrate from the intermediate depth interval into the adjoining deeper transition zone, and so the pilot-scale revealed the technical requirement to target

bioremediation injections using vertical interval control specifically within the transition zone water-bearing zone. The longevity of reducing effects from a one-time bioremediation injection validated the use of injection points as opposed to injection wells as a lower cost bioremediation injection method.

4.3 CONCLUSION

The results of the pilot-scale remediation provided sufficient technical information to prepare a Feasibility Study for the Site. With approval from SCDHEC, a Feasibility Study will be prepared to evaluate available treatment technologies for a Remedial Action Plan.

5.0 REFERENCES

Butler, E. et al. (2009) *Abiotic Reductive Dechlorination of Tetrachloroethylene and Trichloroethylene in Anaerobic Environments.* Department of Defense Strategic Environmental Research and Development Program (SERDP), www.researchgate.net. Date accessed: June 8, 2020.

Butler, E.C. and K.F. Hayes. (1999) *Kinetics of the Transformation of Trichloroethylene and Tetrachloroethylene by Iron Sulfide.* Environmental Science and Technology, 33: 2021-2027.

CRB Geological & Env. Services. (2014). *Conceptual Site Model, Woven Electronics, 1001 Old Stage Road, Simpsonville, SC, 29681.*

He Y.T, Wilson J.T., Su, C. and Wilkin R.T. (2015) *Review of Abiotic Degradation of Chlorinated Solvents by Reactive Iron Minerals in Aquifers.* Groundwater Monitoring & Remediation, 35(3): 57-75.

He Y.T. et al. (2009) *Identification and Characterization Methods for Reactive Minerals Responsible for Natural Attenuation and Chlorinated Organic Compounds in Ground Water.* Environmental Protection Agency, www.epa.gov/ada. Date accessed: June 15, 2020.

Heimann, A. et al. (2006) *Methanosarcina spp. Drive Vinyl Chloride Dechlorination via Interspecies Hydrogen Transfer.* Applied and Environmental Microbiology, 72(4): 2942–2949.

Gavaskar, A, Tatar, L, Condit, W. (2005) *Cost and Performance Report Nanoscale Zero-Valent Iron Technologies for Source Remediation.* Report CR-05-007-ENV, Naval Facilities Engieering Command.

Kriegman-King, M.R. and M Reinhard. (1992) *Transformation of Carbon Tetrachloride in the Presence of Sulfide, Biotite, and Vermiculite.* Environmental Science & Technology 26: 2198-2206.

Lee, W. and B. Batchelor. (2004) *Abiotic Reductive Dechlorination of Chlorinated Ethylenes by Iron-Bearing Phyllosilicates*. Chemosphere 56: 999-1009.

Lee, W. and B. Batchelor. (2002) *Abiotic Reductive Dechlorination of Chlorinated Ethylenes by Iron-Bearing Soil Minerals. 2. Green Rust.* Environmental Science and Technology, 36: 5348-5354.

Lu, X., Wilton J.T., Kampbell, D.H. (2006) *Relationship between Geochemical Parameters and the Occurrence of Dehalococcoides DNA in Contaminated Aquifers*, Water Resources Research, Vol. 42.

Maybin, A.D., (2003) *OFR-149 - Geologic Map of the Mauldin Quadrangle, Greenville County, South Carolina*. South Carolina Geological Survey

Microbial Insights. *Evaluating Potential for Abiotic Degradation.* www.microbe.com. Date accessed: June 12, 2020.

Neumann, A. et al. (2009) *Reduction of Polychlorinated Ethanes and Carbon Tetrachloride by Structural Fe(II) in Smectites.* Environmental Science & Technology 43: 4082-4089.

Wiedemeier, T.H. et al. (2017) *Providing Additional Support for MNA by Including Quantitative Lines of Evidence for Abiotic Degradation and Co-metabolic Oxidation and Chlorinated Ethylenes.* Department of Defense Environmental Security Technology Certification Program (ESTCP). www.researchgate.com . Date accessed: May 14, 2020.

FIGURES

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Figure 9 – Transition Zone Groundwater Concentration Diagram
Figure 10 – Deep Groundwater Concentration Diagram
Figure 11 – Bioremediation Trends 2018-2020
Figure 12 – Site Geologic Map Detail

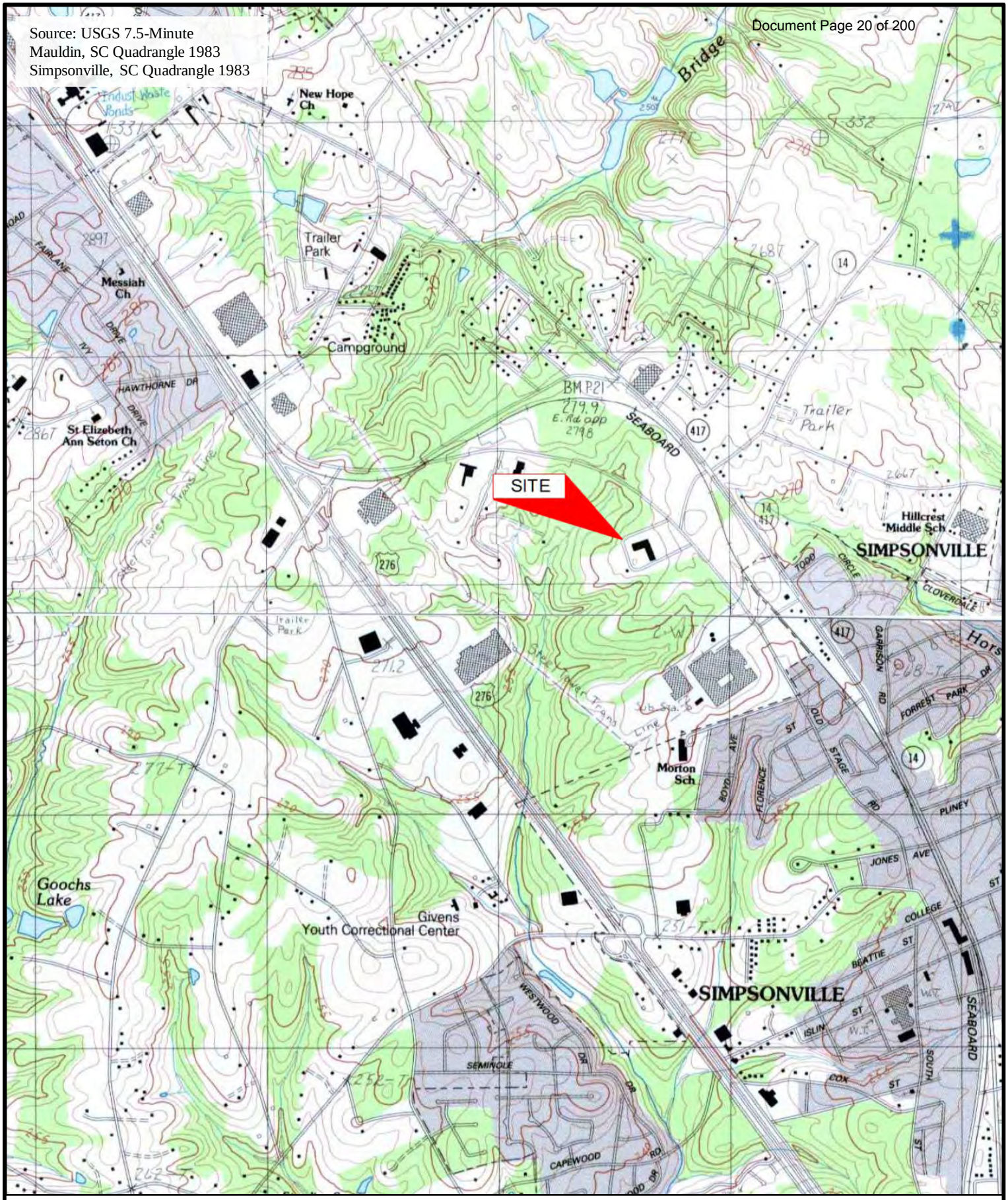

Figure 1

Site Location Map
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville, South Carolina

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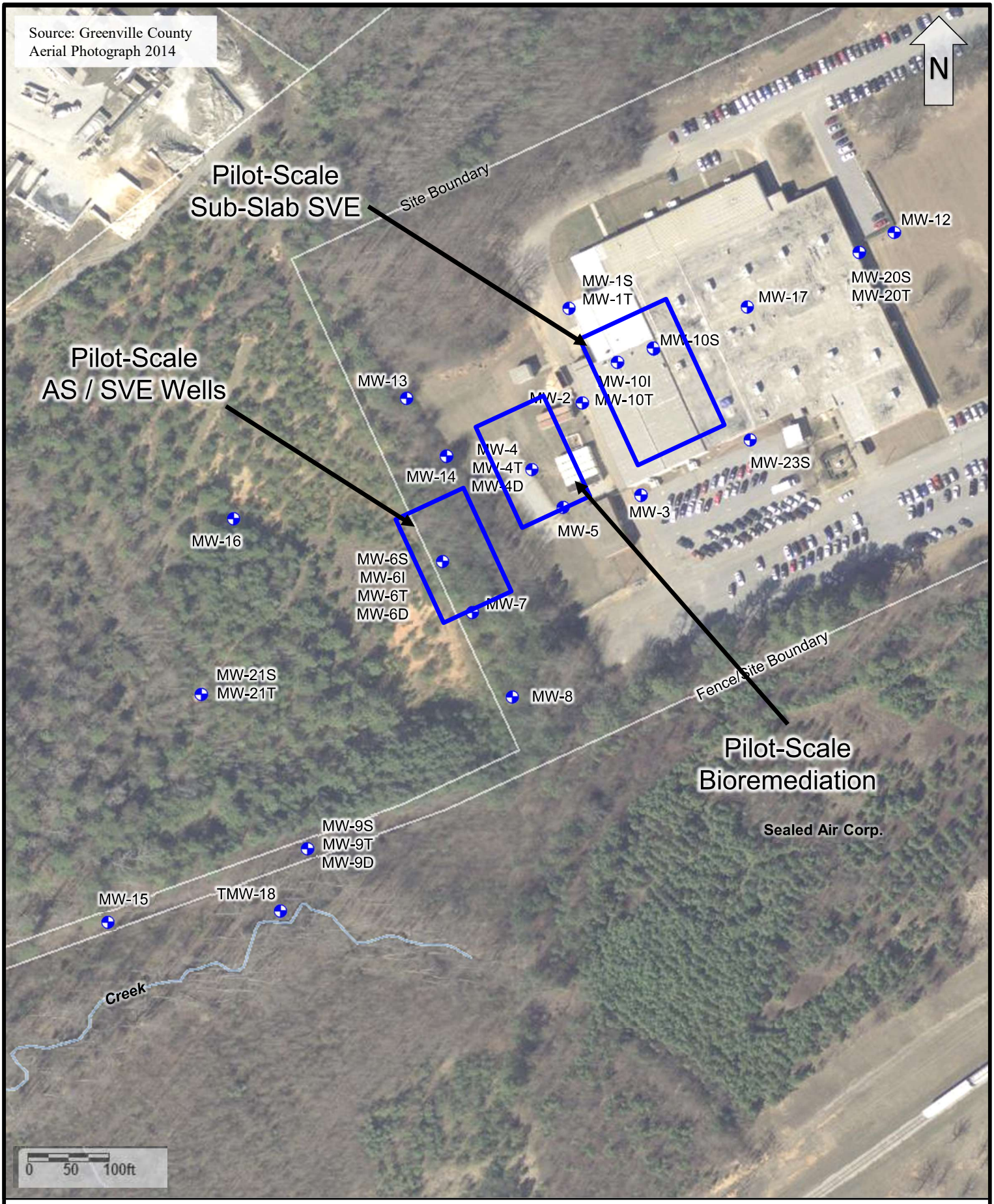

Figure 2

Pilot-Scale Remediation Layout
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1001 Old Stage Road, Simpsonville, South Carolina

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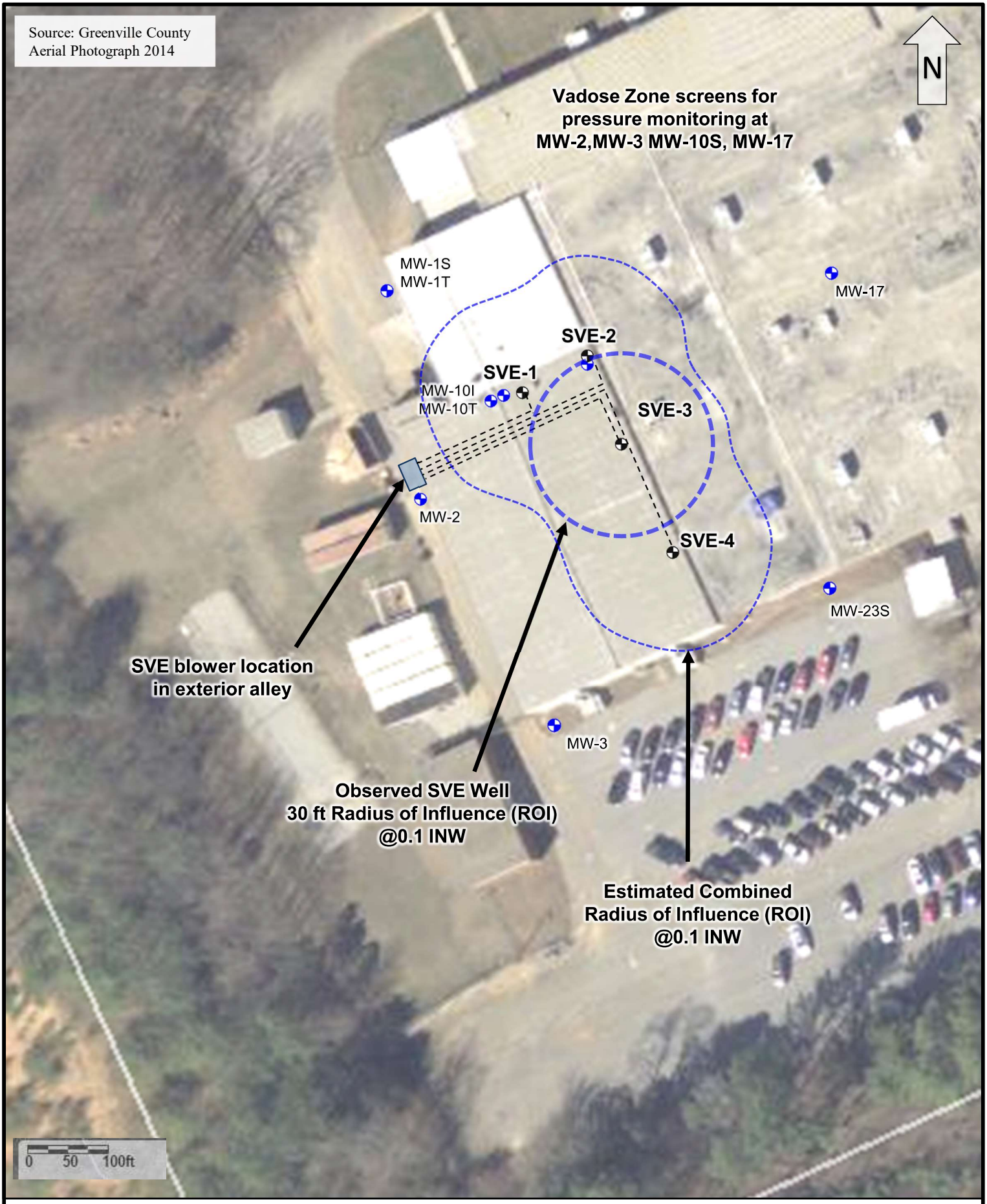

Figure 3

Sub-Slab SVE Layout
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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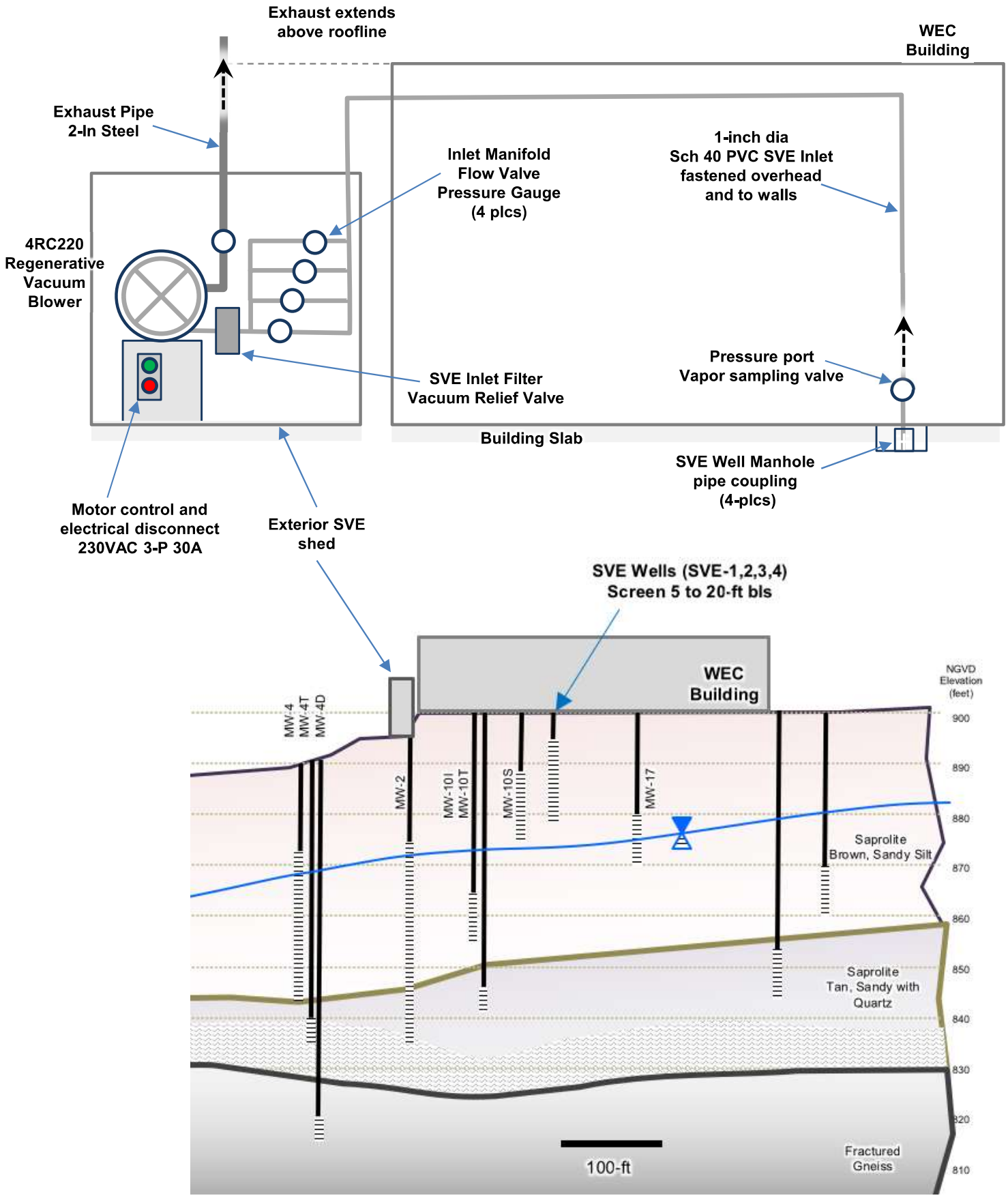

Figure 4

Sub-Slab SVE Cross-Section and Equipment Diagram
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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Figure 5

ERD Injection Wells Layout
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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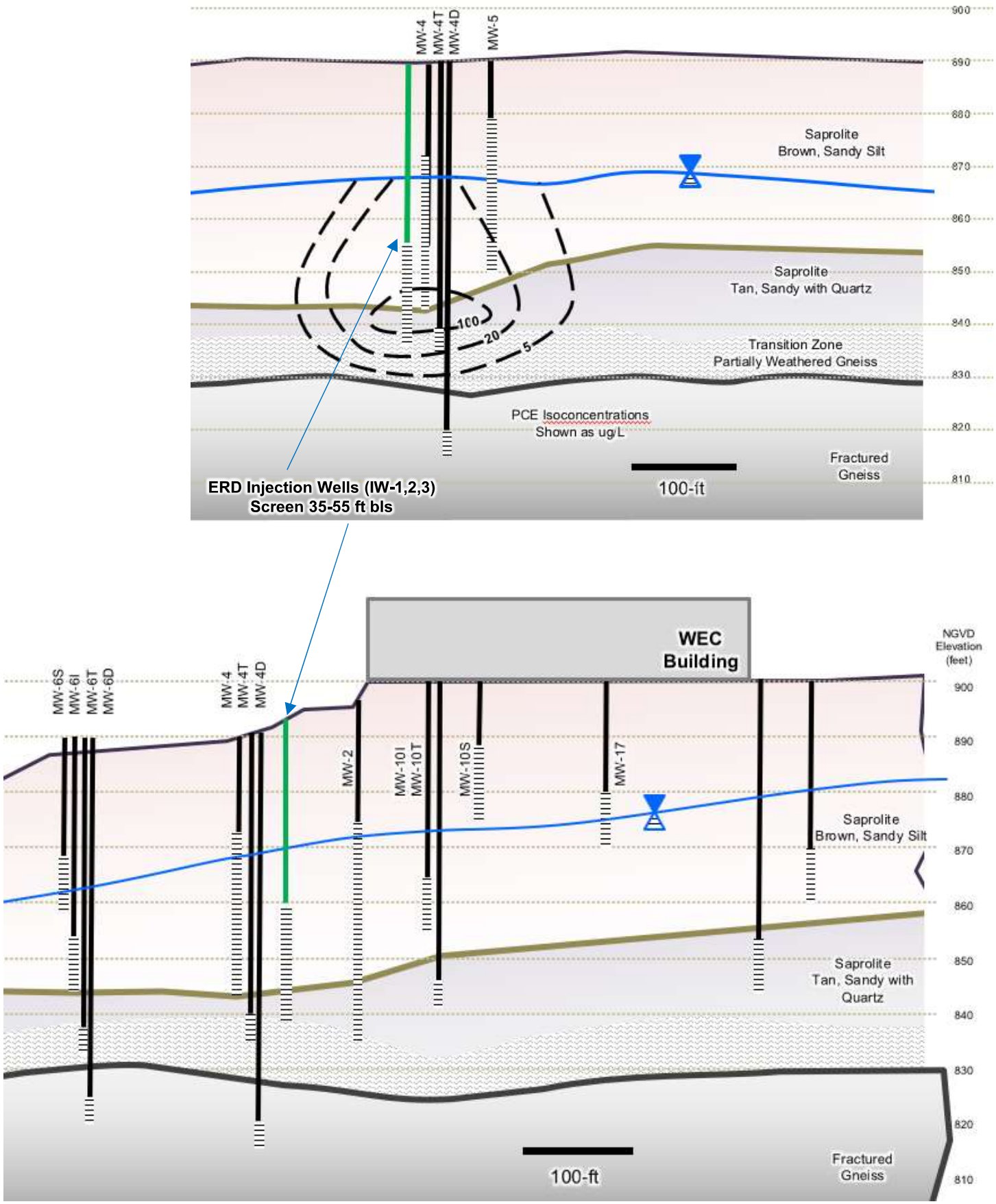

Figure 6

ERD Cross-Section
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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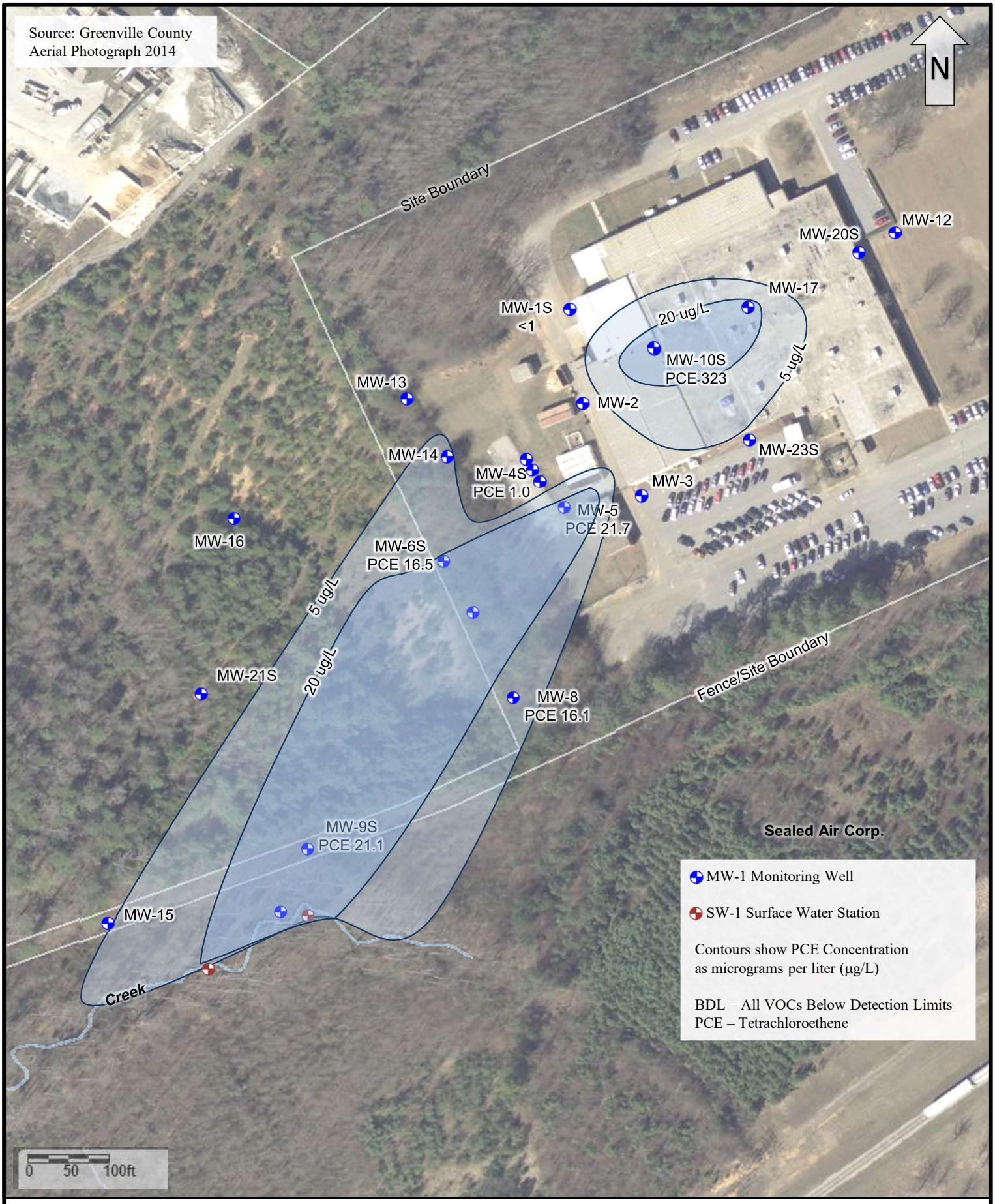

Figure 7

Shallow Groundwater Concentration Diagram (April 2020)
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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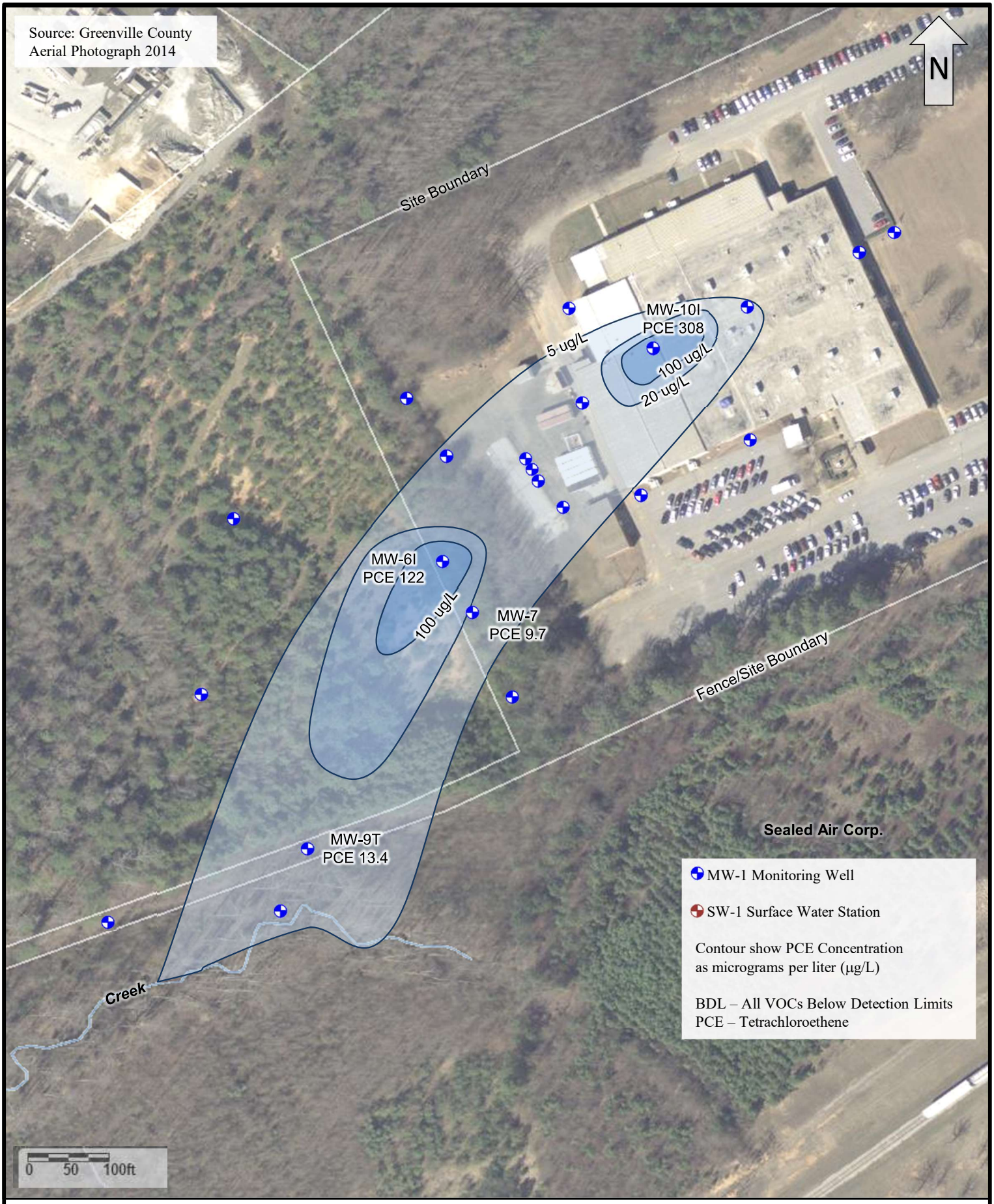

Figure 8

Intermediate Zone Groundwater Concentration Diagram (April 2020)
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1001 Old Stage Road, Simpsonville, South Carolina

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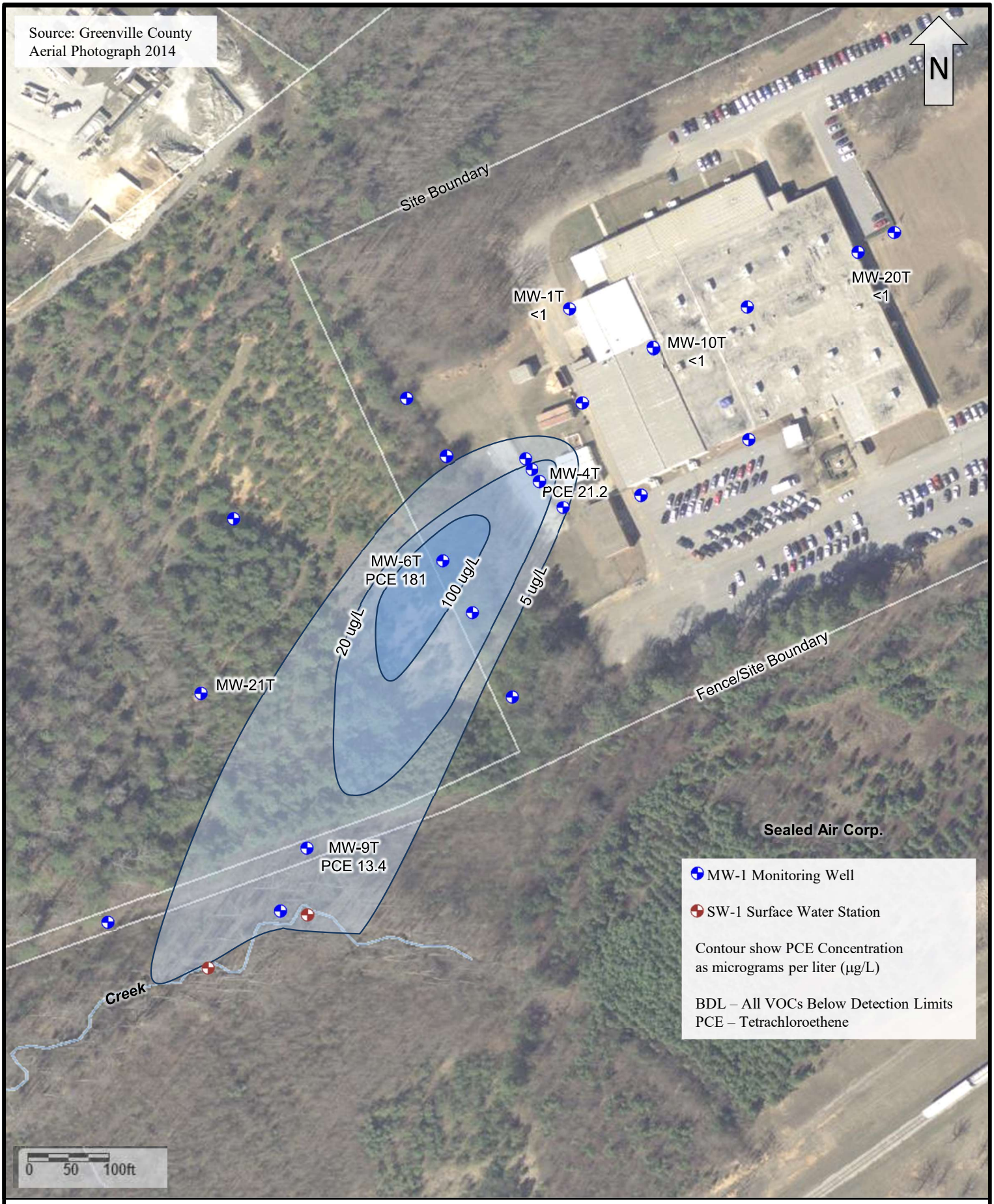

Figure 9

Transition Zone Groundwater Concentration Diagram (April 2020)
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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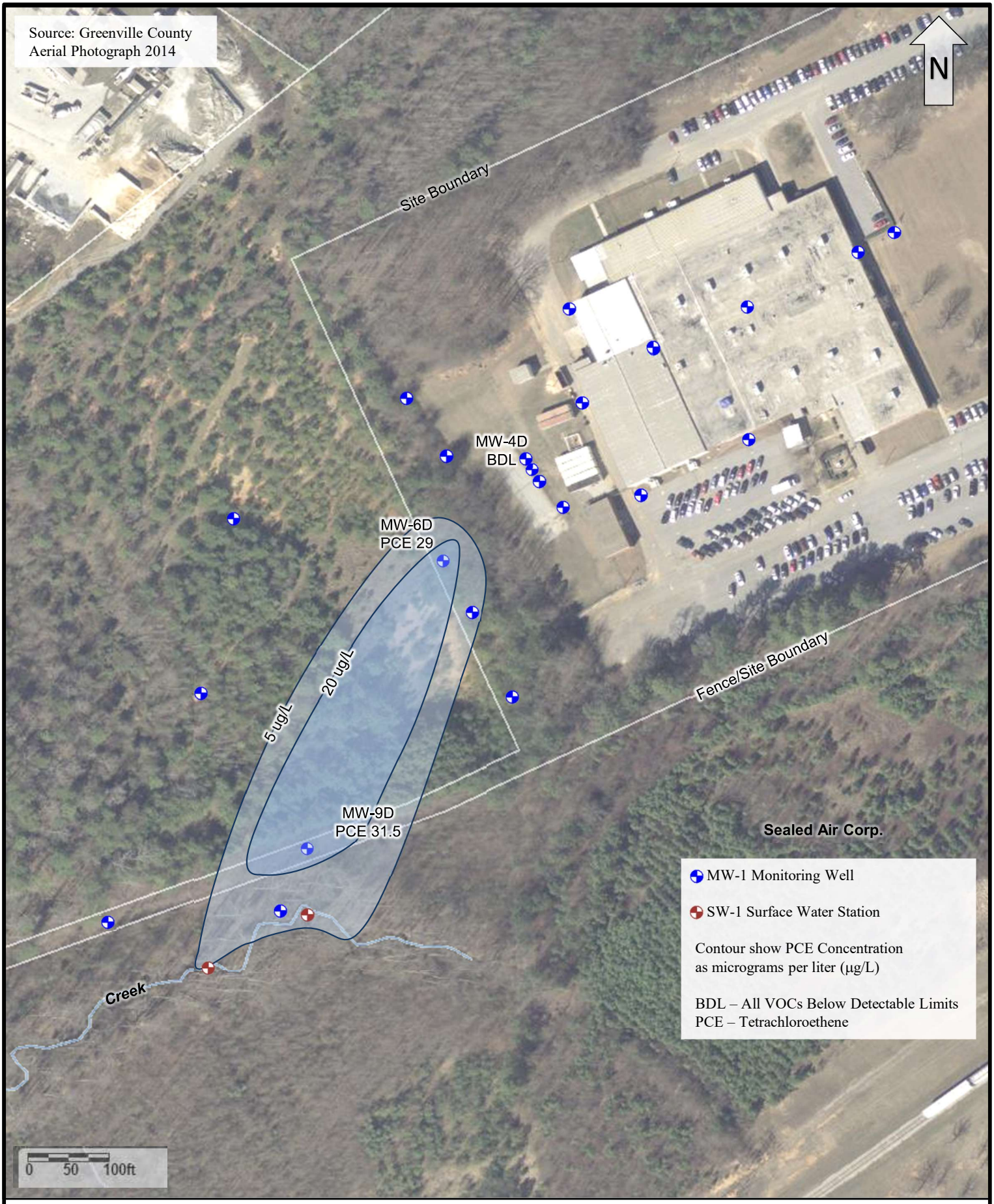

Figure 10

Deep / Bedrock Groundwater Concentration Diagram (April 2020)
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

CRB

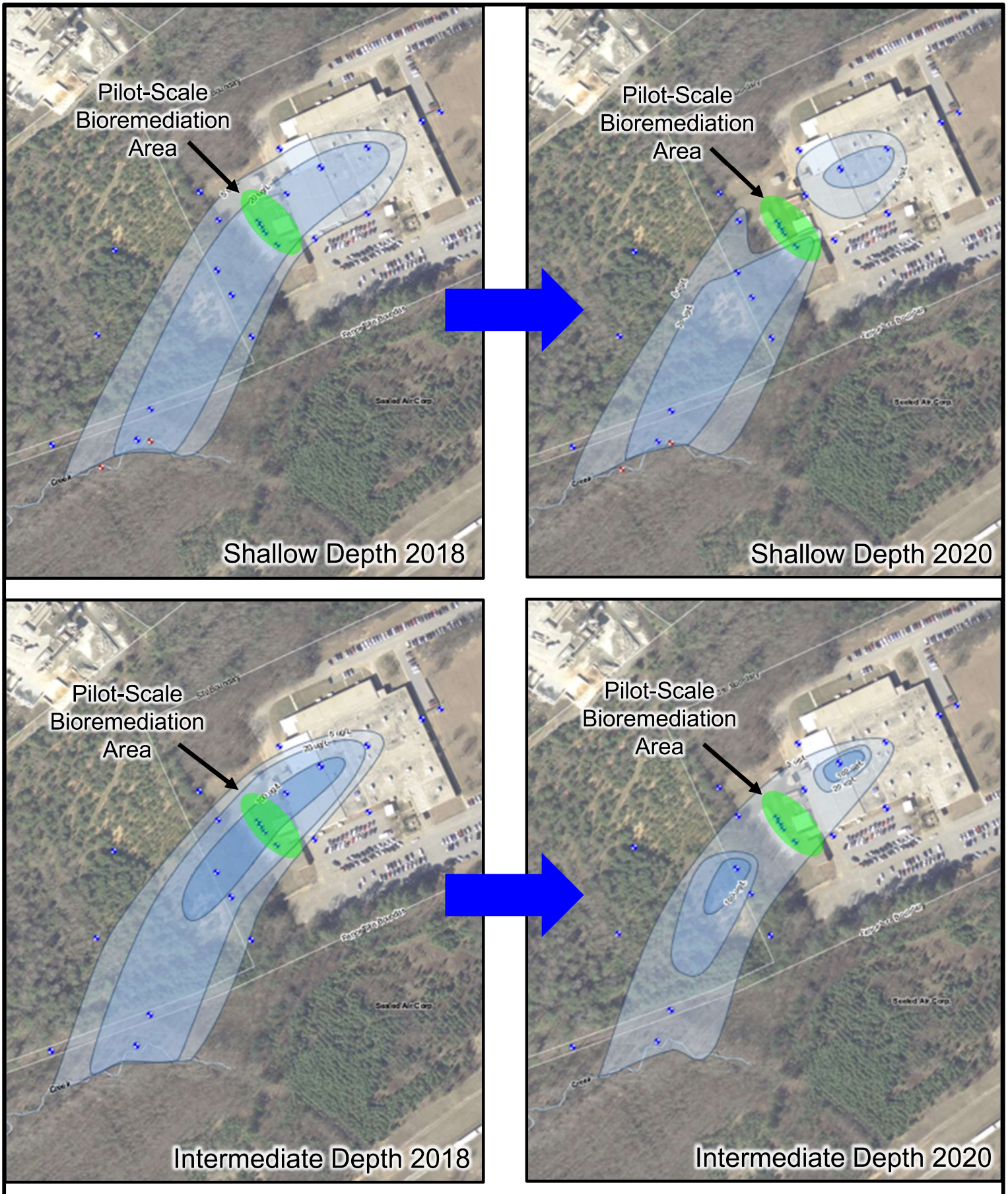

Figure 11

Bioremediation Trends 2018-2020
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

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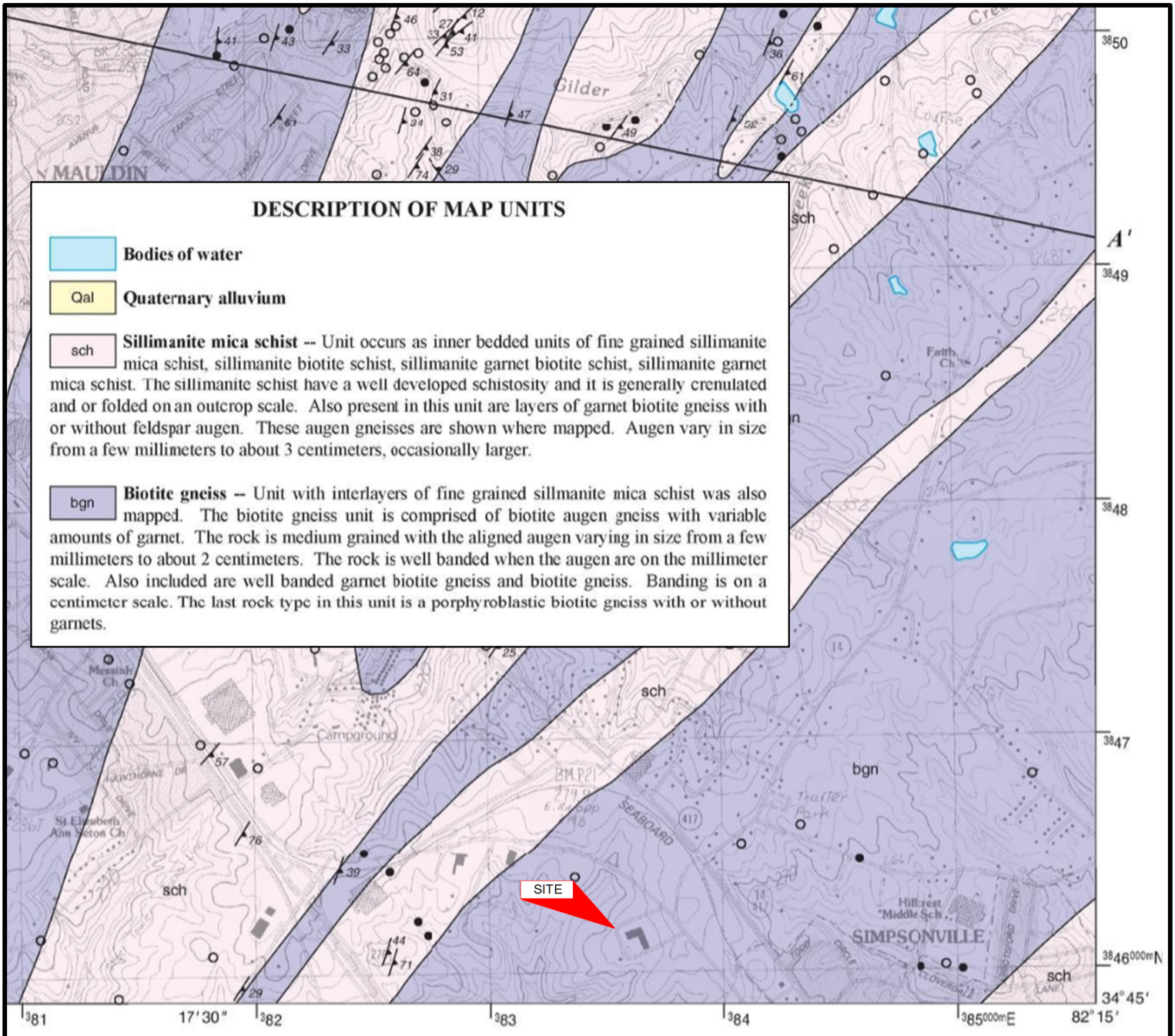

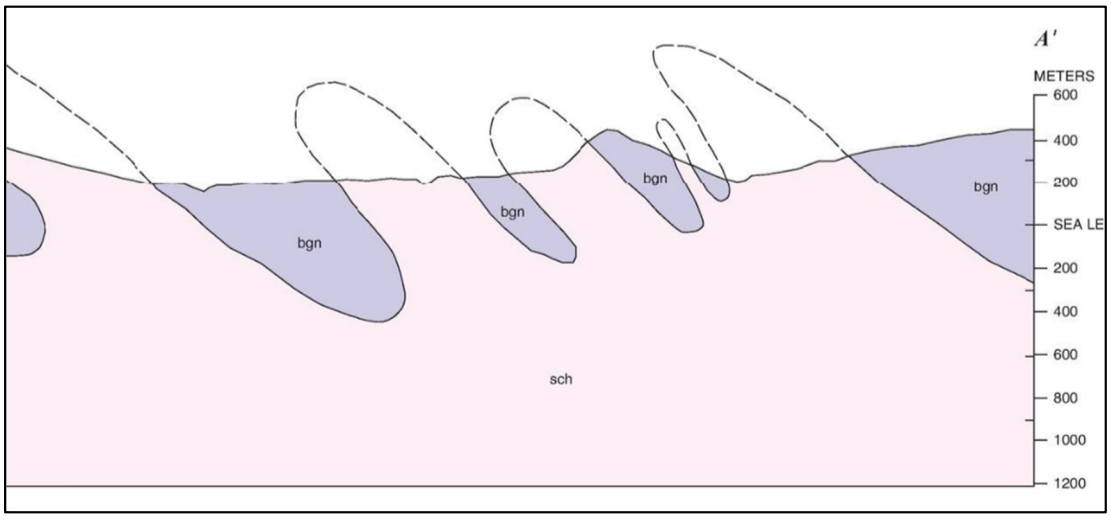

Source: Maybin, A.D., South Carolina Geological Survey, 2003. *Geologic Map of the Mauldin Quadrangle, Greenville County, SC. Open File Report OFR-149*

Figure 12

Geologic Map – Mauldin, SC OFR-149
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, South Carolina

CRB

TABLES

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Table 3 – Groundwater Elevation Measurements
Table 4 – Laboratory Analytical Results – Groundwater VOCs
Table 5 – Groundwater Geochemical Parameters
Table 6 – Microbiology Analytical Results - Groundwater

Table 1 - Sub-Slab SVE Results
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, SC

Sample ID	Sample Date	PCE (ug/m^3)	TCE (ug/m^3)	PID (ppmV)
USEPA VISL		**1570**	**99.7**	
SVE-1	08/07/18	-	-	2.9
	08/08/18	-	-	7.4
	08/09/18	-	-	7.3
	11/02/18	270	<5.4	0.1
	11/20/18	-	-	0.6
	12/05/18	-	-	0.2
	01/17/19	-	-	<0.1
	02/22/19	-	-	1.7
	03/25/19	-	-	0.7
	07/19/19	-	-	<0.1
	01/20/20	**1900**	<5.4	1.0
	04/14/20	<6.8	<5.4	0.2
SVE-2	08/07/18	**-**	-	6.7
	08/08/18	**-**	-	8.9
	08/09/18	**-**	-	13
	09/04/18	**11000**	13	-
	11/02/18	**8400**	9.1	3.5
	11/20/18	-	-	3.2
	12/05/18	-	-	3.5
	01/17/19	**5850**	7.3	2.5
	02/22/19	-	-	2.3
	03/25/19	320	<1.9	2.7
	07/19/19	-	-	2.3
	01/20/20	18	<5.4	1.4
	04/14/20	630	<5.4	0.3
SVE-3	08/07/18	-	-	4
	08/08/18	-	-	2.9
	08/09/18	-	-	8.4
	11/02/18	**3000**	<5.4	0.6
	11/20/18	-	-	1.00
	12/05/18	-	-	0.5
	01/17/19	198	0.94	0.2
	02/22/19	-	-	0.5
	03/25/19	430	<1.9	0.8
	01/20/20	17	<5.4	1.0
	04/14/20	600	<5.4	0.2

Table 1 - Sub-Slab SVE Results
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville, SC

Sample ID	Sample Date	PCE (ug/m^3)	TCE (ug/m^3)	PID (ppmV)
USEPA VISL		**1570**	**99.7**	
SVE-4	08/07/18	-	-	1.6
	08/08/18	-	-	3.1
	08/09/18	-	-	6.8
	11/02/18	**1800**	<5.4	0.4
	11/20/18	-	-	0.8
	12/05/18	-	-	0.3
	01/17/19	-	-	0.2
	02/22/19	-	-	0.4
	03/25/19	330	<1.9	0.7
	01/20/20	75	<5.4	1.2
	04/14/20	740	<5.4	0.2
SVE Exhaust	08/07/18	-	-	4.2
	08/08/18	-	-	3
	08/09/18	-	-	5.4
	09/04/18	**3800**	5.6	-
	11/20/18	-	-	1.1
	12/05/18	-	-	1.4
	02/22/19	-	-	0.9
	03/25/19	-	-	1.5
	07/19/19	-	-	0.6
	04/16/20	-	-	0.8
SG-10	12/8/2014	**1700**	<	-
SG-11	12/8/2014	**9790**	<	-
SG-12	12/8/2014	466	<	-
SG-13	12/8/2014	**9810**	<	-

Notes:

"<" - Below Reporting Limits

Concentrations shown as micrograms per cubic meter ($\mu g/m^3$)

PID - Photoionization Detector measurements reported as volumetric parts per million (ppmV)

VISL - Commercial Vapor Intrusion Screening Level

PCE - Tetrachloroethene

TCE - Trichloroethene

Bold results exceed VISL

Table 2 - Monitoring Well Construction Summary
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID	Total Depth	TIC Elevation[1]	Screened Interval	Screen Top Depth	Screen Base Depth	Screen Top Elevation	Screen Base Elevation	Well Diameter (inches)	Screened Formation
MW-1S	29.98	895.82	20-30	19.98	29.98	875.84	865.84	2.0	Saprolite
MW-1T [2]	69.71	895.74	60-70	59.71	69.71	836.03	826.03	2.0	Transition
MW-2	58.61	894.91	19-59	18.61	58.61	876.30	836.30	2.0	Saprolite
MW-3	60.28	892.99	20-60	20.28	60.28	872.71	832.71	2.0	Saprolite
MW-4	45.58	889.78	16-46	15.58	45.58	874.20	844.20	1.0	Saprolite
MW-4T	54.65	889.87	50-55	49.65	54.65	840.22	835.22	2.0	Transition
MW-4D [3]	73.22	889.85	68-73	68.22	73.22	821.63	816.63	2.0	Bedrock
MW-5	41.83	891.83	12-42	11.83	41.83	880.00	850.00	1.0	Saprolite
MW-6S[4]	30.50	889.97	21-31	21.00	30.50	868.97	859.47	1.0	Saprolite
MW-6I	46.96	890.49	35-45	36.96	46.96	853.53	843.53	2.0	Saprolite
MW-6T	56.70	890.63	52-57	51.70	56.70	838.93	833.93	2.0	Transition
MW-6D	69.50	890.19	64-69	64.50	69.50	825.69	820.69	2.0	Bedrock
MW-7	39.71	889.92	9-39	9.71	39.71	880.21	850.21	1.0	Saprolite
MW-8	36.04	889.51	14-34	16.04	36.04	873.47	853.47	1.0	Saprolite
MW-9S[5]	20.80	865.36	11-21	11.00	20.80	854.36	844.56	1.0	Saprolite
MW-9T	37.97	864.46	25-35	27.97	37.97	836.49	826.49	2.0	Transition
MW-9D	56.90	862.04	51-56	51.90	56.90	810.14	805.14	2.0	Bedrock
MW-10S[6]	23.60	899.70	10-23	10.00	23.60	889.70	876.10	1.0	Saprolite
MW-10I	34.65	899.70	25-35	24.65	34.65	875.05	865.05	2.0	Saprolite
MW-10T	58.45	899.70	53-58	53.45	58.45	846.25	841.25	2.0	Transition
MW-12	40.97	899.71	31-41	30.97	40.97	868.74	858.74	1.0	Saprolite
MW-13	42.97	891.27	33-43	32.97	42.97	858.30	848.30	1.0	Saprolite
MW-14	45.55	891.14	36-46	35.55	45.55	855.59	845.59	1.0	Saprolite
MW-15	32.74	854.13	23-33	22.74	32.74	831.39	821.39	1.0	Saprolite
MW-16	45.20	883.68	30-45	30.20	45.20	853.48	838.48	2.0	Saprolite
MW-17	29.57	899.70	20-30	19.57	29.57	880.13	870.13	1.0	Saprolite
TMW-18	8.90	853.45	0-9	4.90	8.90	848.55	844.55	1.0	Transition
MW-20S	20.26	899.58	15-20	15.26	20.26	884.32	879.32	2.0	Saprolite
MW-20T	56.51	899.59	46-56	46.51	56.51	853.08	843.08	2.0	Transition
MW-21S	27.35	881.52	17-27	17.35	27.35	864.17	854.17	2.0	Saprolite
MW-21T	36.95	881.59	31-36	31.95	36.95	849.64	844.64	2.0	Transition
MW-23S	24.97	899.00	15-25	14.97	24.97	884.03	874.03	2.0	Saprolite

Notes

Depth in feet below land surface; elevation in feet above sea level NGVD 83
DTW - Depth to Water
TIC - Top of Inner Casing

[1] - Top of Inner Casing elevation in feet relative to building slab elevation of 900 feet.

[2] - MW-1 was renamed MW-1T as part of the MW-1 cluster

[3] - MW-11D was renamed MW-4D as part of the MW-4 cluster

[4] - MW-6 was plugged to a depth of 31.0 feet and renamed MW-6S as part of the MW-6 cluster

[5] - MW-9 was plugged to a depth of 21.0 feet and renamed MW-9S as part of the MW-9 cluster

[6] - MW-10 was plugged to a depth of 23.6 feet and renamed MW-10S as part of the MW-10 cluster

Monitoring Well Cluster Screen Designations

S - Shallow Zone water table or uppermost water-bearing depth

I - Intermediate Zone water-bearing depth above Transition Zone

T - Transition Zone water-bearing depth at the saprolite / bedrock boundary

D - Deep Zone, bedrock water-bearing depth

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-1S (20-30)	895.82	5/10/2016	14.02	881.80
		2/14/2017	21.97	873.85
		9/27/2018	19.45	876.37
		3/26/2019	12.27	883.55
		1/22/2020	18.61	877.21
MW-1T[2] (60-70)	895.74	11/5/2012	24.05	871.69
		11/14/2012	24.31	871.43
		1/3/2013	23.61	872.13
		5/29/2014	14.49	881.25
		11/20/2014	20.04	875.70
		1/7/2015	18.87	876.87
		4/13/2015	16.84	878.90
		5/10/2016	13.94	881.80
		2/14/2017	21.68	874.06
		9/27/2018	19.56	876.18
		3/26/2019	11.58	884.16
		1/22/2020	17.55	878.19
MW-2 (19-59)	894.91	11/5/2012	25.18	869.73
		11/14/2012	25.45	869.46
		1/3/2013	24.75	870.16
		5/29/2014	15.44	879.47
		11/20/2014	20.79	874.12
		1/7/2015	20.41	874.50
		2/25/2015	18.91	876.00
		4/13/2015	18.19	876.72
		5/10/2016	15.68	879.23
		2/14/2017	23.13	871.78
		6/20/2018	19.02	875.89
		9/27/2018	20.74	874.17
		12/5/2018	20.45	874.46
		3/26/2019	14.18	880.73
		1/22/2020	19.74	875.17

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-3 (20-60)	892.99	11/5/2012	25.55	867.44
		11/14/2012	25.75	867.24
		1/3/2013	25.05	867.94
		5/29/2014	16.24	876.75
		11/20/2014	20.62	872.37
		1/7/2015	23.05	869.94
		4/13/2015	19.16	873.83
		5/10/2016	16.28	876.71
		2/14/2017	23.61	869.38
		9/27/2018	21.28	871.71
		3/26/2019	15.99	877
		1/21/2020	21.07	871.92
MW-4 (16-46)	889.78	11/5/2012	23.25	866.53
		11/14/2012	23.60	866.18
		1/3/2013	22.90	866.88
		5/29/2014	13.91	875.87
		12/2/2014	18.95	870.83
		1/7/2015	18.40	871.38
		2/25/2015	17.04	872.74
		4/13/2015	16.49	873.29
		5/11/2016	14.20	875.58
		2/14/2017	21.28	868.50
		6/20/2018	17.46	872.32
		9/27/2018	18.75	871.03
		12/5/2018	18.07	871.71
		2/25/2019	13.28	876.50
		1/22/2020	17.46	872.32
		4/14/2020	14.39	875.39

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-4T (50-55)	889.87	5/11/2016	14.32	875.55
		2/14/2017	21.38	868.49
		6/20/2018	17.52	872.35
		9/27/2018	19.32	870.55
		12/5/2018	18.43	871.44
		2/25/2019	12.85	877.02
		3/26/2019	12.12	877.75
		1/22/2020	17.86	872.01
		4/14/2020	14.41	875.46
MW-4D[3] (68-73)	889.85	1/3/2013	24.09	865.76
		5/29/2014	13.70	876.15
		11/20/2014	19.08	870.77
		1/7/2015	18.02	871.83
		2/25/2015	16.45	873.40
		4/13/2015	16.03	873.82
		5/11/2016	15.38	874.47
		2/14/2017	21.19	868.66
		6/20/2018	17.96	871.89
		9/27/2018	19.32	870.53
		2/25/2019	12.24	877.61
		3/26/2019	11.69	878.16
MW-5 (12-42)	891.83	11/5/2012	26.15	865.68
		11/14/2012	26.40	865.43
		1/3/2013	25.70	866.13
		5/29/2014	17.01	874.82
		11/20/2014	19.56	872.27
		1/7/2015	21.72	870.11
		4/13/2015	19.66	872.17
		5/11/2016	16.99	874.84
		2/14/2017	24.37	867.46
		3/26/2019	15.72	876.11
		1/22/2020	21.25	870.58
		4/14/2020	17.61	874.22

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-6S[4] (21-31)	889.96	11/5/2012	28.79	861.17
		11/14/2012	29.05	860.91
		1/3/2013	29.75	860.21
		5/29/2014	19.61	870.35
		12/2/2014	24.92	865.04
		1/7/2015	24.29	865.67
		4/13/2015	22.32	867.64
		5/12/2016	20.20	869.76
		2/14/2017	27.19	862.77
		6/21/2018	23.72	866.24
		9/28/2018	25.59	864.37
		2/25/2019	17.96	872.00
		3/26/2019	17.34	872.62
		1/22/2020	23.91	866.05
		4/14/2020	20.74	869.22
MW-6I (35-45)	890.49	5/12/2016	20.18	870.31
		8/4/2016	23.74	866.75
		2/14/2017	27.04	863.45
		6/21/2018	23.61	866.88
		9/28/2018	25.34	865.15
		12/6/2018	24.82	865.67
		2/25/2019	17.79	872.70
		3/26/2019	17.32	873.17
		1/22/2020	23.51	866.98
		4/14/2020	19.65	870.84

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-6T (52-57)	890.63	5/12/2016	20.86	869.77
		8/4/2016	24.35	866.28
		2/14/2017	27.65	862.98
		6/21/2018	24.01	866.62
		9/28/2018	25.85	864.78
		12/5/2018	24.82	865.81
		2/25/2019	18.3	872.33
		3/26/2019	17.89	872.74
		1/23/2020	23.92	866.71
		4/15/2020	20.22	870.41
MW-6D (64-69)	890.19	5/12/2016	21.57	868.62
		6/6/2016	22.28	867.91
		8/4/2016	-	-
		2/14/2017	28.71	861.48
		6/21/2018	25.24	864.95
		9/28/2018	27.1	863.09
		2/25/2019	19.45	870.74
		3/26/2019	18.91	871.28
		1/21/2020	24.9	865.29
		4/15/2020	21.25	868.94
MW-7 (9-39)	889.92	11/5/2012	28.42	861.50
		11/14/2012	28.59	861.33
		1/3/2013	27.89	862.03
		5/29/2014	19.68	870.24
		12/2/2014	24.63	865.29
		1/7/2015	24.38	865.54
		4/13/2015	22.31	867.61
		5/11/2016	22.15	867.77
		2/14/2017	29.04	860.88
		3/26/2019	19.87	870.05
		1/22/2020	well clogged	-
		4/14/2020	22.21	867.71

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-8 (14-34)	889.51	11/5/2012	30.45	859.06
		11/14/2012	30.69	858.82
		1/3/2013	29.99	859.52
		5/29/2014	22.03	867.48
		12/2/2014	25.41	864.10
		1/7/2015	29.87	859.64
		4/13/2015	24.22	865.29
		5/10/2016	22.15	867.36
		2/14/2017	28.44	861.07
		3/26/2019	20.12	869.39
		1/22/2020	25.52	863.99
		4/14/2020	22.15	867.36
MW-9S[5] (11-21)	865.49	11/5/2012	15.73	849.76
		11/14/2012	15.78	849.71
		1/3/2013	15.08	850.41
		5/29/2014	10.42	855.07
		12/2/2014	14.32	851.17
		1/7/2015	12.90	852.59
		3/24/2015	13.15	852.34
		4/13/2015	11.99	853.50
		5/12/2016	10.56	854.93
		8/4/2016	12.91	852.58
		2/14/2017	14.42	851.07
		6/21/2018	12.72	852.77
		3/26/2019	8.31	857.18
		1/23/2020	12.82	852.67
		4/15/2020	10.02	855.47
MW-9T (25-35)	864.46	5/12/2016	9.93	854.53
		8/4/2016	12.26	852.20
		2/14/2017	13.86	850.60
		6/21/2018	12.00	852.46
		3/26/2019	7.45	857.01
		1/23/2020	12.21	852.25
		4/16/2020	9.42	855.04

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-9D (51-56)	862.04	5/12/2016	10.27	851.77
		6/6/2016	10.85	851.19
		8/4/2016	12.91	849.13
		6/21/2018	12.42	849.62
		3/26/2019	7.7	854.34
		1/23/2020	12.9	849.14
		4/16/2020	9.86	852.18
MW-10S[6] (10-23)	899.70	11/5/2012	28.05	871.65
		11/14/2012	28.27	871.43
		1/3/2013	27.57	872.13
		5/29/2014	18.05	881.65
		12/2/2014	23.21	876.49
		1/7/2015	23.10	876.60
		4/13/2015	20.82	878.88
		5/11/2016	18.16	881.54
		2/14/2017	dry	-
		6/19/2018	dry	-
		9/28/2018	dry	-
		3/26/2019	17.56	882.14
		1/21/2020	22.74	876.96
		4/15/2020	18.80	880.90
MW-10I (25-35)	899.70	5/11/2016	18.62	881.08
		2/14/2017	26.32	873.38
		6/19/2018	22.55	877.15
		9/28/2018	23.85	875.85
		12/5/2018	23.85	875.85
		3/26/2019	17.92	881.78
		1/24/2020	22.11	877.59
		4/15/2020	19.21	880.49

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-10T (53-58)	899.70	5/11/2016	18.62	881.08
		2/14/2017	26.22	873.48
		6/19/2018	22.02	877.68
		9/28/2018	23.83	875.87
		12/5/2018	23.71	875.99
		3/26/2019	17.73	881.97
		1/24/2020	22.73	876.97
		4/15/2020	19.04	880.66
MW-12 (31-41)	899.71	1/3/2013	23.75	875.96
		5/29/2014	12.26	887.45
		12/2/2014	13.24	886.47
		1/7/2015	16.54	883.17
		4/13/2015	14.46	885.25
		5/10/2016	12.40	887.31
		2/14/2017	19.19	880.52
		3/26/2019	11.02	888.69
MW-13 (33-43)	891.27	1/3/2013	27.05	864.22
		5/29/2014	15.80	875.47
		11/20/2014	23.10	868.17
		1/7/2015	21.30	869.97
		4/13/2015	18.25	873.02
		5/10/2016	16.31	874.96
		2/14/2017	24.5	866.77
		3/26/2019	12.35	878.92
		1/22/2020	20.01	871.26

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-14 (36-46)	891.14	1/3/2013	27.77	863.37
		5/29/2014	17.17	873.97
		12/2/2014	19.92	871.22
		1/7/2015	21.67	869.47
		4/13/2015	19.87	871.27
		5/11/2016	17.94	873.20
		2/14/2017	24.77	866.37
		3/26/2019	14.82	876.32
		1/22/2020	20.44	870.70
MW-15 (23-33)	854.13	1/3/2013	16.85	837.28
		5/29/2014	14.18	839.95
		12/2/2014	18.65	835.48
		1/7/2015	14.58	839.55
		4/13/2015	15.05	839.08
		5/11/2016	14.33	839.80
		2/14/2017	16.64	837.49
		6/21/2018	16.04	838.09
		3/26/2019	11.47	842.66
		1/23/2020	14.56	839.57
MW-16 (30-45)	883.68	12/2/2014	26.89	856.79
		1/7/2015	25.89	857.79
		4/13/2015	23.05	860.63
		5/11/2016	20.69	862.99
		6/6/2016	21.59	862.09
		2/14/2017	28.83	854.85
		3/26/2019	16.28	867.40

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-17	899.70	12/2/2014	21.65	878.05
(20-30)		1/7/2015	21.43	878.27
		2/25/2015	20.70	879.00
		4/13/2015	19.21	880.49
		5/11/2016	16.53	883.17
		2/14/2017	24.21	875.49
		6/20/2018	21.02	878.68
		9/28/2018	21.83	877.87
		12/5/2018	21.75	877.95
		3/26/2019	16.2	883.50
		1/24/2020	21.18	878.52
MW-20S	899.58	5/10/2016	14.94	-
(angled well)		2/14/2017	dry	-
(15-20)		3/26/2019	13.85	885.73
MW-20T	899.59	5/10/2016	13.41	886.18
(46-56)		2/14/2017	20.41	879.18
		3/26/2019	12.3	887.29
MW-21S	881.52	6/6/2016	26.67	854.85
(17-27)		8/4/2016	27.24	854.28
		2/14/2017	dry	-
		3/26/2019	22.27	859.25
		1/23/2020	dry	
MW-21T	881.59	6/6/2016	26.87	854.72
(31-36)		8/4/2016	29.43	852.16
		2/14/2017	31.05	850.54
		6/21/2018	28.98	852.61
		3/26/2019	22.47	859.12
		1/23/2020	29.85	851.74

Table 3 - Groundwater Elevation Measurements
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Well ID (Screened Interval, ft)	TIC Elevation[1]	Date	DTW	GW Elevation
MW-23S (15-25)	899.00	5/10/2016	18.86	880.14
		2/14/2017	dry	-
		3/26/2019	19.25	879.75
		1/22/2020	25.01	873.99
SW-4[7] (Creek Stage)	818.00	3/24/2015	-	818.00

Notes

"-" No measurement DTW - Depth to Water GW - Groundwater

Monitoring Well Cluster Screen Designations

S - Shallow Zone water table or uppermost water-bearing depth

I - Intermediate Zone water-bearing depth above Transition Zone

T - Transition Zone water-bearing depth at the saprolite / bedrock boundary

D - Deep Zone, bedrock water-bearing depth

[1] - Top of Inner Casing elevation in feet relative to the building slab benchmark of 900 feet.

[2] - MW-1 was renamed MW-1T as part of the MW-1 cluster

[3] - MW-11D was renamed MW-4D as part of the MW-4 cluster

[4] - MW-6 was plugged to a depth of 31.0 feet and renamed MW-6S as part of the MW-6 cluster

[5] - MW-9 was plugged to a depth of 21.0 feet and renamed MW-9S as part of the MW-9 cluster

[6] - MW-10 was plugged to a depth of 23.6 feet and renamed MW-10S as part of the MW-10 cluster

[7] - Creek stage elevations estimated based on Greenville County GIS and SCDNR LiDAR.

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
	USEPA RSL (Tap Water)	11	0.49	280	36	0.019	2.8	55000
MW-1S	05/10/16	3.3	<	<	<	<	<	4.2
	03/27/19	<1	<1	<1	<1	<1	<1	-
	01/22/20	<1	<1	<1	<1	<1	<1	<1
MW-1T	11/14/12	<	<	<	<	<	<	<
	05/29/14	<	<	<	<	<	<	<
	11/20/14	<	<	<	<	<	<	<
	05/10/16	<	<	<	<	<	<	<
	03/27/19	<1	<1	<1	<1	<1	<1	-
	01/22/20	<1	<1	<1	<1	<1	<1	<1
MW-2	11/14/12	**120**	<	1.4	<	<	<	50
	05/29/14	**41.5**	<	<	<	<	<	27
	11/20/14	**141**	<	<	<	<	<	37.7
	02/25/15	**11.5**	<	<	<	<	<	13.7
PDB - 25'	09/10/15	**75.5**	<	0.9	<	<	<	46
PDB - 40'	09/10/15	**51.9**	<	0.7	<	<	<	39.2
PDB - 50'	09/10/15	**10.1**	<	<	<	<	<	<
PDB - 25'	05/10/16	**23.5**	<	<	<	<	<	16.7
	06/20/18	3.1	<1	<1	<1	<1	<1	-
25'	03/28/19	4.9	<1	<1	<1	<1	<1	-
40'	03/28/19	3.1	<1	<1	<1	<1	<1	-
20'	01/22/20	2.5	<1	<1	<1	<1	<1	2.3
40'	01/22/20	1.4	<1	<1	<1	<1	<1	<1
MW-3	11/14/12	1.3	<	<	<	<	<	<
	05/29/14	<	<	<	<	<	<	<
	11/20/14	<	<	<	<	<	<	<
PDB - 25'	09/10/15	**12.1**	<	<	<	<	<	<
PDB - 40'	09/10/15	0.63I	<	<	<	<	<	<
PDB - 50'	09/10/15	1.2	<	<	<	<	<	<
PDB - 25'	05/10/16	<	<	<	<	<	<	<
	03/27/19	<1	<1	<1	<1	<1	<1	-
PDB - 25'	03/27/19	<1	<1	<1	<1	<1	<1	-
	01/22/20	<1	<1	<1	<1	<1	<1	<1

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-4	11/14/12	**230**	**<**	**7.9**	<	<	<	260
	05/29/14	**96.4**	**<**	**<**	**<**	**<**	**<**	109
	12/02/14	**85.6**	**<**	**<**	**<**	**<**	**<**	110
	02/25/15	**74.7**	**<**	**<**	**<**	**<**	**<**	69.1
PDB - 20'	09/10/15	<	<	<	<	<	<	<
PDB - 30'	09/10/15	1.5	<	<	<	<	<	1.2
PDB - 40'	09/10/15	**5.8**	<	<	<	<	<	4.7
	05/11/16	**20.4**	<	<	<	<	<	20.9
	06/20/18	**8.1**	<1	<1	<1	<1	<1	-
	09/27/18	<1	<1	<1	<1	<1	<1	-
	12/05/18	3.9	<1	<1	<1	<1	<1	-
	03/28/19	1.1	<1	<1	<1	<1	<1	-
	01/22/20	1.1	1.3	<1	<1	<1	<1	<1
	04/14/20	1.0	<1	<1	1.59	<1	<1	<1
MW-4T	05/11/16	**42.7**	<	<	<	<	<	57.6
	02/16/17	**50.9**	<1	<1	<1	<1	<1	53.8
	06/20/18	**48.5**	<1	<1	<1	<1	<1	-
	09/27/18	**74.4**	<1	<1	<1	<1	<1	-
	12/05/18	**48.2**	<1	<1	<1	<1	<1	-
	03/28/19	**8.4**	<1	<1	<1	<1	<1	-
	01/22/20	**65.3**	<1	<1	<1	<1	<1	39.3
	04/14/20	**21.2**	<1	<1	<1	<1	<1	27.2
MW-4D	01/03/13	<	<	<	<	<	<	-
(formerly MW-11D)	05/29/14	<	<	<	<	<	<	<
	11/20/15	<	<	<	<	<	<	<
	02/25/15	<	<	<	<	<	<	<
	05/11/16	<	<	<	<	<	<	<
	06/20/18	<1	<1	<1	<1	<1	<1	-
	03/28/19	<1	<1	<1	<1	<1	<1	-
MW-5	11/14/12	**27**	<	<	<	<	<	27
	05/29/14	**7**	<	<	<	<	<	9.3
	11/20/14	**29.4**	<	<	<	<	<	24.7
PDB - 20'	09/10/15	**33.9**	<	<	<	<	<	13.6
PDB - 30'	09/10/15	**34.3**	<	<	<	<	<	58.1
	05/11/16	**5.9**	<	<	<	<	<	8.1
	03/29/19	**17.5**	<1	<1	<1	<1	<1	-
	01/22/20	**31.4**	<1	<1	<1	<1	<1	19.2
	04/14/20	**21.7**	<1	<1	<1	<1	<1	17

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-6	11/14/12	**400**	<	**34**	<	<	<	1100
	01/03/13	**480**	<	**29**	<	<	<	-
	05/29/14	**185**	<	<	<	<	<	463
	12/02/14	**232**	<	**27.2**	<	<	<	638
	02/25/15	**128**	<	**<**	<	<	<	172
PDB - 25'	09/10/15	**33.8**	<	3	<	<	<	25
PDB - 30'	09/10/15	**113**	<	**9.5I**	<	<	<	183
PDB - 50'	09/10/15	**873**	1	**71.5**	<	<	0.54J	1710
MW-6S	05/12/16	3.8	<	<	<	<	<	5.2
	02/16/17	**12.7**	<1	<1	<1	<1	<1	6.6
	06/21/18	**21.4**	<1	<1	<1	<1	<1	-
	03/29/19	**5.5**	<1	<1	<1	<1	<1	-
	01/22/20	**30.4**	<1	1.1	<1	<1	<1	10.9
	04/14/20	**16.5**	<1	<1	<1	<1	<1	5.4
MW-6I	05/12/16	**259**	<	13.6	<	<	<	324
	02/16/17	**277**	<1	**18.7**	<2	<2	<1	351
	06/21/18	**200**	<2	<2	<2	<2	<2	-
	09/28/18	**181**	<2	<2	<2	<2	<2	-
	12/06/18	**221**	<2	<2	<2	<2	<2	-
	03/29/19	**108**	<1	<1	<1	<1	<1	-
	01/22/20	**216**	<1	**10.6**	<1	<1	1.1	224
	04/14/20	**122**	<1	5.8	<1	<1	<1	86.3
MW-6T	05/12/16	**173**	<	5.4	<	<	<	206
	02/16/17	**167**	<2	6.5	<2	<2	<2	198
	06/21/18	**212**	<2	<2	<2	<2	<2	-
	12/05/18	**183**	<2	<2	<2	<2	<2	-
	04/11/19	**188**	<1	<1	<1	<1	2.1	-
	01/23/20	**165**	<1	4.8	<1	<1	<1	143
(D)	01/23/20	**186**	<1	5.4	<1	<1	<1	142
	04/15/20	**181**	<1	4.9	<1	<1	1.5	99.1
MW-6D	05/12/16	**11.2**	<	<	<	<	<	10.7
	06/06/16	**12.8**	<	<	<	<	<	14.1
	02/16/17	**18.9**	<1	<1	<1	<1	<1	9.9
	06/21/18	**25.7**	<1	<1	<1	<1	<1	-
	03/29/19	**17.5**	<1	<1	<1	<1	<1	-
	01/21/20	**12.8**	<1	<1	<1	<1	<1	-
(D)	01/21/20	**12.1**	<1	<1	<1	<1	<1	4.66
	04/15/20	**29**	<1	<1	<1	<1	<1	8.3

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-7	11/14/12	**52**	<	<	<	<	<	2.7
	05/29/14	**38.9**	<	<	<	<	<	<
	12/02/14	**47**	<	<	<	<	<	12.1
PDB - 25'	09/10/15	**15.6**	<	<	<	<	<	<
PDB - 36'	09/10/15	**21**	<	<	<	<	<	<
	05/12/16	**25.3**	<	<	<	<	<	<
	04/16/20	**9.7**	<1	<1	<1	<1	<1	<1
MW-8	11/14/12	**14**	<	<	<	<	<	<
	05/29/14	<	<	<	<	<	<	<
	11/21/14	**8.6**	<	<	<	<	<	<
	05/10/16	**9.3**	<	<	<	<	<	<
	01/22/20	**53.7**	<1	<1	<1	<1	<1	<1
	04/14/20	**16.1**	<1	<1	<1	<1	<1	<1
MW-9	11/14/12	**68**	<	<	<	<	<	<
	05/29/14	**11.6**	<	<	<	<	<	13.7
	11/21/14	**27**	<	<	<	<	<	<
MW-9S	05/12/16	**5.9**	<	<	<	<	<	<
	02/16/17	**28.1**	<1	<1	<1	<1	<1	<1
	06/21/18	**46.7**	<1	<1	<1	<1	<1	-
	04/11/19	**20**	<1	<1	<1	<1	<1	-
	01/23/20	**39**	<1	<1	<1	<1	<1	<1
	04/15/20	**21.1**	<1	<1	<1	<1	<1	<1
MW-9T	05/12/16	**16.1**	<	<	<	<	<	31.8
	02/16/17	**44.4**	<1	<1	<1	<1	<1	<1
	06/21/18	**22**	<1	<1	<1	<1	<1	-
	04/11/19	**23.2**	<1	<1	<1	<1	<1	-
	01/23/20	**45.6**	<1	<1	<1	<1	<1	<1
	04/16/20	**13.4**	<1	<1	<1	<1	<1	18.6
MW-9D	05/12/16	**25.8**	<	2.4	<	<	1.1	87.8
	06/06/16	**32.1**	<	<	<	<	1.7	143
	02/16/17	**23.1**	<1	<1	<1	<1	<1	8.8
	06/21/18	**23.9**	<1	<1	<1	<1	<1	-
	04/11/19	**27.4**	<1	<1	<1	<1	1.1	-
	01/23/20	**11.2**	<1	<1	<1	<1	2.1	1
	04/16/20	**31.5**	<1	1.2	<1	<1	<1	56

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-10	11/14/12	**120**	<	4.6	<	<	<	64
	05/29/14	**172**	<	<	<	<	<	71.2
	12/08/14	**181**	<	**9**	<	<	<	64.5
(D)	12/08/14	**209**	<	<	<	<	<	<
	02/25/15	**242**	<	<	<	<	<	69.9
PDB - 25'	09/10/15	**237**	<	7.7	<	<	<	15.1
PDB - 36'	09/10/15	**487**	0.52I	**15.8**	<	<	<	150
MW-10S	05/11/16	**215**	<	4.6	<	<	<	29.6
	06/19/18	dry	-	-	-	-	-	-
	04/10/19	**359**	<4	<4	<4	<4	<4	-
	01/21/20	**196**	<1	4.3	<1	<1	<1	38.2
	04/15/20	**323**	<1	4.6	<1	<1	<1	97
MW-10I	05/11/16	**342**	<	5.4	<	<	<	65.2
	02/15/17	**327**	<2.5	**8.1**	<2.5	<2.5	<2.5	81.8
	06/19/18	**291**	<2.5	<2.5	<2.5	<2.5	<2.5	-
	09/28/18	**453**	<2.5	<2.5	<2.5	<2.5	<2.5	-
	12/05/18	**97.6**	<1	3	-	<1	<1	-
	12/20/18	**172**	<1	-	-	-	-	-
	04/12/19	**181**	<1	<1	<1	<1	<1	-
(D)	04/12/19	**178**	<1	<1	<1	<1	<1	-
	01/24/20	**248**	<1	5	<1	<1	<1	99.1
	04/15/20	**308**	<1	5.3	<1	<1	<1	71.2
MW-10T	05/11/16	2.3	<	<	<	<	<	<
	02/15/17	<1	<1	<1	<1	<1	<1	<1
	06/19/18	<1	<1	<1	<1	<1	<1	-
	04/10/19	<1	<1	<1	<1	<1	<1	-
	01/24/20	<1	<1	<1	<1	<1	<1	<1
	04/15/20	<1	<1	<1	<1	<1	<1	<1
MW-12	01/03/13	<	<	<	<	<	<	-
	05/29/14	<	<	<	<	<	<	<
	11/21/14	<	<	<	<	<	<	<
	05/10/16	<	<	<	<	<	<	<
	03/27/19	<1	<1	<1	<1	<1	<1	-
MW-13	01/03/13	<	<	<	<	<	<	-
	05/29/14	<	<	<	<	<	<	<
	11/21/14	<	<	<	<	<	<	<
	05/10/16	<	<	<	<	<	<	<
	03/29/19	<1	<1	<1	<1	<1	<1	-
	01/22/20	<1	<1	<1	<1	<1	<1	<1

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-14	01/03/13	**46**	<	2	6.8	<	21	-
	05/29/14	**35.2**	<	<	16	<	43.3	47.5
	11/21/14	**23**	<	<	20.5	<	55.4	38.1
	05/11/16	**12.3**	<	1.2	<	<	19.9	15.6
	03/29/19	**5.8**	<1	<1	<1	<1	11.7	-
	01/22/20	**10.3**	<1	<1	2.5	<1	11.5	9.1
MW-15	01/03/13	**7.8**	<	1.5	<	<	<	-
	05/29/14	**7.7**	<	<	<	<	<	28.2
	11/21/14	**5.5**	<	<	<	<	<	23
	05/11/16	3	<	<	<	<	<	<
	02/16/17	2.7	<1	<1	<1	<1	<1	6.8
	06/21/18	<5	<5	<5	<5	<5	<5	-
	04/11/19	4.1	<1	<1	<1	<1	<1	-
	01/23/20	**7**	<1	<1	<1	<1	<1	17.5
MW-16	12/02/14	<	<	<	<	<	<	<
	05/11/16	<	<	<	<	<	<	<
	04/12/19	<1	<1	<1	<1	<1	<1	-
MW-17	12/08/14	**148**	<	<	<	<	<	<
	02/25/15	**18.3**	<	<	<	<	<	<
	05/11/16	**147**	<	<	<	<	<	10.8
	02/15/17	**92.7**	<1	<1	<1	<1	<1	11.7
	06/20/18	**15.6**	<1	<1	<1	<1	<1	-
	09/28/18	**231**	<2	<2	<2	<2	<2	-
	12/05/18	**22.3**	<1	<1	<1	<1	<1	-
	12/20/18	**16.5**	<1	-	-	-	-	-
	04/10/19	**14.2**	<1	<1	<1	<1	<1	-
(D)	04/10/19	**15.6**	<1	<1	<1	<1	<1	-
	01/24/20	**35.5**	<1	<1	<1	<1	<1	<1
TMW-18	03/24/15	**9.3**	<	<	<	<	<	<
MW-20S	05/10/16	<	<	<	<	<	<	<
	03/27/19	<1	<1	<1	<1	<1	<1	-
MW-20T	05/10/16	<	<	<	<	<	<	<
	03/27/19	<1	<1	<1	<1	<1	<1	-
MW-21S	06/06/16	<	<	<	<	<	<	<
	04/11/19	<1	<1	<1	<1	<1	<1	-

Table 4 - Laboratory Analytical Results - Groundwater VOCs
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	PCE	TCE	1,1-DCE	cis 1,2 DCE	Vinyl Chloride	1,1-DCA	112-TCFA
	USEPA MCL	**5**	**5**	**7**	**70**	**2**	**-**	**-**
USEPA RSL (Tap Water)		11	0.49	280	36	0.019	2.8	55000
MW-21T	06/06/16	**25.9**	<	<	<	<	<	77.7
	02/16/17	3.9	<1	<1	<1	<1	<1	11.9
	06/21/18	**10.2**	<1	<1	<1	<1	<1	-
	04/11/19	3.5	<1	<1	<1	<1	<1	-
	01/23/20	2.1	<1	<1	<1	<1	<1	5
MW-23S	05/10/16	**7.2**	<	<	<	<	<	<
	03/27/19	4.8	<1	<1	<1	<1	<1	-
	01/22/20	4.7	<1	<1	<1	<1	<1	<1
EQ Blank	04/11/19	<1	<1	<1	<1	<1	<1	-
	01/24/20	<1	<1	<1	<1	<1	<1	<1
Trip Blank	04/12/19	<1	<1	<1	<1	<1	<1	-

Notes
"-" - Not Analyzed
"<" - Below Detection Limit
Only detected compounds shown
(D) - Duplicate sample
Concentrations shown as micrograms per liter (µg/L)
PDB - Passive Diffusion Bag Sample (depth in feet)
MCL - Maximum Contaminant Level
RSL - Regional Screening Level
Bold results exceed MCL

PCE - Tetrachloroethene
DCE - Dichloroethene
DCA - Dichloroethane
TCE - Trichloroethene
TCFA - Trichlorotriflouroethane

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO	ORP	Cond.	Sulfate	TOC	Ferrous Iron	Nitrate
			ppm	mV	µs/cm	mg/L	mg/L	mg/L	mg/L
MW-1T[1]	11/14/12	7.1	1.5	-290	134	-	-	-	-
	05/29/14	-	0.4	200	126	-	-	-	-
	11/20/14	7.8	0.9	-23	106	-	-	-	-
	05/10/16	6.9	0.4	-13	136	-	-	-	-
	03/27/19	6.8	0.0	251	113	-	-	-	-
	01/22/20	6.9	1.9	128	166	-	-	-	-
MW-1S	05/10/16	4.5	1.0	195	35	-	-	-	-
	03/27/19	4.9	4.0	289	33	-	-	-	-
	01/22/20	4.6	5.6	369	34	-	-	-	-
MW-2	11/14/12	6.0	3.5	18	60	-	-	-	-
	05/29/14	-	7.5	105	44	-	-	-	-
	11/20/14	6.6	6.0	9	43	-	-	-	-
	02/25/15	5.7	5.5	197	45	-	-	-	-
	06/20/18	5.1	3.9	189	46	-	-	-	-
25'	03/28/19	6.0	3.1	292	48	-	-	-	-
40'	03/28/19	6.1	3.5	285	49	-	-	-	-
20'	01/22/20	5.6	5.2	295	45	-	-	-	-
40'	01/22/20	5.7	4.9	247	47	-	-	-	-
MW-3	11/14/12	5.5	5.9	88	30	-	-	-	-
	05/29/14	-	2.5	105	57	-	-	-	-
	11/20/14	5.5	-	-23	287	-	-	-	-
	03/27/19	5.7	5.3	304	32	-	-	-	-
	01/21/20	5.4	6.7	293	29	-	-	-	-
MW-4	11/14/12	4.9	7.3	162	41	-	-	-	-
	05/29/14	-	4.8	287	55	-	-	-	-
	12/02/14	4.9	-	131	66	-	-	-	-
	02/25/15	4.8	8.0	271	117	-	-	-	-
	05/11/16	4.5	1.1	298	66	<	-	-	-
	06/20/18	4.8	5.0	162	65	<1	<1	<0.5	-
	09/27/18	6.3	0.6	-51	265	<1	-	2.5	-
	12/05/18	6.6	0.0	83	501	<1	2790	2.5	-
	02/25/19	5.8	0.0	213	639	-	-	4.5	-
	03/28/19	5.9	0.0	222	567	<1	2430	8.0	-
	01/22/20	6.3	0.3	-67	553	<1	-	5.3	-
	04/14/20	6.5	0.2	-93	542	<1	29.1	7.0	8.0

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO	ORP	Cond.	Sulfate	TOC	Ferrous Iron	Nitrate
			ppm	mV	µs/cm	mg/L	mg/L	mg/L	mg/L
MW-4T	05/11/16	5.9	1.0	138	48	4.8	-	-	-
	02/16/17	5.7	5.1	202	58	-	-	-	-
	06/20/18	5.4	4.4	92	55	1.9	<1	<0.5	-
	09/27/18	5.9	2.7	238	50	-	-	<0.5	-
	12/05/18	6.0	4.9	105	46	-	<1	<0.5	-
	02/25/19	5.8	4.5	269	46	-	-	<0.5	-
	03/28/19	6.1	3.3	296	48	2	<1	<0.5	-
	01/22/20	5.8	5.7	220	53	-	-	1.0	-
	04/14/20	5.7	4.2	211	52	<1	<1	2.0	<1
MW-4D[2]	01/03/13	10.0	5.1	180	143	-	-	-	-
	05/29/14	-	0.3	252	178	-	-	-	-
	11/20/14	8.7	0.2	5	167	-	-	-	-
	02/25/15	5.4	3.4	168	75	-	-	-	-
	05/11/16	6.5	0.4	215	95	-	-	-	-
	06/20/18	5.7	0.6	95	83	11.3	<1	0.7	-
	03/28/19	6.5	1.7	253	104	-	-	-	-
MW-5	11/14/12	4.9	7.2	124	29	-	-	-	-
	05/29/14	-	3.8	270	25	-	-	-	-
	06/03/14	-	-	217	46	-	-	-	-
	11/20/14	5.9	-	41	24	-	-	-	-
	05/11/16	4.7	1.1	252	27	-	-	-	-
	03/29/19	4.4	7.5	315	27	-	-	-	-
	01/22/20	4.8	8.1	341	30	-	-	-	-
	04/14/20	4.6	7.9	324	31	-	-	-	-
MW-6S[3]	05/12/16	4.7	0.0	252	253	2.6	-	-	-
	02/16/17	-	-	-	-	-	-	-	-
	06/21/18	4.7	5.1	208	67	-	-	-	-
	03/29/19	4.4	1.5	321	188	<1	<1	<0.5	-
	01/22/20	4.5	5.6	408	75	<	-	0.75	-
	04/14/20	4.4	3.9	428	112	<1	<1	1.0	4.0
MW-6I	05/12/16	4.8	5.2	310	49	-	-	-	-
	02/16/17	5.3	5.8	240	46	-	-	-	-
	06/21/18	4.8	4.9	91	44	-	-	-	-
	09/28/18	5.2	2.9	345	48	-	-	-	-
	12/06/18	5.1	5.3	120	49	-	<1	<0.5	-
	02/25/19	4.6	5.8	329	50	-	-	<0.5	-
	03/29/19	4.9	5.3	352	52	<1	<1	<0.5	-
	01/22/20	4.6	7.0	386	43	<	-	1.4	-
	04/14/20	4.6	6.9	402	56	<1	<1	1.0	1.0

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO ppm	ORP mV	Cond. µs/cm	Sulfate mg/L	TOC mg/L	Ferrous Iron mg/L	Nitrate mg/L
MW-6T	05/12/16	6.1	2.8	138	93	4.8	-	-	-
	02/16/17	6.2	5.8	192	53	-	-	-	-
	06/21/18	5.7	5.4	47	51	-	-	-	-
	12/05/18	6.2	5.2	112	54	-	<1	<0.5	-
	02/25/19	5.8	5.9	312	52	-	-	<0.5	-
	04/11/19	5.8	6.3	332	56	-	-	1.0	-
	01/23/20	5.7	6.1	274	55	<	-	1.0	-
	04/15/20	5.6	6.3	297	55	<1	<1	1.0	<1
MW-6D	05/12/16	7.0	1.4	62	107	-	-	-	-
	06/06/16	6.3	0.4	187	101	-	-	-	-
	02/16/17	6.5	0.2	182	94	-	-	-	-
	06/21/18	6.3	0.0	55	94	-	-	-	-
	02/25/19	6.3	0.0	293	93	-	-	2.0	-
	03/29/19	6.5	0.0	322	94	11.6	<1	<0.5	-
	01/21/20	6.4	0.3	43	99	<	-	3.0	-
	04/15/20	6.2	0.3	50	90	<1	<1	1.5	<1
MW-7	11/14/12	4.8	7.4	163	27	-	-	-	-
	05/29/14	-	0.9	357	32	-	-	-	-
	12/02/14	6.9	-	116	30	-	-	-	-
	05/11/16	4.3	1.2	340	30	-	-	-	-
	04/14/20	4.5	6.6	392	31	-	-	-	-
MW-8	11/14/12	5.5	4.7	144	64	-	-	-	-
	05/29/14	-	1.3	335	30	-	-	-	-
	12/02/14	5.9	-	87	42	-	-	-	-
	05/10/16	4.5	3.6	316	36	-	-	-	-
	01/22/20	5.3	5.5	335	96	-	-	-	-
	04/14/20	4.8	5.6	364	49	-	-	-	-
MW-9S[4]	11/14/12	4.8	5.1	118	18	-	-	-	-
	05/29/14	-	3.6	402	42	-	-	-	-
	12/02/14	4.3	-	-15	53	-	-	-	-
	05/12/16	4.6	6.0	379	52	-	-	-	-
	02/16/17	4.8	4.6	280	48	-	-	-	-
	06/21/18	4.4	4.9	158	42	-	-	-	-
	04/11/19	4.7	4.7	349	42	-	-	-	-
	01/23/20	4.5	4.0	604	49	-	-	-	-
	04/15/20	4.4	5.7	556	44	-	-	-	-
MW-9T	05/12/16	5.5	5.6	267	54	-	-	-	-
	02/16/17	5.6	6.3	244	36	-	-	-	-
	06/21/18	5.0	5.2	148	36	-	-	-	-
	04/11/19	5.5	4.1	347	56	-	-	-	-
	01/23/20	5.3	7.5	459	40	-	-	-	-
	04/16/20	5.3	6.6	312	43	-	-	-	-

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO ppm	ORP mV	Cond. µs/cm	Sulfate mg/L	TOC mg/L	Ferrous Iron mg/L	Nitrate mg/L
MW-9D	05/12/16	6.5	3.5	241	159	-	-	-	-
	06/06/16	5.9	3.6	254	130	-	-	-	-
	02/16/17	6.3	3.5	234	77	-	-	-	-
	06/21/18	5.5	4.6	160	63	-	-	-	-
	04/11/19	5.9	3.1	335	78	-	-	-	-
	01/23/20	6.2	6.7	405	63	-	-	-	-
	04/16/20	5.6	5.5	255	70	-	-	-	-
MW-10S[5]	11/14/12	4.8	4.8	144	34	-	-	-	-
	05/29/14	-	4.2	230	30	-	-	-	-
	12/02/14	6.8	-	47	136	-	-	-	-
	04/10/19	5.4	5.4	311	37	<1	<1	-	-
	01/21/20	4.8	6.5	347	38	-	-	-	-
	04/15/20	5.1	7.6	324	41	-	-	-	-
MW-10I	05/11/16	5.3	1.2	191	45	2.4			-
	02/15/17	5.3	5.5	207	39	-	-	-	-
	06/19/18	4.3	5.1	201	35	-	-	-	-
	09/28/18	5.6	3.0	288	36	-	-	-	-
	12/05/18	5.4	3.1	97	39	-	-	-	-
	12/20/18	4.7	3.9	118	37	-	-	-	-
	04/12/19	4.6	4.9	292	36	<1	<1	-	-
	01/24/20	4.7	7.0	381	37	-	-	-	-
	04/15/20	4.5	7.5	402	37	-	-	-	-
MW-10T	05/11/16	6.2	0.3	-174	119	-	-	-	-
	02/15/17	6.4	1.1	181	85	-	-	-	-
	06/19/18	5.3	8.5	193	62	-	-	-	-
	04/10/19	5.8	0.8	305	57	12.4	<1	-	-
	01/24/20	5.4	1.1	270	61	-	-	-	-
	04/15/20	5.4	1.6	236	56	-	-	-	-
MW-12	01/03/13	5.4	7.0	147	14	-	-	-	-
	05/29/14	-	1.0	333	27	-	-	-	-
	12/02/14	5.3	-	89	46	-	-	-	-
	05/10/16	4.1	1.4	196	27	<	-	-	-
	03/27/19	4.8	5.5	271	56	-	-	-	-
MW-13	01/03/13	6.0	2.5	135	41	-	-	-	-
	05/29/14	-	3.7	304	35	-	-	-	-
	11/20/14	5.4	-	51	102	-	-	-	-
	05/10/16	5.2	1.2	246	29	-	-	-	-
	03/29/19	5.6	3.4	297	35	-	-	-	-
	01/22/20	5.4	5.4	330	36	-	-	-	-

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO ppm	ORP mV	Cond. µs/cm	Sulfate mg/L	TOC mg/L	Ferrous Iron mg/L	Nitrate mg/L
MW-14	01/03/13	5.0	5.0	151	25	-	-	-	-
	05/29/14	-	0.8	346	37	-	-	-	-
	12/02/14	6.5	-	178	42	-	-	-	-
	05/11/16	4.7	0.8	366	34	-	-	-	-
	03/29/19	4.8	3.9	336	40	-	-	-	-
	01/22/20	4.7	6.5	388	41	-	-	-	-
MW-15	01/03/13	5.3	5.1	180	25	-	-	-	-
	05/29/14	-	3.4	272	30	-	-	-	-
	12/02/14	6.4	-	13	65	-	-	-	-
	05/11/16	4.8	1.7	296	30	-	-	-	-
	02/16/17	5.3	7.5	245	30	-	-	-	-
	06/21/18	4.8	8.3	157	31	-	-	-	-
	04/11/19	5.1	5.7	347	30	-	-	-	-
	01/23/20	5.0	7.3	352	29	-	-	-	-
MW-16	12/02/14	8.4	-	85	84	-	-	-	-
	05/11/16	4.7	1.5	279	25	-	-	-	-
	04/12/19	4.9	6.4	336	27	-	-	-	-
MW-17	12/02/14	5.8	-	25	48	-	-	-	-
	02/25/15	5.2	7.6	212	31	-	-	-	-
	05/11/16	6.3	1.4	107	58	-	-	-	-
	06/20/18	4.3	5.4	214	27	-	-	-	-
	12/20/18	4.7	4.6	114	27	-	-	-	-
	04/10/19	4.8	5.1	300	28	-	-	-	-
	01/24/20	4.6	7.4	373	29	-	-	-	-
MW-20S	05/10/16	6.3	1.2	252	589	2.3	-	-	-
	03/27/19	5.6	6.3	246	426	-	-	-	-
MW-20T	05/10/16	5.3	1.4	267	21.5	<	-	-	-
	03/27/19	5.5	4.6	238	20	-	-	-	-
MW-21S	06/06/16	-	-	-	-	-	-	-	-
	04/11/19	4.7	3.1	346	33	-	-	-	-
MW-21T	06/06/16	5.4	2.0	-399	77.7	-	-	-	-
	02/16/17	5.4	4.1	204	78	-	-	-	-
	06/21/18	4.6	4.0	193	65	-	-	-	-
	04/11/19	5.2	3.6	326	72	-	-	-	-
	01/23/20	4.9	3.0	414	72	-	-	-	-

Table 5 - Groundwater Geochemical Parameters
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

MW ID	Sample Date	pH	DO	ORP	Cond.	Sulfate	TOC	Ferrous Iron	Nitrate
			ppm	mV	µs/cm	mg/L	mg/L	mg/L	mg/L
MW-23S	05/10/16	4.3	1.2	295	27.9	-	-	-	-
	03/27/19	5.0	6.1	317	31	-	-	-	-
	01/22/20	4.8	6.2	331	32	-	-	-	-

"-" - Not Analyzed
"<" - Below Detection Limits
TOC - Total Organic Carbon by EPA Method 5310
DO - Dissolved Oxygen
Cond. - Specific Conductance
ORP - Oxidation Reduction Potential
* - Well evacuated before parameters could be measured
[1] - MW-1 was renamed MW-1T as part of the MW-1 cluster
[2] - MW-11D was renamed MW-4D as part of the MW-4 cluster
[3] - MW-6 was plugged to a depth of 31.0 feet and renamed MW-6S as part of the MW-6 cluster
[4] - MW-9 was plugged to a depth of 21.0 feet and renamed MW-9S as part of the MW-9 cluster
[5] - MW-10 was plugged to a depth of 23.6 feet and renamed MW-10S as part of the MW-10 cluster

Table 6 - Groundwater Bioremediation Microbe Analysis
Woven Electronics Corporation
1001 Old Stage Road, Simpsonville SC

Sample ID	Sample Date	*DHC*	*Sulfate Reducers*	*Methanogens*	*Geobacter*
		(cell counts per milliliter)			
MW-4	4/15/2019	7.24×10^{1}	1.86×10^{4}	9.61×10^{4}	2.05×10^{3}
	4/14/2020	5.00×10^{-1} (J)	3.55×10^{4}	4.96×10^{4}	1.10×10^{0} (J)
MW-4T	4/15/2019	3.00×10^{-1} (J)	1.88×10^{1}	1.00×10^{-1} (J)	5.00×10^{-1} (J)
	4/14/2020	2.00×10^{-1} (J)	2.07×10^{4}	1.19×10^{1}	2.19×10^{1}
MW-6I	4/15/2019	3.00×10^{-1} (J)	$<4.50 \times 10^{0}$	$<4.50 \times 10^{0}$	$<4.50 \times 10^{0}$
	4/14/2020	$<5.00 \times 10^{-1}$	$<4.70 \times 10^{0}$	$<4.70 \times 10^{0}$	$<4.70 \times 10^{0}$
MW-10I	4/15/2019	$<5.00 \times 10^{-1}$	$<4.50 \times 10^{0}$	$<4.50 \times 10^{0}$	$<4.50 \times 10^{0}$
	4/15/2020	$<5.00 \times 10^{-1}$	3.82×10^{3}	$<4.70 \times 10^{0}$	$<4.70 \times 10^{0}$

NC - Not Calculated
"<" - Below Detection Limits
(J) - Estimated value
DHC - Dehalococcoides

CHARTS

Chart 1 – Soil Vapor Extraction Concentrations - PCE
Chart 2 – PCE in Groundwater - Source Area Wells
Chart 3 – PCE in Groundwater - Plume Area Wells
Chart 4 – PCE in Groundwater - Downgradient Wells
Chart 5 – PCE in Groundwater - Downgradient Boundary Wells
Chart 6 – Groundwater Geochemical Parameters in Pilot Study Area

Chart 1 - Soil Vapor Extraction Concentration - PCE
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC

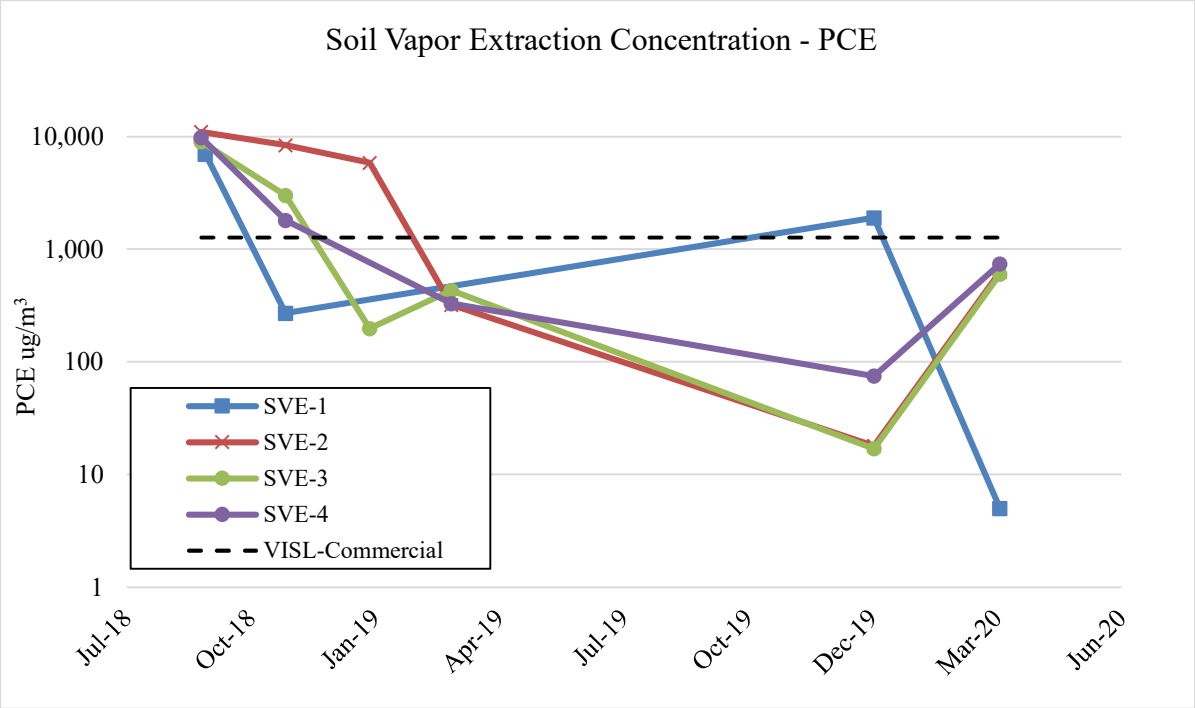
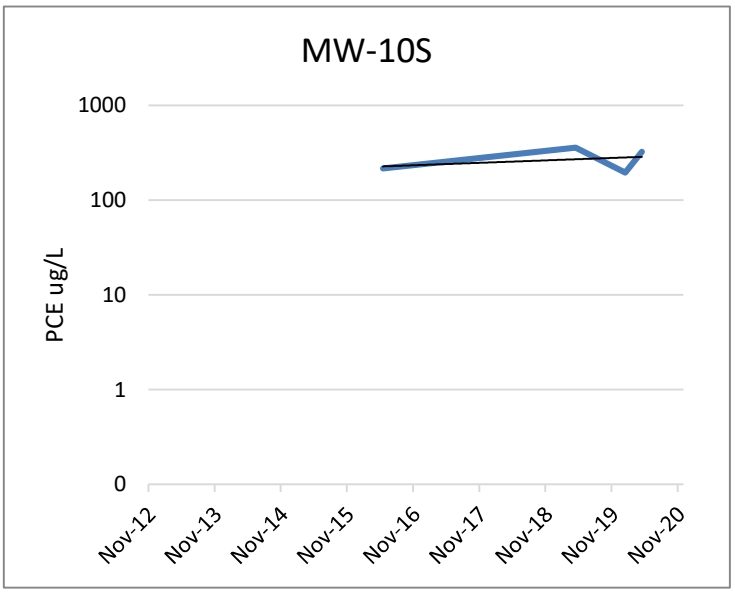
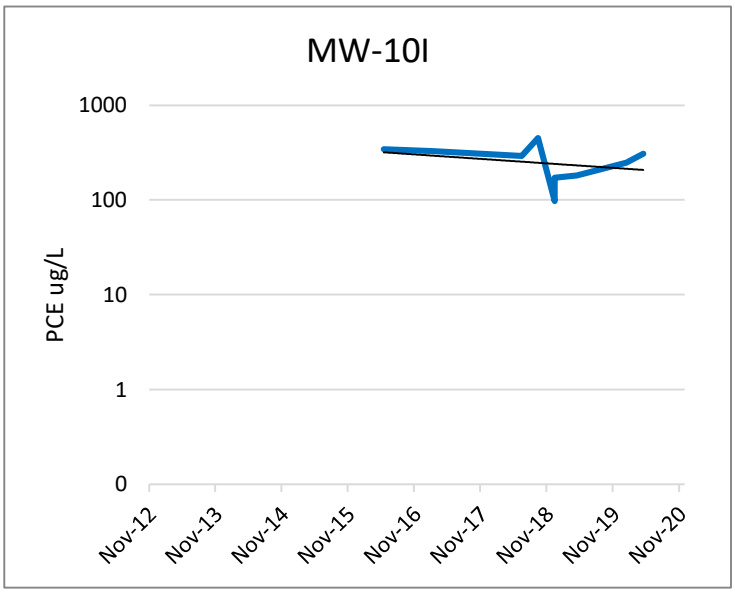
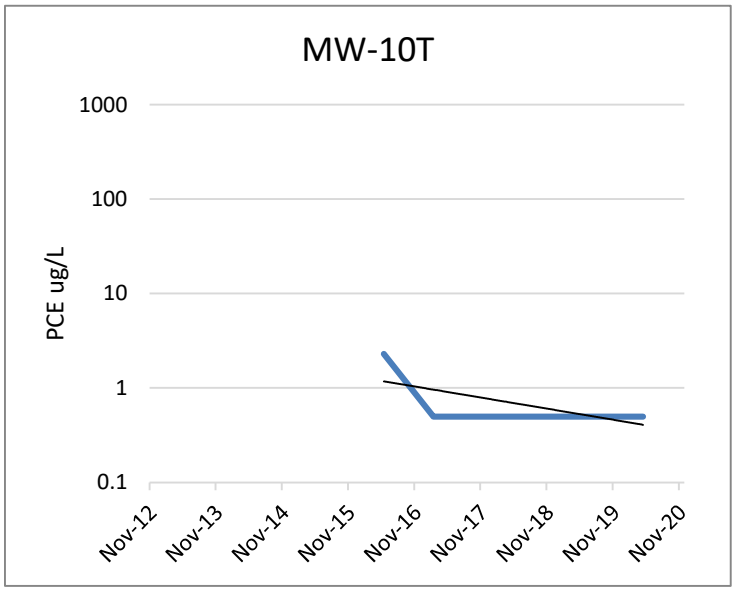


Chart 2 - PCE in Groundwater - Source Area Wells
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC







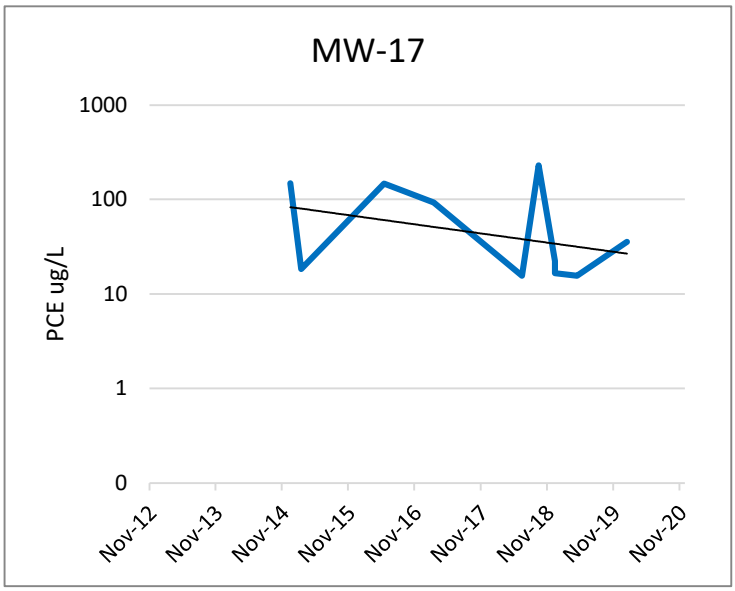
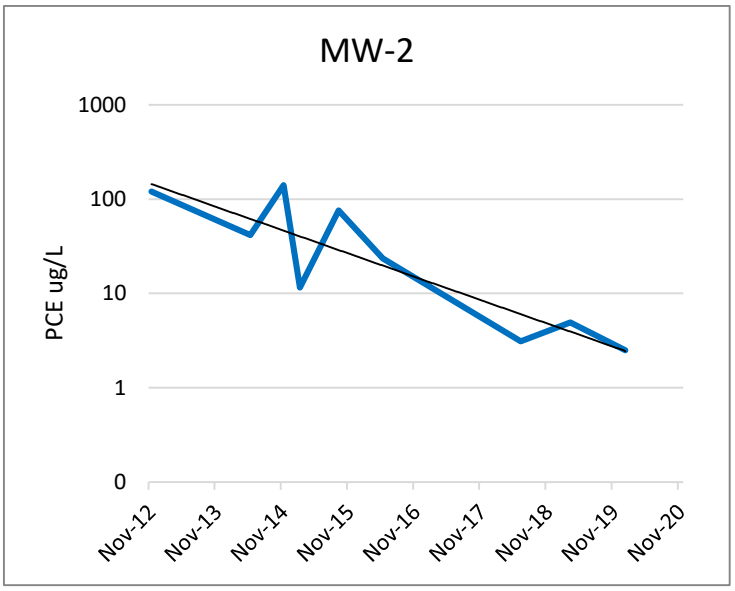
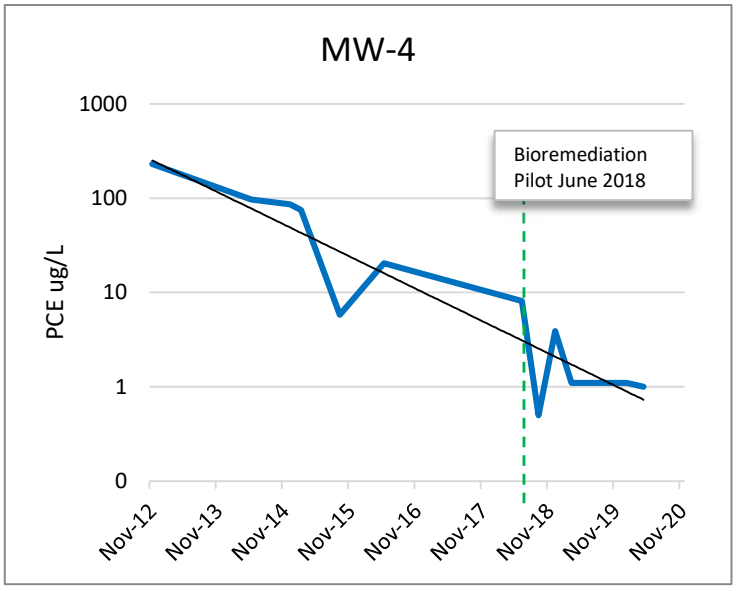
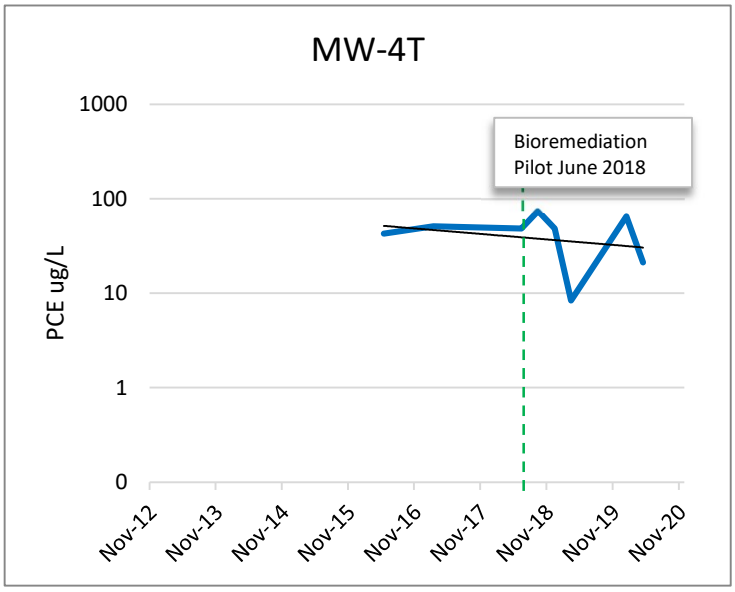


Chart 3 - PCE in Groundwater - Plume Area Wells
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC







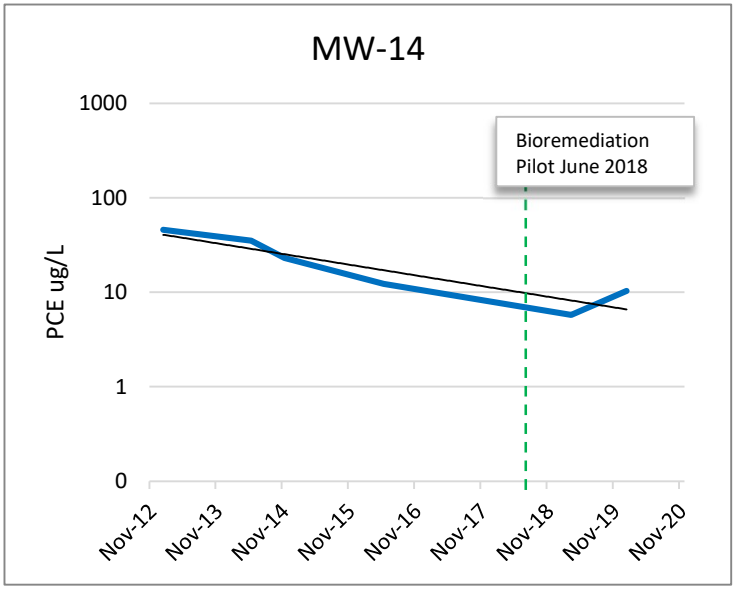
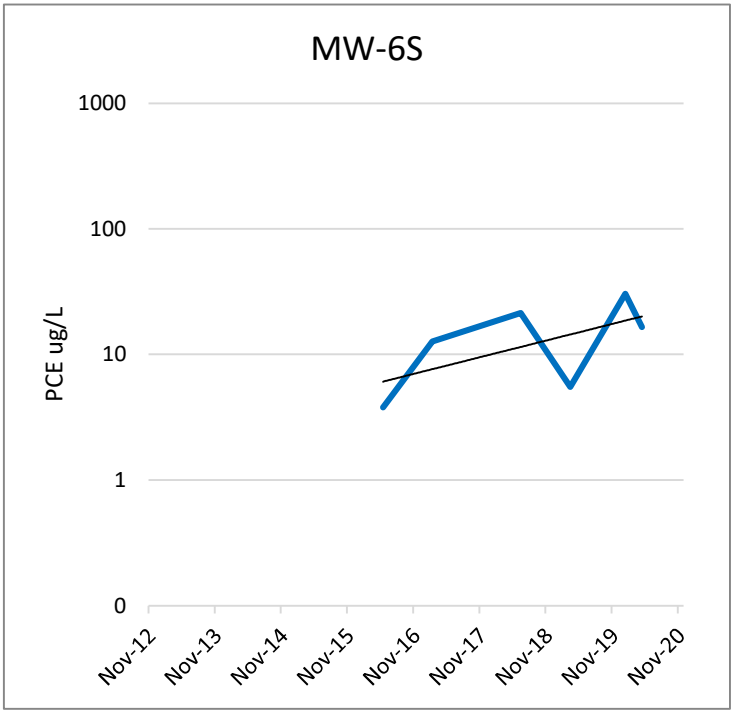
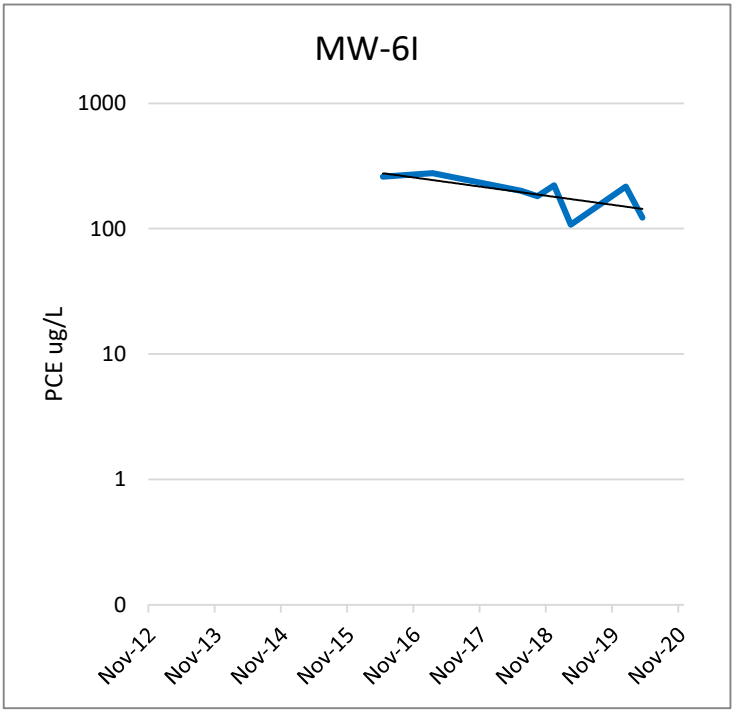
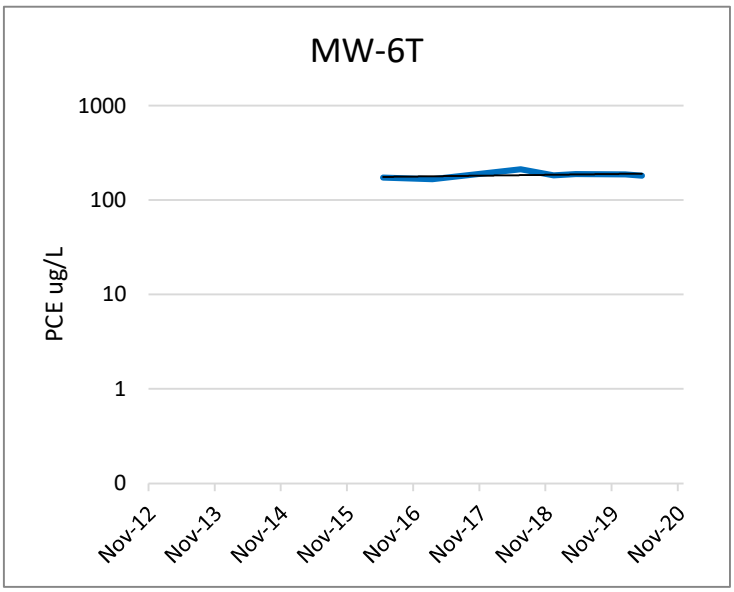


Chart 4 - PCE in Groundwater - Downgradient Wells
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC







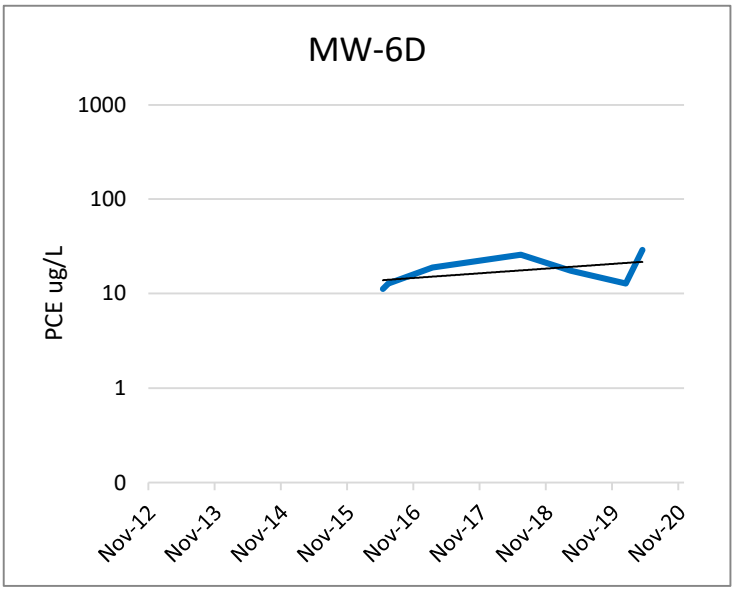
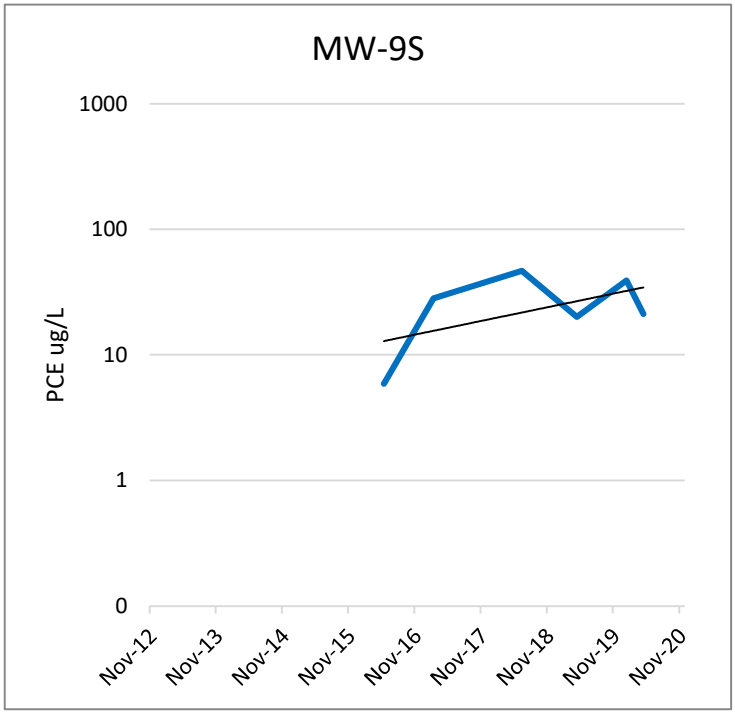
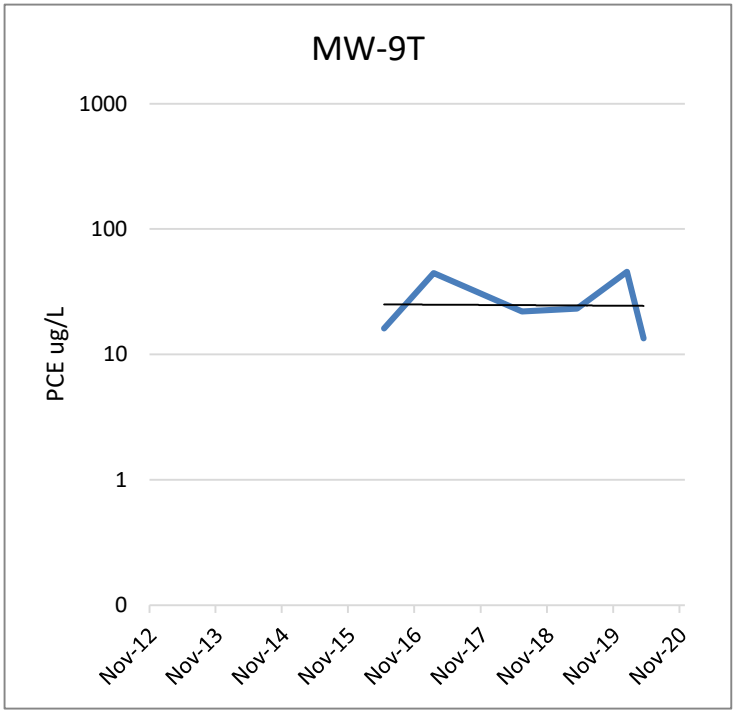
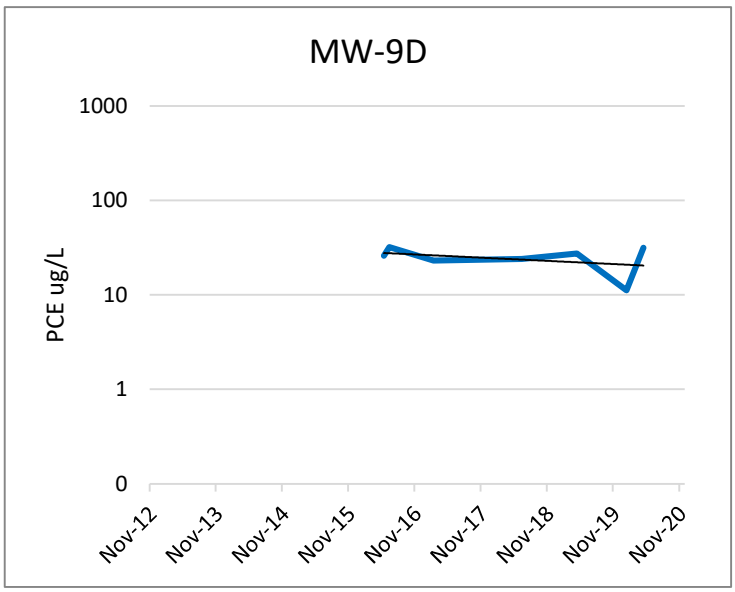


Chart 5 - PCE in Groundwater - Downgradient Boundary Wells
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC







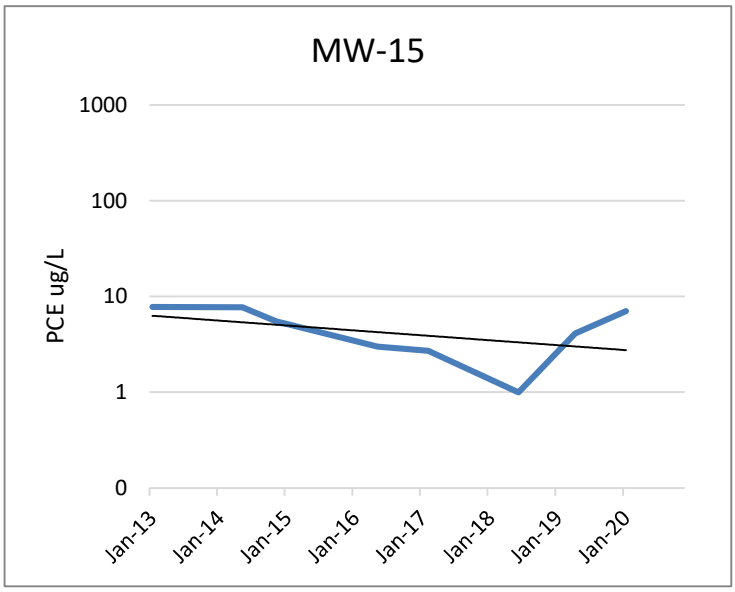
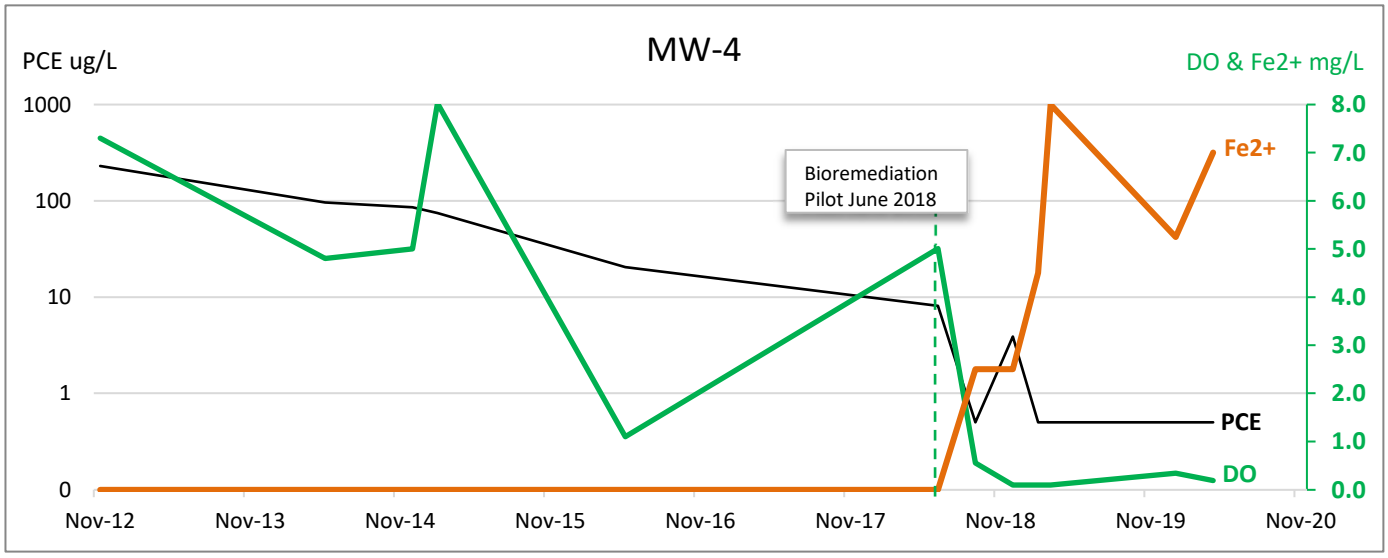
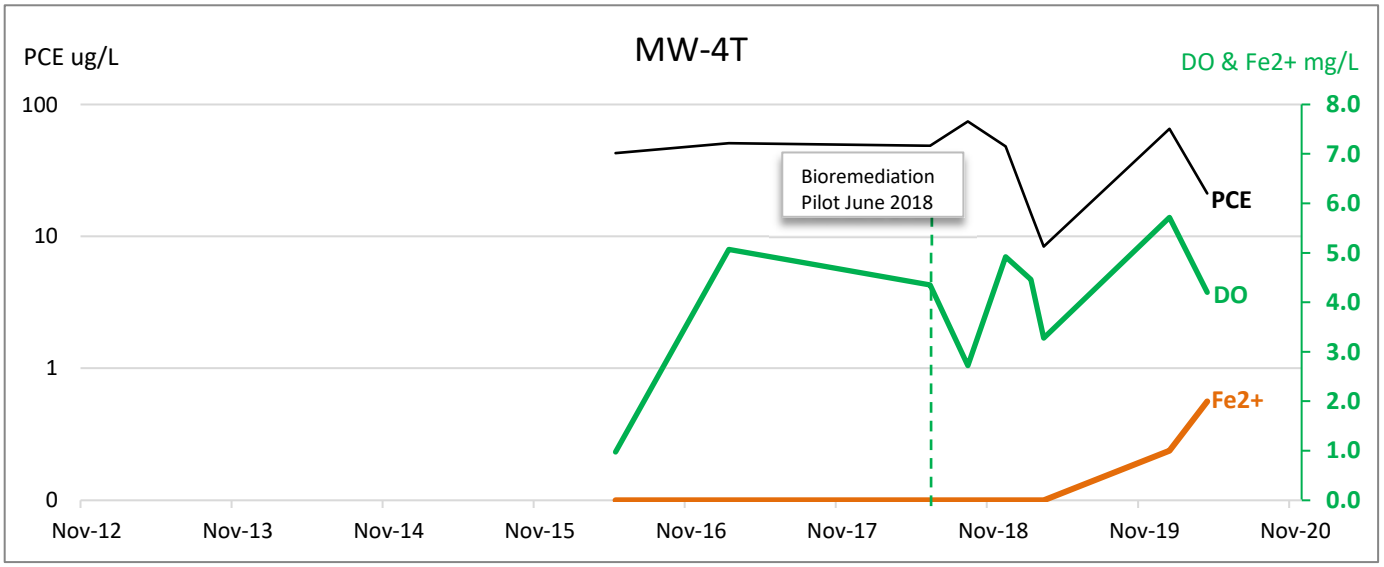
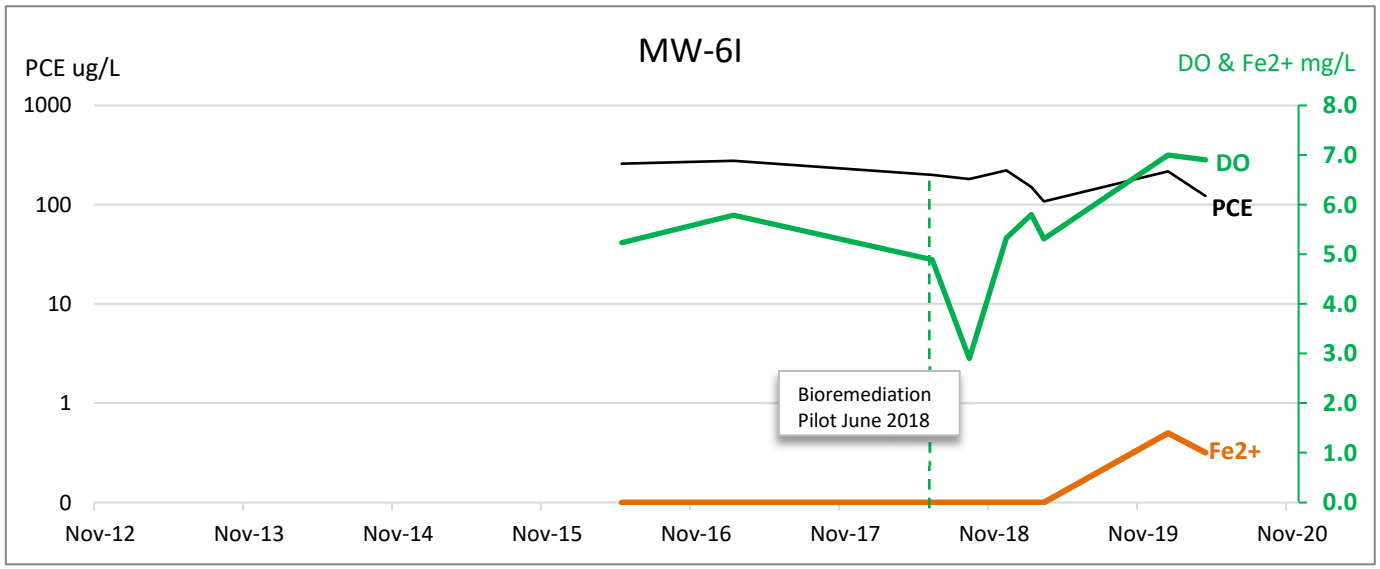


Chart 6 - Groundwater Bioremediation Parameters in Pilot-Scale Area
Woven Electronics, LLC
1001 Old Stage Road, Simpsonville SC







APPENDIX

Appendix I – Regulatory Correspondence
Appendix II – Soil Vapor Laboratory Analytical Reports
Appendix III – Groundwater Sampling Worksheets
Appendix IV – Groundwater Laboratory Analytical Reports
Appendix V – Microbiological Laboratory Analytical Reports

APPENDIX I

REGULATORY CORRESPONDENCE

March 26, 2020

Mr. Brian Hackler
Vice President and General Manger
Woven Electronics, LLC
1001 Old Stage Road
Simpsonville, SC 29681

Re: Pilot-Scale Remediation Interim Report (CRB; March 25, 2020)
Email Summary dated March 26, 2020
Woven Electronics
Greenville County
Voluntary Cleanup Contract #13-6203-RP
BLWM File #418096

Dear Mr. Hackler:

The South Carolina Department of Health and Environmental Control (the Department) has reviewed the reference report. The Department recommends an additional sampling event to confirm the results of SVE-1 and to support the theory that the abiotic degradation is occurring at the Site.

The next interim report should be submitted to my attention on or before June 30, 2020. Please reference BLWM File #418096 on all correspondence. If you have any questions, please e-mail me at trentjc@dhec.sc.gov or contact me at (803) 898-0723.

Sincerely,

Jan Trent

Jan Trent, Project Manager
State Voluntary Cleanup Program
Site Assessment, Remediation & Revitalization Division
Bureau of Land and Waste Management

cc: Lucas Berresford, BLWM
Natalie Kirkpatrick, Area Director, Upstate BEHS, Greenville
Robert Workman, CRB; 5000 Old Buncombe Rd., Suite 21 Greenville, SC 29617
BLWM File #418096

APPENDIX II

SOIL VAPOR LABORATORY ANALYTICAL RESULTS

AND

CHAIN OF CUSTODY

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

April 22, 2020

Rob Workman
CRB Geo & Env.

5000 Old Buncombe Rd.
Greenville SC 29617

RE: RCI414-26

Dear Rob Workman: Order No: 2004F05

Analytical Environmental Services, Inc. received 4 samples on 4/16/2020 9:12:00 AM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Air & Emissions for Volatile Organics effective 07/01/19-06/30/20.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Chris Pafford

Project Manager

3080 Presidential Drive • Atlanta, Georgia 30340 • Tel: 770.457.8177 • Fax: 770.457.8188 • Toll Free: 800.972.4889
www.aesatlanta.com

APPENDIX

Compound	CAS #	Alternate Name	TO-14A	TO-15	SOP
Acetone	67-64-1				X
Allyl chloride	107-05-1	3-Chloropropene		X	
Benzene	71-43-2		X	X	
Benzyl chloride	100-44-7		X	X	
Bromodichloromethane	75-27-4	Dichlorobromomethane			X
Bromoform	75-25-2	Tribromomethane		X	
Bromomethane	74-83-9	Methyl bromide	X	X	
1,3-Butadiene	106-99-0			X	
Carbon disulfide	75-15-0			X	
Carbon tetrachloride	56-23-5		X	X	
Chlorobenzene	108-90-7		X	X	
Chloroethane	75-00-3	Ethyl chloride	X	X	
Chloroform	67-66-3		X	X	
Chloromethane	74-87-3	Methyl chloride	X	X	
Cyclohexane	110-82-7				X
Dibromochloromethane	124-48-1	Chlorodibromomethane			X
1,2-Dibromoethane	106-93-4	EDB/Ethylene dibromide	X	X	
1,2-Dichlorobenzene	95-50-1	*o*-Dichlorobenzene	X	X	
1,3-Dichlorobenzene	541-73-1	*m*-Dichlorobenzene	X	X	
1,4-Dichlorobenzene	106-46-7	p-Dichlorobenzene	X	X	
Dichlorodifluoromethane	75-71-8	Freon-12	X		
1,1-Dichloroethane	75-34-3		X	X	
1,2-Dichloroethane	107-06-2		X	X	
1,1-Dichloroethene	75-35-4	1,1-Dichloroethylene	X	X	
cis-1,2-Dichloroethene	156-59-2	*cis*-1,2-Dichloroethylene	X	X	
trans-1,2-Dichloroethene	156-60-5	*trans*-1,2-Dichloroethylene		X	
1,2-Dichloropropane	78-87-5		X	X	
cis-1,3-Dichloropropene	10061-01-5		X	X	
trans-1,3-Dichloropropene	10061-02-6		X	X	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	Freon-114	X		
1,4-Dioxane	123-91-1	1,4-Diethylene oxide		X	
Ethyl acetate	141-78-6	Acetic acid, ethyl ester			X
Ethylbenzene	100-41-4		X	X	
4-Ethyltoluene	622-96-8				X
n-Heptane	142-82-5	Heptane			X
Hexachlorobutadiene	87-68-3	Hexachloro-1,3-butadiene	X	X	

n-Hexane	110-54-3	Hexane		X	
Compound	**CAS #**	**Alternate Name**	**TO-14A**	**TO-15**	**SOP**
2-Hexanone	591-78-6	Methyl butyl ketone			X
Methylene chloride	75-09-2	Dichloromethane	X	X	
Methyl tert-butyl ether	1634-04-4	MTBE		X	
Methyl ethyl ketone	78-93-3	MEK/2-Butanone		X	
Methyl isobutyl ketone	108-10-1	4-Methyl-2-pentanone		X	
2-Propanol	67-63-0	Isopropanol/Isopropyl alcohol			X
Propene	115-07-1	Propylene			X
Styrene	100-42-5			X	
1,1,2,2-Tetrachloroethane	79-34-5		X	X	
Tetrachloroethene	127-18-4	Tetrachloroethylene	X	X	
Tetrahydrofuran	109-99-9				X
Toluene	108-88-3			X	
1,2,4-Trichlorobenzene	120-82-1			X	
1,1,1-Trichloroethane	74-55-6			X	
1,1,2-Trichloroethane	79-00-5			X	
Trichloroethene	79-01-6	Trichloroethylene		X	
Trichlorofluoromethane	75-69-4	Freon-11	X		
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	Freon-113	X		
1,2,4-Trimethylbenzene	95-63-6		X	X	
1,3,5-Trimethylbenzene	108-67-8		X	X	
2,2,4-Trimethylpentane	540-84-1	Isooctane		X	
Vinyl acetate	108-05-04			X	
Vinyl bromide	593-60-2	Bromoethene		X	
Vinyl chloride	75-01-4	Chloroethene	X	X	
Xylenes, Total	1330-20-7		X	X	
m/p-Xylene	179601-23-1		X	X	
o-Xylene	95-47-6		X	X	

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

3080 Presidential Drive
Atlanta, GA 30340
Phone: (770) 457-8177 / Fax: (770) 457-8188

VAPOR/AIR CHAIN OF CUSTODY

Work Order #: 2004F05
Date:
Page: 1 of 1

COMPANY INFORMATION	PROJECT INFORMATION	INVOICE INFORMATION		SAMPLING INFORMATION
Company Name: CRB Geological + Env. Services	Project Name: RCI 414-26	Company Name:	Invoice To Name(s):	Sampled By (print): Brian Walker
Address: 5000 Old Buncombe Road Suite #21	Project #: RCI 414-26	Company Address:	Invoice To Email(s):	Sampler Signature:
City, State, Zip: Greenville, SC 29617	Report To Name(s): Robert Workman	Company City, State, Zip:	Invoice To Phone #(s):	Date: 4/14/20
Phone #: 864-283-2000	Report To Email(s): rworkman@crbgeo.com	AES Project Manager: Chris Patford	AES Quote # and/or PO #:	State/Project Location: SC

SPECIAL INSTRUCTIONS

Special list of analytes or other comments:

REQUESTED TURNAROUND TIME

- Standard (Five Days) ☑
- Two Day Rush ☐
- Four Day Rush ☐
- Next Day Rush ☐
- Three Day Rush ☐
- Other:

REPORTING REQUIREMENTS

- Standard/Level II Data Package ☐
- Level III Data Package ☐
- Level IV Data Package ☐
- EDD ☐

SHIPPING METHOD

- FedEx ☑
- Client Courier ☐
- UPS ☐
- US Mail ☐
- Client Drop-off ☐
- Other:
- AES Courier ☐

#	Sample ID	Sample Start Date	Sample Start Time (24hr)	Sample Finish Date	Sample Finish Time (24hr)	Sample Matrix (IA = Indoor Air, AA = Ambient Air, SS = Subslab, SV = Soil Vapor)	Canister Serial #	Flow Controller ID	Canister Pressure In Field ("Hg) Start	Canister Pressure In Field ("Hg) Stop	Analysis Requested: TO-15	Remarks
1	SVE-1	4/14	15:33	4/14	15:35	SV	01169	01245	25.5	0.0	✓	
2	SVE-2	4/14	15:41	4/14	15:44	SV	01056	01118	27.5	0.0	✓	
3	SVE-3	4/14	15:48	4/14	15:51	SV	01032	01246	27.5	0.0	✓	
4	SVE-4	4/14	15:56	4/14	15:58	SV	01031	01247	24.0	0.0	✓	
5												
6												
7												
8												
9												
10												

SAMPLE RECEIPT

Relinquished			Received		
Relinquished By:	Date: 4/15/20	Time: 4:07 PM	Received By: Jaynie	Date: 4/16/20	Time: 9:12
Relinquished By:	Date:	Time:	Received By:	Date:	Time: Fedex
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

Submission of samples to the laboratory constitutes acceptance of AES's Terms & Conditions. Client assumes sole responsibility for damage or loss of samples before we accept them. Samples received after 3PM or on Saturday are considered as received the following business day. If no TAT is marked on COC, AES will proceed with standard TAT. Visit our website at www.aesatlanta.com for downloadable COCs and to log in to your AESAccess account.

White Copy - Original; Green Copy - Client

TO-15 COC 62218

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-1
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:35:00 PM
Lab ID:	2004F05-001	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
1,1,1-Trichloroethane	12	5.5		ug/m3	295480	2	04/17/2020 17:01	CC
1,1,2,2-Tetrachloroethane	BRL	6.9		ug/m3	295480	2	04/17/2020 17:01	CC
1,1,2-Trichloroethane	BRL	5.5		ug/m3	295480	2	04/17/2020 17:01	CC
1,1-Dichloroethane	8.9	4.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,1-Dichloroethene	9.1	4.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,2,4-Trichlorobenzene	BRL	7.4		ug/m3	295480	2	04/17/2020 17:01	CC
1,2,4-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 17:01	CC
1,2-Dibromoethane	BRL	7.7		ug/m3	295480	2	04/17/2020 17:01	CC
1,2-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,2-Dichloroethane	BRL	4.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,2-Dichloropropane	BRL	4.6		ug/m3	295480	2	04/17/2020 17:01	CC
1,3,5-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 17:01	CC
1,3-Butadiene	BRL	2.2		ug/m3	295480	2	04/17/2020 17:01	CC
1,3-Dichlorobenzene	6.6	6.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,4-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 17:01	CC
1,4-Dioxane	BRL	3.6		ug/m3	295480	2	04/17/2020 17:01	CC
2,2,4-Trimethylpentane	BRL	4.7		ug/m3	295480	2	04/17/2020 17:01	CC
2-Butanone	8.8	2.9		ug/m3	295480	2	04/17/2020 17:01	CC
2-Hexanone	BRL	4.1		ug/m3	295480	2	04/17/2020 17:01	CC
4-Ethyltoluene	BRL	4.9		ug/m3	295480	2	04/17/2020 17:01	CC
4-Methyl-2-pentanone	BRL	4.1		ug/m3	295480	2	04/17/2020 17:01	CC
Acetone	95	12		ug/m3	295480	2	04/17/2020 17:01	CC
Allyl chloride	BRL	3.1		ug/m3	295480	2	04/17/2020 17:01	CC
Benzene	BRL	3.2		ug/m3	295480	2	04/17/2020 17:01	CC
Benzyl chloride	BRL	5.2		ug/m3	295480	2	04/17/2020 17:01	CC
Bromodichloromethane	BRL	6.7		ug/m3	295480	2	04/17/2020 17:01	CC
Bromoform	BRL	10		ug/m3	295480	2	04/17/2020 17:01	CC
Bromomethane	BRL	3.9		ug/m3	295480	2	04/17/2020 17:01	CC
Carbon disulfide	BRL	3.1		ug/m3	295480	2	04/17/2020 17:01	CC
Carbon tetrachloride	BRL	6.3		ug/m3	295480	2	04/17/2020 17:01	CC
Chlorobenzene	BRL	4.6		ug/m3	295480	2	04/17/2020 17:01	CC
Chloroethane	BRL	2.6		ug/m3	295480	2	04/17/2020 17:01	CC
Chloroform	BRL	4.9		ug/m3	295480	2	04/17/2020 17:01	CC
Chloromethane	2.8	2.1		ug/m3	295480	2	04/17/2020 17:01	CC
cis-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 17:01	CC
cis-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 17:01	CC
Cyclohexane	BRL	3.4		ug/m3	295480	2	04/17/2020 17:01	CC
Dibromochloromethane	BRL	8.5		ug/m3	295480	2	04/17/2020 17:01	CC
Dichlorodifluoromethane	BRL	4.9		ug/m3	295480	2	04/17/2020 17:01	CC
Ethyl acetate	210	3.6		ug/m3	295480	2	04/17/2020 17:01	CC
Ethylbenzene	BRL	4.3		ug/m3	295480	2	04/17/2020 17:01	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-1
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:35:00 PM
Lab ID:	2004F05-001	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
Freon-113	190	7.7		ug/m3	295480	2	04/17/2020 17:01	CC
Freon-114	BRL	7.0		ug/m3	295480	2	04/17/2020 17:01	CC
Hexachlorobutadiene	BRL	11		ug/m3	295480	2	04/17/2020 17:01	CC
Isopropyl alcohol	120	18		ug/m3	295480	2	04/17/2020 17:01	CC
m,p-Xylene	BRL	8.7		ug/m3	295480	2	04/17/2020 17:01	CC
Methyl tert-butyl ether	BRL	3.6		ug/m3	295480	2	04/17/2020 17:01	CC
Methylene chloride	BRL	3.5		ug/m3	295480	2	04/17/2020 17:01	CC
n-Heptane	BRL	4.1		ug/m3	295480	2	04/17/2020 17:01	CC
n-Hexane	48	3.5		ug/m3	295480	2	04/17/2020 17:01	CC
o-Xylene	BRL	4.3		ug/m3	295480	2	04/17/2020 17:01	CC
Propene	BRL	1.7		ug/m3	295480	2	04/17/2020 17:01	CC
Styrene	BRL	4.3		ug/m3	295480	2	04/17/2020 17:01	CC
Tetrachloroethene	BRL	6.8		ug/m3	295480	2	04/17/2020 17:01	CC
Tetrahydrofuran	BRL	2.9		ug/m3	295480	2	04/17/2020 17:01	CC
Toluene	BRL	3.8		ug/m3	295480	2	04/17/2020 17:01	CC
trans-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 17:01	CC
trans-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 17:01	CC
Trichloroethene	BRL	5.4		ug/m3	295480	2	04/17/2020 17:01	CC
Trichlorofluoromethane	BRL	5.6		ug/m3	295480	2	04/17/2020 17:01	CC
Vinyl acetate	BRL	3.5		ug/m3	295480	2	04/17/2020 17:01	CC
Vinyl bromide	BRL	4.4		ug/m3	295480	2	04/17/2020 17:01	CC
Vinyl chloride	BRL	2.6		ug/m3	295480	2	04/17/2020 17:01	CC
Xylenes, Total	BRL	13		ug/m3	295480	2	04/17/2020 17:01	CC
Surr: 4-Bromofluorobenzene	81.8	70-130		%REC	295480	2	04/17/2020 17:01	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-2
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:44:00 PM
Lab ID:	2004F05-002	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
1,1,1-Trichloroethane	44	5.5		ug/m3	295480	2	04/17/2020 18:20	CC
1,1,2,2-Tetrachloroethane	BRL	6.9		ug/m3	295480	2	04/17/2020 18:20	CC
1,1,2-Trichloroethane	BRL	5.5		ug/m3	295480	2	04/17/2020 18:20	CC
1,1-Dichloroethane	29	4.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,1-Dichloroethene	160	4.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,2,4-Trichlorobenzene	BRL	7.4		ug/m3	295480	2	04/17/2020 18:20	CC
1,2,4-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:20	CC
1,2-Dibromoethane	BRL	7.7		ug/m3	295480	2	04/17/2020 18:20	CC
1,2-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,2-Dichloroethane	BRL	4.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,2-Dichloropropane	BRL	4.6		ug/m3	295480	2	04/17/2020 18:20	CC
1,3,5-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:20	CC
1,3-Butadiene	BRL	2.2		ug/m3	295480	2	04/17/2020 18:20	CC
1,3-Dichlorobenzene	41	6.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,4-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 18:20	CC
1,4-Dioxane	BRL	3.6		ug/m3	295480	2	04/17/2020 18:20	CC
2,2,4-Trimethylpentane	BRL	4.7		ug/m3	295480	2	04/17/2020 18:20	CC
2-Butanone	20	2.9		ug/m3	295480	2	04/17/2020 18:20	CC
2-Hexanone	BRL	4.1		ug/m3	295480	2	04/17/2020 18:20	CC
4-Ethyltoluene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:20	CC
4-Methyl-2-pentanone	BRL	4.1		ug/m3	295480	2	04/17/2020 18:20	CC
Acetone	92	12		ug/m3	295480	2	04/17/2020 18:20	CC
Allyl chloride	BRL	3.1		ug/m3	295480	2	04/17/2020 18:20	CC
Benzene	3.5	3.2		ug/m3	295480	2	04/17/2020 18:20	CC
Benzyl chloride	BRL	5.2		ug/m3	295480	2	04/17/2020 18:20	CC
Bromodichloromethane	BRL	6.7		ug/m3	295480	2	04/17/2020 18:20	CC
Bromoform	BRL	10		ug/m3	295480	2	04/17/2020 18:20	CC
Bromomethane	BRL	3.9		ug/m3	295480	2	04/17/2020 18:20	CC
Carbon disulfide	8.4	3.1		ug/m3	295480	2	04/17/2020 18:20	CC
Carbon tetrachloride	BRL	6.3		ug/m3	295480	2	04/17/2020 18:20	CC
Chlorobenzene	BRL	4.6		ug/m3	295480	2	04/17/2020 18:20	CC
Chloroethane	BRL	2.6		ug/m3	295480	2	04/17/2020 18:20	CC
Chloroform	BRL	4.9		ug/m3	295480	2	04/17/2020 18:20	CC
Chloromethane	BRL	2.1		ug/m3	295480	2	04/17/2020 18:20	CC
cis-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 18:20	CC
cis-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 18:20	CC
Cyclohexane	BRL	3.4		ug/m3	295480	2	04/17/2020 18:20	CC
Dibromochloromethane	BRL	8.5		ug/m3	295480	2	04/17/2020 18:20	CC
Dichlorodifluoromethane	BRL	4.9		ug/m3	295480	2	04/17/2020 18:20	CC
Ethyl acetate	1100	14		ug/m3	295480	2	04/20/2020 16:44	CC
Ethylbenzene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:20	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-2
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:44:00 PM
Lab ID:	2004F05-002	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
Freon-113	920	7.7		ug/m3	295480	2	04/17/2020 18:20	CC
Freon-114	BRL	7.0		ug/m3	295480	2	04/17/2020 18:20	CC
Hexachlorobutadiene	BRL	11		ug/m3	295480	2	04/17/2020 18:20	CC
Isopropyl alcohol	690	74		ug/m3	295480	2	04/20/2020 16:44	CC
m,p-Xylene	BRL	8.7		ug/m3	295480	2	04/17/2020 18:20	CC
Methyl tert-butyl ether	BRL	3.6		ug/m3	295480	2	04/17/2020 18:20	CC
Methylene chloride	BRL	3.5		ug/m3	295480	2	04/17/2020 18:20	CC
n-Heptane	BRL	4.1		ug/m3	295480	2	04/17/2020 18:20	CC
n-Hexane	BRL	3.5		ug/m3	295480	2	04/17/2020 18:20	CC
o-Xylene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:20	CC
Propene	BRL	1.7		ug/m3	295480	2	04/17/2020 18:20	CC
Styrene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:20	CC
Tetrachloroethene	630	6.8		ug/m3	295480	2	04/17/2020 18:20	CC
Tetrahydrofuran	BRL	2.9		ug/m3	295480	2	04/17/2020 18:20	CC
Toluene	6.8	3.8		ug/m3	295480	2	04/17/2020 18:20	CC
trans-1,2-Dichloroethene	9.5	4.0		ug/m3	295480	2	04/17/2020 18:20	CC
trans-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 18:20	CC
Trichloroethene	BRL	5.4		ug/m3	295480	2	04/17/2020 18:20	CC
Trichlorofluoromethane	BRL	5.6		ug/m3	295480	2	04/17/2020 18:20	CC
Vinyl acetate	BRL	3.5		ug/m3	295480	2	04/17/2020 18:20	CC
Vinyl bromide	BRL	4.4		ug/m3	295480	2	04/17/2020 18:20	CC
Vinyl chloride	BRL	2.6		ug/m3	295480	2	04/17/2020 18:20	CC
Xylenes, Total	BRL	13		ug/m3	295480	2	04/17/2020 18:20	CC
Surr: 4-Bromofluorobenzene	83.5	70-130		%REC	295480	2	04/17/2020 18:20	CC
Surr: 4-Bromofluorobenzene	80	70-130		%REC	295480	2	04/20/2020 16:44	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-3
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:51:00 PM
Lab ID:	2004F05-003	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
1,1,1-Trichloroethane	41	5.5		ug/m3	295480	2	04/17/2020 18:57	CC
1,1,2,2-Tetrachloroethane	BRL	6.9		ug/m3	295480	2	04/17/2020 18:57	CC
1,1,2-Trichloroethane	BRL	5.5		ug/m3	295480	2	04/17/2020 18:57	CC
1,1-Dichloroethane	24	4.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,1-Dichloroethene	83	4.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,2,4-Trichlorobenzene	BRL	7.4		ug/m3	295480	2	04/17/2020 18:57	CC
1,2,4-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:57	CC
1,2-Dibromoethane	BRL	7.7		ug/m3	295480	2	04/17/2020 18:57	CC
1,2-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,2-Dichloroethane	BRL	4.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,2-Dichloropropane	BRL	4.6		ug/m3	295480	2	04/17/2020 18:57	CC
1,3,5-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:57	CC
1,3-Butadiene	BRL	2.2		ug/m3	295480	2	04/17/2020 18:57	CC
1,3-Dichlorobenzene	12	6.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,4-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 18:57	CC
1,4-Dioxane	BRL	3.6		ug/m3	295480	2	04/17/2020 18:57	CC
2,2,4-Trimethylpentane	BRL	4.7		ug/m3	295480	2	04/17/2020 18:57	CC
2-Butanone	10	2.9		ug/m3	295480	2	04/17/2020 18:57	CC
2-Hexanone	BRL	4.1		ug/m3	295480	2	04/17/2020 18:57	CC
4-Ethyltoluene	BRL	4.9		ug/m3	295480	2	04/17/2020 18:57	CC
4-Methyl-2-pentanone	BRL	4.1		ug/m3	295480	2	04/17/2020 18:57	CC
Acetone	93	12		ug/m3	295480	2	04/17/2020 18:57	CC
Allyl chloride	BRL	3.1		ug/m3	295480	2	04/17/2020 18:57	CC
Benzene	BRL	3.2		ug/m3	295480	2	04/17/2020 18:57	CC
Benzyl chloride	BRL	5.2		ug/m3	295480	2	04/17/2020 18:57	CC
Bromodichloromethane	BRL	6.7		ug/m3	295480	2	04/17/2020 18:57	CC
Bromoform	BRL	10		ug/m3	295480	2	04/17/2020 18:57	CC
Bromomethane	BRL	3.9		ug/m3	295480	2	04/17/2020 18:57	CC
Carbon disulfide	BRL	3.1		ug/m3	295480	2	04/17/2020 18:57	CC
Carbon tetrachloride	BRL	6.3		ug/m3	295480	2	04/17/2020 18:57	CC
Chlorobenzene	BRL	4.6		ug/m3	295480	2	04/17/2020 18:57	CC
Chloroethane	BRL	2.6		ug/m3	295480	2	04/17/2020 18:57	CC
Chloroform	BRL	4.9		ug/m3	295480	2	04/17/2020 18:57	CC
Chloromethane	2.2	2.1		ug/m3	295480	2	04/17/2020 18:57	CC
cis-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 18:57	CC
cis-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 18:57	CC
Cyclohexane	BRL	3.4		ug/m3	295480	2	04/17/2020 18:57	CC
Dibromochloromethane	BRL	8.5		ug/m3	295480	2	04/17/2020 18:57	CC
Dichlorodifluoromethane	BRL	4.9		ug/m3	295480	2	04/17/2020 18:57	CC
Ethyl acetate	280	3.6		ug/m3	295480	2	04/17/2020 18:57	CC
Ethylbenzene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:57	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-3
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:51:00 PM
Lab ID:	2004F05-003	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
Freon-113	480	7.7		ug/m3	295480	2	04/17/2020 18:57	CC
Freon-114	BRL	7.0		ug/m3	295480	2	04/17/2020 18:57	CC
Hexachlorobutadiene	BRL	11		ug/m3	295480	2	04/17/2020 18:57	CC
Isopropyl alcohol	120	18		ug/m3	295480	2	04/17/2020 18:57	CC
m,p-Xylene	BRL	8.7		ug/m3	295480	2	04/17/2020 18:57	CC
Methyl tert-butyl ether	BRL	3.6		ug/m3	295480	2	04/17/2020 18:57	CC
Methylene chloride	BRL	3.5		ug/m3	295480	2	04/17/2020 18:57	CC
n-Heptane	BRL	4.1		ug/m3	295480	2	04/17/2020 18:57	CC
n-Hexane	44	3.5		ug/m3	295480	2	04/17/2020 18:57	CC
o-Xylene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:57	CC
Propene	BRL	1.7		ug/m3	295480	2	04/17/2020 18:57	CC
Styrene	BRL	4.3		ug/m3	295480	2	04/17/2020 18:57	CC
Tetrachloroethene	600	6.8		ug/m3	295480	2	04/17/2020 18:57	CC
Tetrahydrofuran	BRL	2.9		ug/m3	295480	2	04/17/2020 18:57	CC
Toluene	BRL	3.8		ug/m3	295480	2	04/17/2020 18:57	CC
trans-1,2-Dichloroethene	4.2	4.0		ug/m3	295480	2	04/17/2020 18:57	CC
trans-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 18:57	CC
Trichloroethene	BRL	5.4		ug/m3	295480	2	04/17/2020 18:57	CC
Trichlorofluoromethane	BRL	5.6		ug/m3	295480	2	04/17/2020 18:57	CC
Vinyl acetate	BRL	3.5		ug/m3	295480	2	04/17/2020 18:57	CC
Vinyl bromide	BRL	4.4		ug/m3	295480	2	04/17/2020 18:57	CC
Vinyl chloride	BRL	2.6		ug/m3	295480	2	04/17/2020 18:57	CC
Xylenes, Total	BRL	13		ug/m3	295480	2	04/17/2020 18:57	CC
Surr: 4-Bromofluorobenzene	85.5	70-130		%REC	295480	2	04/17/2020 18:57	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-4
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:56:00 PM
Lab ID:	2004F05-004	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
1,1,1-Trichloroethane	24	5.5		ug/m3	295480	2	04/17/2020 19:33	CC
1,1,2,2-Tetrachloroethane	BRL	6.9		ug/m3	295480	2	04/17/2020 19:33	CC
1,1,2-Trichloroethane	BRL	5.5		ug/m3	295480	2	04/17/2020 19:33	CC
1,1-Dichloroethane	10	4.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,1-Dichloroethene	150	4.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,2,4-Trichlorobenzene	BRL	7.4		ug/m3	295480	2	04/17/2020 19:33	CC
1,2,4-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 19:33	CC
1,2-Dibromoethane	BRL	7.7		ug/m3	295480	2	04/17/2020 19:33	CC
1,2-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,2-Dichloroethane	BRL	4.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,2-Dichloropropane	BRL	4.6		ug/m3	295480	2	04/17/2020 19:33	CC
1,3,5-Trimethylbenzene	BRL	4.9		ug/m3	295480	2	04/17/2020 19:33	CC
1,3-Butadiene	BRL	2.2		ug/m3	295480	2	04/17/2020 19:33	CC
1,3-Dichlorobenzene	22	6.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,4-Dichlorobenzene	BRL	6.0		ug/m3	295480	2	04/17/2020 19:33	CC
1,4-Dioxane	BRL	3.6		ug/m3	295480	2	04/17/2020 19:33	CC
2,2,4-Trimethylpentane	BRL	4.7		ug/m3	295480	2	04/17/2020 19:33	CC
2-Butanone	19	2.9		ug/m3	295480	2	04/17/2020 19:33	CC
2-Hexanone	BRL	4.1		ug/m3	295480	2	04/17/2020 19:33	CC
4-Ethyltoluene	BRL	4.9		ug/m3	295480	2	04/17/2020 19:33	CC
4-Methyl-2-pentanone	BRL	4.1		ug/m3	295480	2	04/17/2020 19:33	CC
Acetone	69	12		ug/m3	295480	2	04/17/2020 19:33	CC
Allyl chloride	BRL	3.1		ug/m3	295480	2	04/17/2020 19:33	CC
Benzene	BRL	3.2		ug/m3	295480	2	04/17/2020 19:33	CC
Benzyl chloride	BRL	5.2		ug/m3	295480	2	04/17/2020 19:33	CC
Bromodichloromethane	BRL	6.7		ug/m3	295480	2	04/17/2020 19:33	CC
Bromoform	BRL	10		ug/m3	295480	2	04/17/2020 19:33	CC
Bromomethane	BRL	3.9		ug/m3	295480	2	04/17/2020 19:33	CC
Carbon disulfide	5.1	3.1		ug/m3	295480	2	04/17/2020 19:33	CC
Carbon tetrachloride	BRL	6.3		ug/m3	295480	2	04/17/2020 19:33	CC
Chlorobenzene	BRL	4.6		ug/m3	295480	2	04/17/2020 19:33	CC
Chloroethane	BRL	2.6		ug/m3	295480	2	04/17/2020 19:33	CC
Chloroform	BRL	4.9		ug/m3	295480	2	04/17/2020 19:33	CC
Chloromethane	BRL	2.1		ug/m3	295480	2	04/17/2020 19:33	CC
cis-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 19:33	CC
cis-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 19:33	CC
Cyclohexane	BRL	3.4		ug/m3	295480	2	04/17/2020 19:33	CC
Dibromochloromethane	BRL	8.5		ug/m3	295480	2	04/17/2020 19:33	CC
Dichlorodifluoromethane	BRL	4.9		ug/m3	295480	2	04/17/2020 19:33	CC
Ethyl acetate	730	14		ug/m3	295480	2	04/20/2020 17:19	CC
Ethylbenzene	BRL	4.3		ug/m3	295480	2	04/17/2020 19:33	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **TO-15 Report** **Date:** 22-Apr-20

Client:	CRB Geo & Env.	**Client Sample ID:**	SVE-4
Project Name:	RCI414-26	**Collection Date:**	4/14/2020 3:56:00 PM
Lab ID:	2004F05-004	**Matrix:**	Air

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**				
Freon-113	110	7.7		ug/m3	295480	2	04/17/2020 19:33	CC
Freon-114	BRL	7.0		ug/m3	295480	2	04/17/2020 19:33	CC
Hexachlorobutadiene	BRL	11		ug/m3	295480	2	04/17/2020 19:33	CC
Isopropyl alcohol	380	18		ug/m3	295480	2	04/17/2020 19:33	CC
m,p-Xylene	BRL	8.7		ug/m3	295480	2	04/17/2020 19:33	CC
Methyl tert-butyl ether	BRL	3.6		ug/m3	295480	2	04/17/2020 19:33	CC
Methylene chloride	BRL	3.5		ug/m3	295480	2	04/17/2020 19:33	CC
n-Heptane	BRL	4.1		ug/m3	295480	2	04/17/2020 19:33	CC
n-Hexane	BRL	3.5		ug/m3	295480	2	04/17/2020 19:33	CC
o-Xylene	BRL	4.3		ug/m3	295480	2	04/17/2020 19:33	CC
Propene	BRL	1.7		ug/m3	295480	2	04/17/2020 19:33	CC
Styrene	BRL	4.3		ug/m3	295480	2	04/17/2020 19:33	CC
Tetrachloroethene	740	6.8		ug/m3	295480	2	04/17/2020 19:33	CC
Tetrahydrofuran	8.3	2.9		ug/m3	295480	2	04/17/2020 19:33	CC
Toluene	5.7	3.8		ug/m3	295480	2	04/17/2020 19:33	CC
trans-1,2-Dichloroethene	BRL	4.0		ug/m3	295480	2	04/17/2020 19:33	CC
trans-1,3-Dichloropropene	BRL	4.5		ug/m3	295480	2	04/17/2020 19:33	CC
Trichloroethene	BRL	5.4		ug/m3	295480	2	04/17/2020 19:33	CC
Trichlorofluoromethane	BRL	5.6		ug/m3	295480	2	04/17/2020 19:33	CC
Vinyl acetate	BRL	3.5		ug/m3	295480	2	04/17/2020 19:33	CC
Vinyl bromide	BRL	4.4		ug/m3	295480	2	04/17/2020 19:33	CC
Vinyl chloride	BRL	2.6		ug/m3	295480	2	04/17/2020 19:33	CC
Xylenes, Total	BRL	13		ug/m3	295480	2	04/17/2020 19:33	CC
Surr: 4-Bromofluorobenzene	77.2	70-130		%REC	295480	2	04/17/2020 19:33	CC
Surr: 4-Bromofluorobenzene	81.2	70-130		%REC	295480	2	04/20/2020 17:19	CC

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

SUMMARY OF ANALYTES DETECTED

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	Dilution Factor
Client Sample ID: SVE-1				**Lab ID:** 2004F05-001			
Collection Date: 4/14/2020 3:35:00 PM				**Matrix:** Air			
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**			
1,1,1-Trichloroethane	12		0.98	5.5	ug/m3	295480	2
1,1-Dichloroethane	8.9		0.57	4.0	ug/m3	295480	2
1,1-Dichloroethene	9.1		1.2	4.0	ug/m3	295480	2
1,3-Dichlorobenzene	6.6		1.4	6.0	ug/m3	295480	2
2-Butanone	8.8		0.59	2.9	ug/m3	295480	2
Acetone	95		2.4	12	ug/m3	295480	2
Chloromethane	2.8		1.2	2.1	ug/m3	295480	2
Ethyl acetate	210		1.0	3.6	ug/m3	295480	2
Freon-113	190		0.64	7.7	ug/m3	295480	2
Isopropyl alcohol	120		1.5	18	ug/m3	295480	2
n-Hexane	48		0.59	3.5	ug/m3	295480	2
Client Sample ID: SVE-2				**Lab ID:** 2004F05-002			
Collection Date: 4/14/2020 3:44:00 PM				**Matrix:** Air			
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**			
1,1,1-Trichloroethane	44		0.98	5.5	ug/m3	295480	2
1,1-Dichloroethane	29		0.57	4.0	ug/m3	295480	2
1,1-Dichloroethene	160		1.2	4.0	ug/m3	295480	2
1,3-Dichlorobenzene	41		1.4	6.0	ug/m3	295480	2
2-Butanone	20		0.59	2.9	ug/m3	295480	2
Acetone	92		2.4	12	ug/m3	295480	2
Benzene	3.5		0.35	3.2	ug/m3	295480	2
Carbon disulfide	8.4		0.44	3.1	ug/m3	295480	2
Ethyl acetate	1100		4.1	14	ug/m3	295480	2
Freon-113	920		0.64	7.7	ug/m3	295480	2
Isopropyl alcohol	690		5.8	74	ug/m3	295480	2
Tetrachloroethene	630		0.84	6.8	ug/m3	295480	2
Toluene	6.8		0.29	3.8	ug/m3	295480	2
trans-1,2-Dichloroethene	9.5		0.56	4.0	ug/m3	295480	2
Client Sample ID: SVE-3				**Lab ID:** 2004F05-003			
Collection Date: 4/14/2020 3:51:00 PM				**Matrix:** Air			
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**			
1,1,1-Trichloroethane	41		0.98	5.5	ug/m3	295480	2
1,1-Dichloroethane	24		0.57	4.0	ug/m3	295480	2
1,1-Dichloroethene	83		1.2	4.0	ug/m3	295480	2
1,3-Dichlorobenzene	12		1.4	6.0	ug/m3	295480	2
2-Butanone	10		0.59	2.9	ug/m3	295480	2
Acetone	93		2.4	12	ug/m3	295480	2
Chloromethane	2.2		1.2	2.1	ug/m3	295480	2
Ethyl acetate	280		1.0	3.6	ug/m3	295480	2
Freon-113	480		0.64	7.7	ug/m3	295480	2
Isopropyl alcohol	120		1.5	18	ug/m3	295480	2
n-Hexane	44		0.59	3.5	ug/m3	295480	2
Tetrachloroethene	600		0.84	6.8	ug/m3	295480	2
trans-1,2-Dichloroethene	4.2		0.56	4.0	ug/m3	295480	2
Client Sample ID: SVE-4				**Lab ID:** 2004F05-004			

Analytical Environmental Services, Inc TO-15 Report

Date: 22-Apr-20

SUMMARY OF ANALYTES DETECTED

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	Dilution Factor
Collection Date: 4/14/2020 3:56:00 PM				**Matrix:** Air			
VOCs in Air by TO-15/TO-14A/AES SOP OA-11051				**(TO-15)**			
1,1,1-Trichloroethane	24		0.98	5.5	ug/m3	295480	2
1,1-Dichloroethane	10		0.57	4.0	ug/m3	295480	2
1,1-Dichloroethene	150		1.2	4.0	ug/m3	295480	2
1,3-Dichlorobenzene	22		1.4	6.0	ug/m3	295480	2
2-Butanone	19		0.59	2.9	ug/m3	295480	2
Acetone	69		2.4	12	ug/m3	295480	2
Carbon disulfide	5.1		0.44	3.1	ug/m3	295480	2
Ethyl acetate	730		4.1	14	ug/m3	295480	2
Freon-113	110		0.64	7.7	ug/m3	295480	2
Isopropyl alcohol	380		1.5	18	ug/m3	295480	2
Tetrachloroethene	740		0.84	6.8	ug/m3	295480	2
Tetrahydrofuran	8.3		0.52	2.9	ug/m3	295480	2
Toluene	5.7		0.29	3.8	ug/m3	295480	2

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- F Analyzed in the lab which is a deviation from the method
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc.

Sample Receipt Checklist for Air Canisters

Client GRB Geo & Env. Work Order Number 2004 F05

Checklist completed by [signature] 4/16/20
Signature Date

Carrier name: FedEx ✓ UPS___ Courier___ Client___ US Mail___ Other___

Shipping container in good condition?	Yes ✓ No___ Not Present___
Custody seals intact on shipping container?	Yes___ No___ Not Present ✓
Chain of custody present?	Yes ✓ No___
Chain of custody signed when relinquished and received?	Yes ✓ No___
Chain of custody agrees with sample labels?	Yes ✓ No___
Field data sheets present?	Yes___ No ✓
Sample containers intact?	Yes ✓ No___

If no, explain: ___

All samples received within holding time?	Yes ✓ No___
Was TAT marked on the COC?	Yes ✓ No___
Proceed with Standard TAT as per project history?	Yes___ No___ Not Applicable___
All canisters received per Bottle Order issued?	Yes ✓ No___

See Case Narrative for resolution of the Non-Conformance.

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **MB-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **MBLK** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578885**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	BRL	1.1									
1,1,2,2-Tetrachloroethane	BRL	1.4									
1,1,2-Trichloroethane	BRL	1.1									
1,1-Dichloroethane	BRL	0.81									
1,1-Dichloroethene	BRL	0.79									
1,2,4-Trichlorobenzene	BRL	1.5									
1,2,4-Trimethylbenzene	BRL	0.98									
1,2-Dibromoethane	BRL	1.5									
1,2-Dichlorobenzene	BRL	1.2									
1,2-Dichloroethane	BRL	0.81									
1,2-Dichloropropane	BRL	0.92									
1,3,5-Trimethylbenzene	BRL	0.98									
1,3-Butadiene	BRL	0.44									
1,3-Dichlorobenzene	BRL	1.2									
1,4-Dichlorobenzene	BRL	1.2									
1,4-Dioxane	BRL	0.72									
2,2,4-Trimethylpentane	BRL	0.93									
2-Butanone	BRL	0.59									
2-Hexanone	BRL	0.82									
4-Ethyltoluene	BRL	0.98									
4-Methyl-2-pentanone	BRL	0.82									
Acetone	BRL	2.4									
Allyl chloride	BRL	0.63									
Benzene	BRL	0.64									
Benzyl chloride	BRL	1.0									
Bromodichloromethane	BRL	1.3									
Bromoform	BRL	2.1									

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **MB-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **MBLK** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578885**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Bromomethane	BRL	0.78									
Carbon disulfide	BRL	0.62									
Carbon tetrachloride	BRL	1.3									
Chlorobenzene	BRL	0.92									
Chloroethane	BRL	0.53									
Chloroform	BRL	0.98									
Chloromethane	BRL	0.41									
cis-1,2-Dichloroethene	BRL	0.79									
cis-1,3-Dichloropropene	BRL	0.91									
Cyclohexane	BRL	0.69									
Dibromochloromethane	BRL	1.7									
Dichlorodifluoromethane	BRL	0.99									
Ethyl acetate	BRL	0.72									
Ethylbenzene	BRL	0.87									
Freon-113	BRL	1.5									
Freon-114	BRL	1.4									
Hexachlorobutadiene	BRL	2.1									
Isopropyl alcohol	BRL	3.7									
m,p-Xylene	BRL	1.7									
Methyl tert-butyl ether	BRL	0.72									
Methylene chloride	BRL	0.69									
n-Heptane	BRL	0.82									
n-Hexane	BRL	0.70									
o-Xylene	BRL	0.87									
Propene	BRL	0.34									
Styrene	BRL	0.85									
Tetrachloroethene	BRL	1.4									

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **MB-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **MBLK** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578885**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Tetrahydrofuran	BRL	0.59									
Toluene	BRL	0.75									
trans-1,2-Dichloroethene	BRL	0.79									
trans-1,3-Dichloropropene	BRL	0.91									
Trichloroethene	BRL	1.1									
Trichlorofluoromethane	BRL	1.1									
Vinyl acetate	BRL	0.70									
Vinyl bromide	BRL	0.87									
Vinyl chloride	BRL	0.51									
Xylenes, Total	BRL	2.6									
Surr: 4-Bromofluorobenzene	3.140	0	4.000		78.5	70	130				

Sample ID: **LCS-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **LCS** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578896**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	12.71	1.1	10.91	0.6002	111	70	130				
1,1,2,2-Tetrachloroethane	16.76	1.4	13.73	0.4120	119	70	130				
1,1,2-Trichloroethane	13.37	1.1	10.91		122	70	130				
1,1-Dichloroethane	8.985	0.81	8.095	0.4047	106	70	130				
1,1-Dichloroethene	8.207	0.79	7.930		104	70	130				
1,2,4-Trichlorobenzene	15.00	1.5	14.85		101	70	130				
1,2,4-Trimethylbenzene	10.47	0.98	9.832		106	70	130				
1,2-Dibromoethane	17.83	1.5	15.37		116	70	130				
1,2-Dichlorobenzene	12.63	1.2	12.02		105	70	130				
1,2-Dichloroethane	10.48	0.81	8.095		130	70	130				
1,2-Dichloropropane	10.77	0.92	9.243		116	70	130				
1,3,5-Trimethylbenzene	11.11	0.98	9.832		113	70	130				

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **LCS-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **LCS** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578896**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,3-Butadiene	4.646	0.44	4.425		105	70	130				
1,3-Dichlorobenzene	14.85	1.2	12.02		124	70	130				
1,4-Dichlorobenzene	14.37	1.2	12.02		120	70	130				
1,4-Dioxane	7.280	0.72	7.208		101	70	130				
2,2,4-Trimethylpentane	9.248	0.93	9.342	0.4204	94.5	70	130				
2-Butanone	5.751	0.59	5.899		97.5	70	130				
2-Hexanone	8.278	0.82	8.196		101	70	130				
4-Ethyltoluene	10.27	0.98	9.832		104	70	130				
4-Methyl-2-pentanone	8.360	0.82	8.196		102	70	130				
Acetone	5.369	2.4	4.751		113	70	130				
Allyl chloride	6.229	0.63	6.260		99.5	70	130				
Benzene	7.220	0.64	6.389	0.4792	106	70	130				
Benzyl chloride	10.30	1.0	10.36		99.5	70	130				
Bromodichloromethane	17.35	1.3	13.40	0.8039	124	70	130				
Bromoform	26.57	2.1	20.68	0.8272	124	70	130				
Bromomethane	9.475	0.78	7.766		122	70	130				
Carbon disulfide	7.412	0.62	6.228	0.4048	112	70	130				
Carbon tetrachloride	16.86	1.3	12.58	0.6919	128	70	130				
Chlorobenzene	10.22	0.92	9.211		111	70	130				
Chloroethane	6.122	0.53	5.278		116	70	130				
Chloroform	11.77	0.98	9.767	0.5372	115	70	130				
Chloromethane	5.121	0.41	4.130		124	70	130				
cis-1,2-Dichloroethene	8.286	0.79	7.930		104	70	130				
cis-1,3-Dichloropropene	10.31	0.91	9.080		114	70	130				
Cyclohexane	6.437	0.69	6.884		93.5	70	130				
Dibromochloromethane	22.24	1.7	17.04	0.8519	126	70	130				
Dichlorodifluoromethane	12.11	0.99	9.890	0.5934	116	70	130				

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **LCS-295480** Client ID: Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **LCS** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578896**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Ethyl acetate	7.062	0.72	7.207		98.0	70	130				
Ethylbenzene	8.513	0.87	8.687		98.0	70	130				
Freon-113	18.55	1.5	15.33	0.9198	115	70	130				
Freon-114	17.26	1.4	13.98	0.8388	118	70	130				
Hexachlorobutadiene	25.28	2.1	21.33		118	70	130				
Isopropyl alcohol	5.064	3.7	4.916		103	70	130				
m,p-Xylene	17.55	1.7	17.37		101	70	130				
Methyl tert-butyl ether	6.706	0.72	7.211		93.0	70	130				
Methylene chloride	7.990	0.69	6.948	0.4516	108	70	130				
n-Heptane	8.237	0.82	8.196		100	70	130				
n-Hexane	7.013	0.70	7.049		99.5	70	130				
o-Xylene	9.035	0.87	8.687		104	70	130				
Propene	3.270	0.34	3.442		95.0	70	130				
Styrene	9.154	0.85	8.515		108	70	130				
Tetrachloroethene	16.75	1.4	13.56	0.6781	118	70	130				
Tetrahydrofuran	5.663	0.59	5.899		96.0	70	130				
Toluene	7.650	0.75	7.537		102	70	130				
trans-1,2-Dichloroethene	7.771	0.79	7.930		98.0	70	130				
trans-1,3-Dichloropropene	9.670	0.91	9.080		106	70	130				
Trichloroethene	12.74	1.1	10.75		118	70	130				
Trichlorofluoromethane	13.77	1.1	11.24	0.6744	116	70	130				
Vinyl acetate	7.113	0.70	7.042		101	70	130				
Vinyl bromide	9.138	0.87	8.744		104	70	130				
Vinyl chloride	5.700	0.51	5.112		112	70	130				
Xylenes, Total	26.58	2.6	26.06		102	70	130				
Surr: 4-Bromofluorobenzene	3.650	0	4.000		91.2	70	130				

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **2004F05-001ADUP** Client ID: **SVE-1** Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **DUP** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578890**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	14.46	5.5						12.00	18.6	25	
1,1,2,2-Tetrachloroethane	BRL	6.9						0	0	25	
1,1,2-Trichloroethane	BRL	5.5						0	0	25	
1,1-Dichloroethane	11.33	4.0						8.904	24.0	25	
1,1-Dichloroethene	11.89	4.0						9.119	26.4	25	R
1,2,4-Trichlorobenzene	BRL	7.4						0	0	25	
1,2,4-Trimethylbenzene	BRL	4.9						0	0	25	
1,2-Dibromoethane	BRL	7.7						0	0	25	
1,2-Dichlorobenzene	BRL	6.0						0	0	25	
1,2-Dichloroethane	BRL	4.0						0	0	25	
1,2-Dichloropropane	BRL	4.6						0	0	25	
1,3,5-Trimethylbenzene	BRL	4.9						0	0	25	
1,3-Butadiene	BRL	2.2						0	0	25	
1,3-Dichlorobenzene	8.417	6.0						6.614	24.0	25	
1,4-Dichlorobenzene	BRL	6.0						0	0	25	
1,4-Dioxane	BRL	3.6						0	0	25	
2,2,4-Trimethylpentane	BRL	4.7						0	0	25	
2-Butanone	10.32	2.9						8.848	15.4	25	
2-Hexanone	BRL	4.1						0	0	25	
4-Ethyltoluene	BRL	4.9						0	0	25	
4-Methyl-2-pentanone	BRL	4.1						0	0	25	
Acetone	150.4	12						94.54	45.6	25	R
Allyl chloride	BRL	3.1						0	0	25	
Benzene	BRL	3.2						2.236	0	25	
Benzyl chloride	BRL	5.2						0	0	25	
Bromodichloromethane	BRL	6.7						0	0	25	
Bromoform	BRL	10						0	0	25	

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **2004F05-001ADUP** Client ID: **SVE-1** Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **DUP** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578890**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Bromomethane	BRL	3.9						0	0	25	
Carbon disulfide	3.114	3.1						2.336	28.6	25	R
Carbon tetrachloride	BRL	6.3						0	0	25	
Chlorobenzene	BRL	4.6						0	0	25	
Chloroethane	BRL	2.6						0	0	25	
Chloroform	BRL	4.9						0	0	25	
Chloromethane	2.478	2.1						2.788	11.8	25	
cis-1,2-Dichloroethene	BRL	4.0						0	0	25	
cis-1,3-Dichloropropene	BRL	4.5						0	0	25	
Cyclohexane	BRL	3.4						0	0	25	
Dibromochloromethane	BRL	8.5						0	0	25	
Dichlorodifluoromethane	BRL	4.9						4.698	0	25	
Ethyl acetate	258.5	3.6						205.2	23.0	25	
Ethylbenzene	BRL	4.3						0	0	25	
Freon-113	228.0	7.7						186.2	20.2	25	
Freon-114	BRL	7.0						0	0	25	
Hexachlorobutadiene	BRL	11						0	0	25	
Isopropyl alcohol	332.0	18						118.2	94.9	25	R
m,p-Xylene	BRL	8.7						6.733	0	25	
Methyl tert-butyl ether	BRL	3.6						0	0	25	
Methylene chloride	BRL	3.5						1.563	0	25	
n-Heptane	BRL	4.1						0	0	25	
n-Hexane	225.0	3.5						48.28	129	25	R
o-Xylene	BRL	4.3						0	0	25	
Propene	BRL	1.7						0	0	25	
Styrene	BRL	4.3						0	0	25	
Tetrachloroethene	BRL	6.8						2.373	0	25	

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: CRB Geo & Env.
Project Name: RCI414-26
Workorder: 2004F05

ANALYTICAL QC SUMMARY REPORT

BatchID: 295480

Sample ID: **2004F05-001ADUP** Client ID: **SVE-1** Units: **ug/m3** Prep Date: **04/17/2020** Run No: **423438**
SampleType: **DUP** TestCode: **VOCs in Air by TO-15/TO-14A/AES SOP OA-11051** BatchID: **295480** Analysis Date: **04/17/2020** Seq No: **9578890**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Tetrahydrofuran	BRL	2.9						0	0	25	
Toluene	BRL	3.8						3.580	0	25	
trans-1,2-Dichloroethene	BRL	4.0						0	0	25	
trans-1,3-Dichloropropene	BRL	4.5						0	0	25	
Trichloroethene	BRL	5.4						0	0	25	
Trichlorofluoromethane	BRL	5.6						2.810	0	25	
Vinyl acetate	BRL	3.5						0	0	25	
Vinyl bromide	BRL	4.4						0	0	25	
Vinyl chloride	BRL	2.6						0	0	25	
Xylenes, Total	BRL	13						6.733	0	25	
Surr: 4-Bromofluorobenzene	16.55	0	20.00		82.8	70	130	16.35	0	0	

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

End of Report

APPENDIX III

GROUNDWATER SAMPLING WORKSHEETS

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-5	**Total Depth**	36.32		
Well Diameter	1	**DTW**	17.61		
Well Volume	0.75	**Screen Interval**	14	to	42
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
8:47	0.1	6.03	16.1	0.059	8.53	148.9	156	17.81
8:52	0.2	5.0	16.5	0.034	8.18	231.5	160	17.81
8:57	0.3	4.69	16.7	0.03	8.05	269.1	131	
9:02	0.4	4.65	16.9	0.031	8.04	285.7	100	17.8
9:07	0.5	4.64	17.0	0.031	8.07	298.6	68.26	
9:12	0.6	4.63	17.1	0.031	8.06	308.5	54.67	17.82
9:17	0.7	4.62	17.3	0.031	8.01	316.2	36.22	
9:22	0.8	4.62	17.5	0.031	7.87	320.6	30.45	
9:27	0.9	4.61	17.6	0.031	7.91	324.2	30.26	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
MW-5	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-4	**Total Depth**	42.47		
Well Diameter	1	**DTW**	14.39		
Well Volume	1.15	**Screen Interval**	16	to	46
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
9:50	0.2	6.37	17.6	0.583	1.13	-78	20.12	
9:55	0.3	6.42	17.8	0.594	0.57	-84.6	16.23	14.62
10:00	0.4	6.44	17.7	0.605	0.39	-89.5	17.6	
10:05	0.5	6.47	18.2	0.61	0.28	-95.1	14.01	14.63
10:10	0.6	6.49	18.2	0.609	0.25	-97.8	14.78	
10:15	0.7	6.49	18.4	0.606	0.24	-98.9	14.65	14.63
10:20	0.8	6.5	18.6	0.601	0.21	-99.8	14.62	
10:25	0.9	6.49	18.7	0.584	0.19	-98	15.98	14.64
10:30	1	6.48	18.7	0.572	0.18	-97.1	15.27	
10:35	1.1	6.46	18.8	0.542	0.19	-92.9	14.88	
10:40	1.2	6.46	18.8	0.540	0.19	-91.7	14.69	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
MW-4	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name: Woven Electronics **Location:** Simpsonville, SC

Date: 4/14/2020 **Sampler:** SB

WELL INFO

Well ID MW-4T **Total Depth** 55.46

Well Diameter 2 **DTW** 14.41

Well Volume 6.56 **Screen Interval** 50 to 55

Flow Rate

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
11:15	0.1	6.27	19.3	0.063	7.19	43.1	51.2	14.42
11:19	0.3	5.84	18.9	0.054	4.12	109.9	25.8	14.51
11:25	0.5	5.77	18.9	0.053	3.99	138.5	19	14.58
11:30	0.7	5.74	19	0.053	3.95	150.5	18.6	14.63
11:35	0.9	5.74	18.9	0.053	3.96	157.7	22	
11:40	1.1	5.74	18.9	0.053	3.99	166.6	27.2	14.65
11:45	1.3	5.74	18.9	0.053	4.01	169.9	28.2	14.69
11:50	1.5	5.73	18.9	0.053	4.02	174	35.8	14.72
11:55	1.7	5.73	18.9	0.053	4.02	177.5	49.2	
12:00	1.9	5.73	19	0.053	4.02	180.3	64.4	14.75
12:05	2.1	5.73	19	0.052	4.03	182.8	76.2	
12:10	2.3	5.73	19	0.052	4.02	184.7	73.8	14.78
12:15	2.5	5.73	19	0.052	4.03	187.4	74.7	
12:20	2.7	5.72	19	0.052	4.04	190.3	85.6	
12:25	2.9	5.7	18.7	0.052	4.05	193.9	38.7	
12:30	3.5	5.68	18.8	0.052	4.1	199.2	37.3	15.31
12:35	4	5.69	18.8	0.052	4.14	204.7	37.4	
12:40	3	5.7	18.8	0.052	4.16	207.7	33.3	15.41

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-4T	**Total Depth**	55.46		
Well Diameter	2	**DTW**	14.41		
Well Volume	6.56	**Screen Interval**	50	to	55
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
12:45	5	5.69	18.8	0.052	4.18	209.9	37.8	
12:50	5.5	5.69	18.8	0.052	4.18	210.1	36.2	15.42
12:55	6	5.69	18.8	0.052	4.18	210.9	33.3	
13:00	6.5	5.69	18.8	0.052	4.19	210.9	36.9	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-4T	3	40mL	HCl	40mL	VOC 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-8	**Total Depth**	36.1		
Well Diameter	1	**DTW**	22.15		
Well Volume	0.55	**Screen Interval**	13	to	33
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
13.37	0.1	4.66	20.1	0.041	6.04	308.2	125	
13:42	0.2	4.63	18.7	0.041	5.68	345.1	45.4	22.62
13:47	0.3	4.69	18.4	0.045	5.68	360.3	18.4	
13:52	0.4	4.73	18.3	0.047	5.71	363.4	16.6	22.61
13:57	0.5	4.74	18.4	0.048	5.67	365.4	18.1	
14:02	0.6	4.76	18.6	0.049	5.62	363.5	16.8	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-8	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-7	**Total Depth**	41.2		
Well Diameter	1	**DTW**	22.21		
Well Volume	0.76	**Screen Interval**	9	to	39
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
14.26	0.1	4.7	20.8	0.034	7.13	345.7	52.65	
14.31	0.2	4.52	19.1	0.031	6.63	376.9	41.4	
14:36	0.3	4.51	19	0.031	6.49	383.7	31.2	
14:41	0.4	4.51	19	0.031	6.5	390.7	20.3	
14:46	0.5	4.49	19	0.031	6.5	392.2	22.1	
14:51	0.6	4.5	19.2	0.031	6.5	392	21.1	
14:56	0.7	4.49	19.2	0.031	6.52	392.3	21.2	
15:01	0.8	4.49	19.1	0.031	6.57	391.9	20.7	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-7	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-6S	**Total Depth**	30.65		
Well Diameter	1	**DTW**	20.74		
Well Volume	0.4	**Screen Interval**	21	to	31
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
15:10	0.1	4.46	18.6	0.114	4.71	395.9	27.9	
15:15	0.2	4.33	17.7	0.114	4.06	412.2	24.9	20.91
15:20	0.3	4.37	17.6	0.11	3.99	419.1	19.1	20.95
15:25	0.4	4.36	17.6	0.111	3.89	424.9	30	
15:30	0.5	4.35	17.6	0.112	3.85	428.2	39.6	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-6s	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/14/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-6I	**Total Depth**	48.25		
Well Diameter	2	**DTW**	19.65		
Well Volume	4.57	**Screen Interval**	35	to	45
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
15:45	0.1	4.82	17.9	0.057	7.69	367.7	25.6	21.11
15:50	0.6	4.66	17.5	0.053	7.2	391.4	340	water clear
15:55	1.1	4.66	17.4	0.053	7.17	393.2	245	22.25
16:00	1.6	4.65	17.5	0.054	7.12	393.8	267	
16:05	2.1	4.64	17.5	0.055	7.04	395.5	139	22.45
16:10	2.6	4.63	17.5	0.055	7.07	399.3	147	22.49
16:15	3.1	4.65	17.5	0.057	6.89	400	99.8	
16:20	3.6	4.65	17.5	0.055	6.91	400.3	179	22.51
16:25	4.1	4.63	17.5	0.056	6.89	402.4	108	
16:30	4.6	4.64	17.4	0.056	6.89	401.8	122	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-6i	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-10I	**Total Depth**	34.71		
Well Diameter	2	**DTW**	19.21		
Well Volume	2.5	**Screen Interval**	25	to	35
Flow Rate	1gal/13min				

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
8:45	0.1	4.72	20.8	0.036	8.09	292.5	31.2	
8:50	0.4	4.44	20.7	0.034	8.49	335.7	833	19.85
8:55	0.7	4.47	20.7	0.037	8.42	361.9	227	19.86
9:00	1	4.43	20.7	0.037	8.1	379.3	293	19.96
9:05	1.3	4.49	20.7	0.037	7.81	387.4	1400	water clear
9:10	1.6	4.49	20.7	0.037	7.72	392.6	415	
9:15	1.9	4.47	20.7	0.037	7.61	397.7	215	
9:20	2.2	4.51	20.7	0.037	7.56	397.8	398	
9:25	2.5	4.49	20.7	0.037	7.5	401.8	77	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-10i	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-10T	**Total Depth**	58.51		
Well Diameter	2	**DTW**	19.04		
Well Volume	6.3	**Screen Interval**	53	to	58
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Color/ Odor
9:37	0.1	5.31	20.9	0.061	3.42	172.2	39.3	20.2
9:42	0.6	5.49	20.2	0.061	0.84	164.5	624	21.6
9:47	1.1	5.4	20.4	0.058	0.94	208.6	824	water clear
9:52	1.6	5.41	20.4	0.057	1.05	224.8	787	21.82
9:57	2.1	5.37	20.4	0.056	1.09	235.5	769	
10:03	2.6	5.4	20.4	0.056	1.31	226.5	412	
10:09	3.1	5.42	20.5	0.056	1.52	227.6	322	
10:15	3.6	5.43	20.5	0.056	1.49	238.6	480	
10:21	4.1	5.43	20.5	0.056	1.44	339.8	212	
10:27	4.6	5.42	20.5	0.056	1.51	241.5	377	
10:33	5.1	5.42	20.5	0.056	1.54	239	612	
10:39	5.6	5.39	20.5	0.056	1.49	240.1	307	
10:45	6.1	5.41	20.5	0.056	1.45	235.6	514	
10:51	6.6	5.41	20.5	0.056	1.58	235.7	620	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-10t	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-10S	**Total Depth**	23.7		
Well Diameter	1	**DTW**	18.8		
Well Volume	0.2	**Screen Interval**	10	to	23
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
11:02	0.1	5.2	21.3	0.043	7.44	287.5	19.7	19.79
11:07	0.2	5.12	21.2	0.042	7.2	304.9	43.45	20.09
11:12	0.3	5.11	21.2	0.042	7.66	316.7	42.57	20.32
11:17	0.4	5.1	21.2	0.041	7.63	323.5	28.7	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-10s	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name: Woven Electronics **Location:** Simpsonville, SC

Date: 4/15/2020 **Sampler:** SB

WELL INFO

Well ID MW-6T **Total Depth** 56.29

Well Diameter 2 **DTW** 20.22

Well Volume 5.77 **Screen Interval** 52 to 57

Flow Rate 1gal/13min

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Color/ Odor
11:45	0.1	5.58	16	0.046	9.11	250.9	12.2	20.94
11:50	0.6	5.31	16.6	0.046	8.02	283.2	58.1	21.31
11:55	0.9	5.3	16.6	0.045	7.97	284.3	77.2	
12:00	1.2	5.31	16.6	0.046	7.96	292	121	21.41
12:05	1.5	5.32	16.6	0.048	7.87	298.8	164	
12:10	1.8	5.4	16.6	0.051	5.4	295	197	
12:15	2.1	5.48	16.8	0.054	6.91	297.7	193	21.44
12:20	2.3	5.49	16.8	0.055	6.7	289.2	174	
12:25	2.5	5.5	16.7	0.054	6.77	289.1	174	
12:30	2.9	5.52	16.8	0.055	6.68	291.2	167	21.44
12:35	3.2	5.52	16.9	0.055	6.52	290.5	132	
12:40	3.7	5.53	16.9	0.055	6.7	289.2	124	
12:45	4	5.54	16.8	0.055	6.68	289.1	132	
12:50	4.3	5.54	16.9	0.055	6.55	293.3	129	
12:55	4.7	5.55	16.8	0.056	6.57	294.8	144	
13:00	5	5.54	17	0.055	6.36	295.8	159	
13:05	5.3	5.56	16.9	0.056	6.22	295.7	166	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-6t	3	40mL	HCl	40mL	VOC 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-6D	**Total Depth**	72.01		
Well Diameter	2	**DTW**	21.25		
Well Volume	8.1	**Screen Interval**	64	to	69
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
13:30	0.3	6.16	16.3	0.092	2.67	286.2	48	
13:35	0.6	6.12	16.7	0.094	0.8	277	78	
13:40	0.9	6.13	16.8	0.094	0.69	267.1	148	water clear
13:45	1.3	6.13	16.9	0.093	0.62	261.4	241	22.51
13:50	2.3	6.13	16.8	0.093	0.57	246.7	283	
13:55	2.6	6.13	16.9	0.092	0.53	185.6	307	
14:00	2.9	6.12	16.9	0.091	0.49	114.8	327	22.6
14:05	3.2	6.12	16.9	0.091	0.41	85.5	330	
14:10	3.5	6.12	17	0.091	0.36	75.8	297	22.6
14:15	3.8	6.18	17.1	0.091	0.43	68.5	354	
14:20	4	6.14	17.2	0.091	0.36	62.3	240	
14:25	4.3	6.17	17.2	0.091	0.35	57.2	256	
14:30	4.6	6.18	17.1	0.091	0.36	57.5	324	
14:35	5	6.15	17	0.091	0.35	53.6	370	
14:40	5.3	6.16	17.1	0.090	0.34	53	409	
14:45	5.6	6.17	17	0.090	0.34	53.4	306	
14:50	5.9	6.17	17.2	0.090	0.34	51.4	501	
14:55	6.8	6.18	16.9	0.090	0.35	51.4	625	

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-6D	**Total Depth**	72.01		
Well Diameter	2	**DTW**	21.25		
Well Volume	8.1	**Screen Interval**	64	to	69
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
15:00	7	6.16	17.2	0.090	0.34	52.3	518	
15:05	7.4	6.18	17.2	0.090	0.33	49.6	474	
15:10	8	6.17	17.2	0.090	0.32	49.9	428	
15:15	8.3	6.17	17.2	0.090	0.33	50.2	412	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-6d	3	40mL	HCl	40mL	VOC 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/15/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-9S	**Total Depth**	20.65		
Well Diameter	1	**DTW**	10.02		
Well Volume	0.42	**Screen Interval**	11	to	21
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
15:50	0.1	5.05	15.8	0.047	7.01	311.2	65	10.13
15:55	0.2	4.52	15.4	0.045	5.73	420.1	35	10.2
16:00	0.3	4.45	15.5	0.044	5.7	498.2	14.9	
16:05	0.4	4.43	15.5	0.044	5.66	532.8	9.3	
16:10	0.5	4.42	15.5	0.044	5.65	555.7	8.1	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-9s	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/16/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-9T	**Total Depth**	38.02		
Well Diameter	2	**DTW**	9.42		
Well Volume	4.5	**Screen Interval**	25	to	35
Flow Rate	1gal/11min				

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
9:35	0.1	6.09	14.8	0.042	7.81	232	5.7	
9:40	0.6	5.29	15.8	0.042	6.55	278.3	47.4	9.51
9:45	1.1	5.26	15.8	0.042	6.48	287.3	101	
9:50	1.6	5.25	15.9	0.042	6.45	293.7	170	9.53
9:55	2.1	5.25	15.9	0.043	6.42	297.4	214	
10:00	2.6	5.26	16.0	0.043	6.58	304.7	301	9.55
10:05	3.5	5.25	16.0	0.043	6.63	306.9	348	
10:10	4	5.25	16.0	0.043	6.6	309.6	387	
10:15	4.5	5.25	16.0	0.043	6.61	311.5	429	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-9t	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name:	Woven Electronics	**Location:**	Simpsonville, SC
Date:	4/16/2020	**Sampler:**	SB

WELL INFO

Well ID	MW-9D	**Total Depth**	58.57		
Well Diameter	2	**DTW**	9.86		
Well Volume	7.8	**Screen Interval**	51	to	56
Flow Rate					

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
10:25	0.1	6.26	15	0.06	8.89	283.4	900	water clear
10:30	0.6	6.16	15.8	0.06	8.88	294.1	2.11	11.49
10:35	1.1	6.14	15.9	0.06	8.78	295.6	16.9	
10:40	1.8	5.92	15.9	0.059	7.78	303.7	39	11.54
10:45	2.5	5.8	16	0.059	7.44	294.4	59	
10:50	3.2	5.72	16	0.063	6.72	266	137	11.55
10:55	3.9	5.63	16	0.07	5.9	253.5	110	
11:00	4.5	5.63	16	0.071	5.7	251.5	290	11.56
11:05	5.2	5.63	16.1	0.071	5.54	251.7	387	11.55
11:10	6	5.64	16.1	0.07	5.7	252.3	443	
11:15	6.8	5.62	16.1	0.071	5.45	253.3	434	
11:20	7.5	5.62	16.1	0.071	5.62	253.5	398	
11:25	8	5.62	16.1	0.071	5.5	254.7	456	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
mw-9d	3	40mL	HCl	40mL	Voc 8260	PP

GROUNDWATER SAMPLING LOG

Site Name: Woven Electronics **Location:** Simpsonville, SC

Date: 4/16/2020 **Sampler:** SB

WELL INFO

Well ID Field Blank **Total Depth**

Well Diameter **DTW**

Well Volume **Screen Interval** to

Flow Rate

Time	Vol. Purged	pH	Temp. (C)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity	Water Level
11:30	0.1	9.36	13.8	0.029	9.51	171.6	0.95	
11:32	0.2	9.57	13.4	0.028	9.37	169.6	1.18	

Sample ID Code	# of Container	Volume	Preserv. Used	Vol. added in field	Intended Analysis	Sampling Equip. Used
field blank	3	40mL	HCl	40mL	Voc 8260	PP

APPENDIX IV

GROUNDWATER LABORATORY ANALYTICAL REPORTS

AND

CHAIN OF CUSTODY

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

April 24, 2020

CRB Geological - UTC Greenville, SC

Sample Delivery Group:	L1209919
Samples Received:	04/17/2020
Project Number:	RCI 414-26
Description:	RCI 414-26

Report To: Robert Workman
5000 Old Buncombe Road
Suite 21
Greenville, SC 29617

Entire Report Reviewed By:

Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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MW-5 L1209919-01 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 09:27 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 21:31	04/19/20 21:31	BMB	Mt. Juliet, TN

MW-4 L1209919-02 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 10:40 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 16:31	04/21/20 16:31	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 21:50	04/19/20 21:50	BMB	Mt. Juliet, TN

MW-4T L1209919-03 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 13:00 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 16:49	04/21/20 16:49	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 22:09	04/19/20 22:09	BMB	Mt. Juliet, TN

MW-8 L1209919-04 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 14:02 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 22:28	04/19/20 22:28	BMB	Mt. Juliet, TN

MW-7 L1209919-05 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 15:01 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 22:47	04/19/20 22:47	BMB	Mt. Juliet, TN

MW-6S L1209919-06 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 15:31 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 17:05	04/21/20 17:05	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 23:06	04/19/20 23:06	BMB	Mt. Juliet, TN

MW-6I L1209919-07 GW

Collected by: Sloane Brandon | Collected date/time: 04/14/20 16:30 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 17:20	04/21/20 17:20	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 23:25	04/19/20 23:25	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	10	04/24/20 02:04	04/24/20 02:04	JAH	Mt. Juliet, TN

MW-10I L1209919-08 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 09:25 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/19/20 23:44	04/19/20 23:44	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	10	04/24/20 02:25	04/24/20 02:25	JAH	Mt. Juliet, TN

MW-10T L1209919-09 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 10:51 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 00:03	04/20/20 00:03	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	1	04/24/20 02:45	04/24/20 02:45	JAH	Mt. Juliet, TN

MW-10S L1209919-10 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 11:17 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 00:23	04/20/20 00:23	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	10	04/24/20 03:05	04/24/20 03:05	JAH	Mt. Juliet, TN

MW-6T L1209919-11 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 13:10 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 17:47	04/21/20 17:47	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 00:42	04/20/20 00:42	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	10	04/24/20 03:26	04/24/20 03:26	JAH	Mt. Juliet, TN

MW-6D L1209919-12 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 15:15 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1463884	1	04/21/20 18:03	04/21/20 18:03	VRP	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 01:01	04/20/20 01:01	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	1	04/24/20 03:46	04/24/20 03:46	JAH	Mt. Juliet, TN

MW-9S L1209919-13 GW

Collected by: Sloane Brandon | Collected date/time: 04/15/20 16:10 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 01:20	04/20/20 01:20	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	1	04/24/20 04:06	04/24/20 04:06	JAH	Mt. Juliet, TN

MW-9T L1209919-14 GW

Collected by: Sloane Brandon | Collected date/time: 04/16/20 10:20 | Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 01:39	04/20/20 01:39	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1465566	1	04/24/20 04:27	04/24/20 04:27	JAH	Mt. Juliet, TN

MW-9D L1209919-15 GW

Collected by: Sloane Brandon
Collected date/time: 04/16/20 11:25
Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 01:58	04/20/20 01:58	BMB	Mt. Juliet, TN

FIELD BLANK L1209919-16 GW

Collected by: Sloane Brandon
Collected date/time: 04/16/20 11:35
Received date/time: 04/17/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1463114	1	04/20/20 02:17	04/20/20 02:17	BMB	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris McCord
Project Manager

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 21:31	WG1463114
Bromoform	ND		1.00	1	04/19/2020 21:31	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 21:31	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 21:31	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 21:31	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 21:31	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 21:31	WG1463114
Chloroform	ND		5.00	1	04/19/2020 21:31	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 21:31	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 21:31	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 21:31	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 21:31	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 21:31	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 21:31	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 21:31	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 21:31	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 21:31	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 21:31	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 21:31	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 21:31	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 21:31	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 21:31	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 21:31	WG1463114
1,1,2-Trichlorotrifluoroethane	17.0	J0	1.00	1	04/19/2020 21:31	WG1463114
Tetrachloroethene	21.7		1.00	1	04/19/2020 21:31	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 21:31	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 21:31	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 21:31	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 21:31	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 21:31	WG1463114
(S) Toluene-d8	*105*		*80.0-120*		*04/19/2020 21:31*	WG1463114
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*04/19/2020 21:31*	WG1463114
(S) 1,2-Dichloroethane-d4	*90.2*		*70.0-130*		*04/19/2020 21:31*	WG1463114

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	29100		1000	1	04/21/2020 16:31	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 21:50	WG1463114
Bromoform	ND		1.00	1	04/19/2020 21:50	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 21:50	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 21:50	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 21:50	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 21:50	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 21:50	WG1463114
Chloroform	ND		5.00	1	04/19/2020 21:50	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 21:50	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 21:50	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 21:50	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 21:50	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 21:50	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 21:50	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 21:50	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 21:50	WG1463114
cis-1,2-Dichloroethene	1.59		1.00	1	04/19/2020 21:50	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 21:50	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 21:50	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 21:50	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 21:50	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 21:50	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 21:50	WG1463114
1,1,2-Trichlorotrifluoroethane	ND	J0	1.00	1	04/19/2020 21:50	WG1463114
Tetrachloroethene	1.00		1.00	1	04/19/2020 21:50	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 21:50	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 21:50	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 21:50	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 21:50	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 21:50	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/19/2020 21:50*	WG1463114
(S) 4-Bromofluorobenzene	*107*		*77.0-126*		*04/19/2020 21:50*	WG1463114
(S) 1,2-Dichloroethane-d4	*95.4*		*70.0-130*		*04/19/2020 21:50*	WG1463114

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1000	1	04/21/2020 16:49	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 22:09	WG1463114
Bromoform	ND		1.00	1	04/19/2020 22:09	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 22:09	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 22:09	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 22:09	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 22:09	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 22:09	WG1463114
Chloroform	ND		5.00	1	04/19/2020 22:09	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 22:09	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 22:09	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 22:09	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 22:09	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 22:09	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 22:09	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 22:09	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 22:09	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:09	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:09	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 22:09	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:09	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:09	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 22:09	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 22:09	WG1463114
1,1,2-Trichlorotrifluoroethane	27.2	J0	1.00	1	04/19/2020 22:09	WG1463114
Tetrachloroethene	21.2		1.00	1	04/19/2020 22:09	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 22:09	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 22:09	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 22:09	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 22:09	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 22:09	WG1463114
(S) Toluene-d8	*105*		*80.0-120*		*04/19/2020 22:09*	WG1463114
(S) 4-Bromofluorobenzene	*106*		*77.0-126*		*04/19/2020 22:09*	WG1463114
(S) 1,2-Dichloroethane-d4	*93.8*		*70.0-130*		*04/19/2020 22:09*	WG1463114

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 22:28	WG1463114
Bromoform	ND		1.00	1	04/19/2020 22:28	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 22:28	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 22:28	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 22:28	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 22:28	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 22:28	WG1463114
Chloroform	ND		5.00	1	04/19/2020 22:28	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 22:28	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 22:28	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 22:28	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 22:28	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 22:28	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 22:28	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 22:28	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 22:28	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:28	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:28	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 22:28	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:28	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:28	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 22:28	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 22:28	WG1463114
1,1,2-Trichlorotrifluoroethane	ND	J0	1.00	1	04/19/2020 22:28	WG1463114
Tetrachloroethene	16.1		1.00	1	04/19/2020 22:28	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 22:28	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 22:28	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 22:28	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 22:28	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 22:28	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/19/2020 22:28*	WG1463114
(S) 4-Bromofluorobenzene	*103*		*77.0-126*		*04/19/2020 22:28*	WG1463114
(S) 1,2-Dichloroethane-d4	*92.3*		*70.0-130*		*04/19/2020 22:28*	WG1463114

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 22:47	WG1463114
Bromoform	ND		1.00	1	04/19/2020 22:47	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 22:47	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 22:47	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 22:47	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 22:47	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 22:47	WG1463114
Chloroform	ND		5.00	1	04/19/2020 22:47	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 22:47	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 22:47	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 22:47	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 22:47	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 22:47	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 22:47	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 22:47	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 22:47	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:47	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 22:47	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 22:47	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:47	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 22:47	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 22:47	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 22:47	WG1463114
1,1,2-Trichlorotrifluoroethane	ND	J0	1.00	1	04/19/2020 22:47	WG1463114
Tetrachloroethene	9.67		1.00	1	04/19/2020 22:47	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 22:47	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 22:47	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 22:47	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 22:47	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 22:47	WG1463114
(S) Toluene-d8	*106*		*80.0-120*		*04/19/2020 22:47*	WG1463114
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*04/19/2020 22:47*	WG1463114
(S) 1,2-Dichloroethane-d4	*92.4*		*70.0-130*		*04/19/2020 22:47*	WG1463114

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1000	1	04/21/2020 17:05	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 23:06	WG1463114
Bromoform	ND		1.00	1	04/19/2020 23:06	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 23:06	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 23:06	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 23:06	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 23:06	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 23:06	WG1463114
Chloroform	ND		5.00	1	04/19/2020 23:06	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 23:06	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 23:06	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 23:06	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 23:06	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 23:06	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 23:06	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 23:06	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/19/2020 23:06	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:06	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:06	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 23:06	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:06	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:06	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 23:06	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 23:06	WG1463114
1,1,2-Trichlorotrifluoroethane	5.43	J0	1.00	1	04/19/2020 23:06	WG1463114
Tetrachloroethene	16.5		1.00	1	04/19/2020 23:06	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 23:06	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 23:06	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 23:06	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 23:06	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 23:06	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/19/2020 23:06*	WG1463114
(S) 4-Bromofluorobenzene	*104*		*77.0-126*		*04/19/2020 23:06*	WG1463114
(S) 1,2-Dichloroethane-d4	*97.7*		*70.0-130*		*04/19/2020 23:06*	WG1463114

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1000	1	04/21/2020 17:20	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 23:25	WG1463114
Bromoform	ND		1.00	1	04/19/2020 23:25	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 23:25	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 23:25	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 23:25	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 23:25	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 23:25	WG1463114
Chloroform	ND		5.00	1	04/19/2020 23:25	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 23:25	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 23:25	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 23:25	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 23:25	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 23:25	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 23:25	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 23:25	WG1463114
1,1-Dichloroethene	5.84		1.00	1	04/19/2020 23:25	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:25	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:25	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 23:25	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:25	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:25	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 23:25	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 23:25	WG1463114
1,1,2-Trichlorotrifluoroethane	86.3		10.0	10	04/24/2020 02:04	WG1465566
Tetrachloroethene	122		10.0	10	04/24/2020 02:04	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 23:25	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 23:25	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 23:25	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 23:25	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 23:25	WG1463114
(S) Toluene-d8	*106*		*80.0-120*		*04/19/2020 23:25*	WG1463114
(S) Toluene-d8	*111*		*80.0-120*		*04/24/2020 02:04*	WG1465566
(S) 4-Bromofluorobenzene	*100*		*77.0-126*		*04/19/2020 23:25*	WG1463114
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*04/24/2020 02:04*	WG1465566
(S) 1,2-Dichloroethane-d4	*96.2*		*70.0-130*		*04/19/2020 23:25*	WG1463114
(S) 1,2-Dichloroethane-d4	*101*		*70.0-130*		*04/24/2020 02:04*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/19/2020 23:44	WG1463114
Bromoform	ND		1.00	1	04/19/2020 23:44	WG1463114
Bromomethane	ND		5.00	1	04/19/2020 23:44	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/19/2020 23:44	WG1463114
Chlorobenzene	ND		1.00	1	04/19/2020 23:44	WG1463114
Chlorodibromomethane	ND		1.00	1	04/19/2020 23:44	WG1463114
Chloroethane	ND		5.00	1	04/19/2020 23:44	WG1463114
Chloroform	ND		5.00	1	04/19/2020 23:44	WG1463114
Chloromethane	ND		2.50	1	04/19/2020 23:44	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/19/2020 23:44	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/19/2020 23:44	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/19/2020 23:44	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/19/2020 23:44	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/19/2020 23:44	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/19/2020 23:44	WG1463114
1,1-Dichloroethene	5.30		1.00	1	04/19/2020 23:44	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:44	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/19/2020 23:44	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/19/2020 23:44	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:44	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/19/2020 23:44	WG1463114
Methylene Chloride	ND		5.00	1	04/19/2020 23:44	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/19/2020 23:44	WG1463114
1,1,2-Trichlorotrifluoroethane	71.2		10.0	10	04/24/2020 02:25	WG1465566
Tetrachloroethene	308		10.0	10	04/24/2020 02:25	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/19/2020 23:44	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/19/2020 23:44	WG1463114
Trichloroethene	ND		1.00	1	04/19/2020 23:44	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/19/2020 23:44	WG1463114
Vinyl chloride	ND		1.00	1	04/19/2020 23:44	WG1463114
(S) Toluene-d8	*105*		*80.0-120*		*04/19/2020 23:44*	WG1463114
(S) Toluene-d8	*113*		*80.0-120*		*04/24/2020 02:25*	WG1465566
(S) 4-Bromofluorobenzene	*99.7*		*77.0-126*		*04/19/2020 23:44*	WG1463114
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*04/24/2020 02:25*	WG1465566
(S) 1,2-Dichloroethane-d4	*93.3*		*70.0-130*		*04/19/2020 23:44*	WG1463114
(S) 1,2-Dichloroethane-d4	*98.0*		*70.0-130*		*04/24/2020 02:25*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 00:03	WG1463114
Bromoform	ND		1.00	1	04/20/2020 00:03	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 00:03	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 00:03	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 00:03	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 00:03	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 00:03	WG1463114
Chloroform	ND		5.00	1	04/20/2020 00:03	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 00:03	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 00:03	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 00:03	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 00:03	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 00:03	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 00:03	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 00:03	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/20/2020 00:03	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:03	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:03	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 00:03	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:03	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:03	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 00:03	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 00:03	WG1463114
1,1,2-Trichlorotrifluoroethane	ND		1.00	1	04/24/2020 02:45	WG1465566
Tetrachloroethene	ND		1.00	1	04/24/2020 02:45	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 00:03	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 00:03	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 00:03	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 00:03	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 00:03	WG1463114
(S) Toluene-d8	*103*		*80.0-120*		*04/20/2020 00:03*	WG1463114
(S) Toluene-d8	*113*		*80.0-120*		*04/24/2020 02:45*	WG1465566
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*04/20/2020 00:03*	WG1463114
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*04/24/2020 02:45*	WG1465566
(S) 1,2-Dichloroethane-d4	*96.1*		*70.0-130*		*04/20/2020 00:03*	WG1463114
(S) 1,2-Dichloroethane-d4	*101*		*70.0-130*		*04/24/2020 02:45*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 00:23	WG1463114
Bromoform	ND		1.00	1	04/20/2020 00:23	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 00:23	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 00:23	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 00:23	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 00:23	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 00:23	WG1463114
Chloroform	ND		5.00	1	04/20/2020 00:23	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 00:23	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 00:23	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 00:23	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 00:23	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 00:23	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 00:23	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 00:23	WG1463114
1,1-Dichloroethene	4.58		1.00	1	04/20/2020 00:23	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:23	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:23	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 00:23	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:23	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:23	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 00:23	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 00:23	WG1463114
1,1,2-Trichlorotrifluoroethane	97.0	J0	1.00	1	04/20/2020 00:23	WG1463114
Tetrachloroethene	323		10.0	10	04/24/2020 03:05	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 00:23	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 00:23	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 00:23	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 00:23	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 00:23	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/20/2020 00:23*	WG1463114
(S) Toluene-d8	*115*		*80.0-120*		*04/24/2020 03:05*	WG1465566
(S) 4-Bromofluorobenzene	*102*		*77.0-126*		*04/20/2020 00:23*	WG1463114
(S) 4-Bromofluorobenzene	*104*		*77.0-126*		*04/24/2020 03:05*	WG1465566
(S) 1,2-Dichloroethane-d4	*96.9*		*70.0-130*		*04/20/2020 00:23*	WG1463114
(S) 1,2-Dichloroethane-d4	*97.8*		*70.0-130*		*04/24/2020 03:05*	WG1465566

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1000	1	04/21/2020 17:47	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 00:42	WG1463114
Bromoform	ND		1.00	1	04/20/2020 00:42	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 00:42	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 00:42	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 00:42	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 00:42	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 00:42	WG1463114
Chloroform	ND		5.00	1	04/20/2020 00:42	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 00:42	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 00:42	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 00:42	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 00:42	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 00:42	WG1463114
1,1-Dichloroethane	1.46		1.00	1	04/20/2020 00:42	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 00:42	WG1463114
1,1-Dichloroethene	4.95		1.00	1	04/20/2020 00:42	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:42	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 00:42	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 00:42	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:42	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 00:42	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 00:42	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 00:42	WG1463114
1,1,2-Trichlorotrifluoroethane	99.1		10.0	10	04/24/2020 03:26	WG1465566
Tetrachloroethene	181		10.0	10	04/24/2020 03:26	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 00:42	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 00:42	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 00:42	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 00:42	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 00:42	WG1463114
(S) Toluene-d8	*102*		*80.0-120*		*04/20/2020 00:42*	WG1463114
(S) Toluene-d8	*111*		*80.0-120*		*04/24/2020 03:26*	WG1465566
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*04/20/2020 00:42*	WG1463114
(S) 4-Bromofluorobenzene	*102*		*77.0-126*		*04/24/2020 03:26*	WG1465566
(S) 1,2-Dichloroethane-d4	*99.0*		*70.0-130*		*04/20/2020 00:42*	WG1463114
(S) 1,2-Dichloroethane-d4	*100*		*70.0-130*		*04/24/2020 03:26*	WG1465566

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1000	1	04/21/2020 18:03	WG1463884

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 01:01	WG1463114
Bromoform	ND		1.00	1	04/20/2020 01:01	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 01:01	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 01:01	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 01:01	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 01:01	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 01:01	WG1463114
Chloroform	ND		5.00	1	04/20/2020 01:01	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 01:01	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 01:01	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 01:01	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 01:01	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 01:01	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 01:01	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 01:01	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/20/2020 01:01	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:01	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:01	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 01:01	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:01	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:01	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 01:01	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 01:01	WG1463114
1,1,2-Trichlorotrifluoroethane	8.30		1.00	1	04/24/2020 03:46	WG1465566
Tetrachloroethene	29.0		1.00	1	04/24/2020 03:46	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 01:01	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 01:01	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 01:01	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 01:01	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 01:01	WG1463114
(S) Toluene-d8	*106*		*80.0-120*		*04/20/2020 01:01*	WG1463114
(S) Toluene-d8	*111*		*80.0-120*		*04/24/2020 03:46*	WG1465566
(S) 4-Bromofluorobenzene	*101*		*77.0-126*		*04/20/2020 01:01*	WG1463114
(S) 4-Bromofluorobenzene	*104*		*77.0-126*		*04/24/2020 03:46*	WG1465566
(S) 1,2-Dichloroethane-d4	*98.8*		*70.0-130*		*04/20/2020 01:01*	WG1463114
(S) 1,2-Dichloroethane-d4	*99.2*		*70.0-130*		*04/24/2020 03:46*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 01:20	WG1463114
Bromoform	ND		1.00	1	04/20/2020 01:20	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 01:20	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 01:20	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 01:20	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 01:20	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 01:20	WG1463114
Chloroform	ND		5.00	1	04/20/2020 01:20	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 01:20	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 01:20	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 01:20	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 01:20	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 01:20	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 01:20	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 01:20	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/20/2020 01:20	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:20	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:20	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 01:20	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:20	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:20	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 01:20	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 01:20	WG1463114
1,1,2-Trichlorotrifluoroethane	ND		1.00	1	04/24/2020 04:06	WG1465566
Tetrachloroethene	21.1		1.00	1	04/24/2020 04:06	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 01:20	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 01:20	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 01:20	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 01:20	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 01:20	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/20/2020 01:20*	WG1463114
(S) Toluene-d8	*110*		*80.0-120*		*04/24/2020 04:06*	WG1465566
(S) 4-Bromofluorobenzene	*102*		*77.0-126*		*04/20/2020 01:20*	WG1463114
(S) 4-Bromofluorobenzene	*104*		*77.0-126*		*04/24/2020 04:06*	WG1465566
(S) 1,2-Dichloroethane-d4	*98.0*		*70.0-130*		*04/20/2020 01:20*	WG1463114
(S) 1,2-Dichloroethane-d4	*103*		*70.0-130*		*04/24/2020 04:06*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 01:39	WG1463114
Bromoform	ND		1.00	1	04/20/2020 01:39	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 01:39	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 01:39	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 01:39	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 01:39	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 01:39	WG1463114
Chloroform	ND		5.00	1	04/20/2020 01:39	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 01:39	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 01:39	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 01:39	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 01:39	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 01:39	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 01:39	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 01:39	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/20/2020 01:39	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:39	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:39	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 01:39	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:39	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:39	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 01:39	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 01:39	WG1463114
1,1,2-Trichlorotrifluoroethane	18.6	J0	1.00	1	04/20/2020 01:39	WG1463114
Tetrachloroethene	13.4		1.00	1	04/24/2020 04:27	WG1465566
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 01:39	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 01:39	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 01:39	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 01:39	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 01:39	WG1463114
(S) Toluene-d8	*104*		*80.0-120*		*04/20/2020 01:39*	WG1463114
(S) Toluene-d8	*112*		*80.0-120*		*04/24/2020 04:27*	WG1465566
(S) 4-Bromofluorobenzene	*102*		*77.0-126*		*04/20/2020 01:39*	WG1463114
(S) 4-Bromofluorobenzene	*105*		*77.0-126*		*04/24/2020 04:27*	WG1465566
(S) 1,2-Dichloroethane-d4	*100*		*70.0-130*		*04/20/2020 01:39*	WG1463114
(S) 1,2-Dichloroethane-d4	*98.8*		*70.0-130*		*04/24/2020 04:27*	WG1465566

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 01:58	WG1463114
Bromoform	ND		1.00	1	04/20/2020 01:58	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 01:58	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 01:58	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 01:58	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 01:58	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 01:58	WG1463114
Chloroform	ND		5.00	1	04/20/2020 01:58	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 01:58	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 01:58	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 01:58	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 01:58	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 01:58	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 01:58	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 01:58	WG1463114
1,1-Dichloroethene	1.21		1.00	1	04/20/2020 01:58	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:58	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 01:58	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 01:58	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:58	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 01:58	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 01:58	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 01:58	WG1463114
1,1,2-Trichlorotrifluoroethane	56.0	J0	1.00	1	04/20/2020 01:58	WG1463114
Tetrachloroethene	31.5		1.00	1	04/20/2020 01:58	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 01:58	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 01:58	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 01:58	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 01:58	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 01:58	WG1463114
(S) Toluene-d8	*106*		*80.0-120*		*04/20/2020 01:58*	WG1463114
(S) 4-Bromofluorobenzene	*100*		*77.0-126*		*04/20/2020 01:58*	WG1463114
(S) 1,2-Dichloroethane-d4	*102*		*70.0-130*		*04/20/2020 01:58*	WG1463114

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Bromodichloromethane	ND		1.00	1	04/20/2020 02:17	WG1463114
Bromoform	ND		1.00	1	04/20/2020 02:17	WG1463114
Bromomethane	ND		5.00	1	04/20/2020 02:17	WG1463114
Carbon tetrachloride	ND	J0	1.00	1	04/20/2020 02:17	WG1463114
Chlorobenzene	ND		1.00	1	04/20/2020 02:17	WG1463114
Chlorodibromomethane	ND		1.00	1	04/20/2020 02:17	WG1463114
Chloroethane	ND		5.00	1	04/20/2020 02:17	WG1463114
Chloroform	ND		5.00	1	04/20/2020 02:17	WG1463114
Chloromethane	ND		2.50	1	04/20/2020 02:17	WG1463114
1,2-Dichlorobenzene	ND		1.00	1	04/20/2020 02:17	WG1463114
1,3-Dichlorobenzene	ND		1.00	1	04/20/2020 02:17	WG1463114
1,4-Dichlorobenzene	ND		1.00	1	04/20/2020 02:17	WG1463114
Dichlorodifluoromethane	ND	J0	5.00	1	04/20/2020 02:17	WG1463114
1,1-Dichloroethane	ND		1.00	1	04/20/2020 02:17	WG1463114
1,2-Dichloroethane	ND		1.00	1	04/20/2020 02:17	WG1463114
1,1-Dichloroethene	ND		1.00	1	04/20/2020 02:17	WG1463114
cis-1,2-Dichloroethene	ND		1.00	1	04/20/2020 02:17	WG1463114
trans-1,2-Dichloroethene	ND		1.00	1	04/20/2020 02:17	WG1463114
1,2-Dichloropropane	ND	J4	1.00	1	04/20/2020 02:17	WG1463114
cis-1,3-Dichloropropene	ND		1.00	1	04/20/2020 02:17	WG1463114
trans-1,3-Dichloropropene	ND		1.00	1	04/20/2020 02:17	WG1463114
Methylene Chloride	ND		5.00	1	04/20/2020 02:17	WG1463114
1,1,2,2-Tetrachloroethane	ND		1.00	1	04/20/2020 02:17	WG1463114
1,1,2-Trichlorotrifluoroethane	ND	J0	1.00	1	04/20/2020 02:17	WG1463114
Tetrachloroethene	ND		1.00	1	04/20/2020 02:17	WG1463114
1,1,1-Trichloroethane	ND		1.00	1	04/20/2020 02:17	WG1463114
1,1,2-Trichloroethane	ND		1.00	1	04/20/2020 02:17	WG1463114
Trichloroethene	ND		1.00	1	04/20/2020 02:17	WG1463114
Trichlorofluoromethane	ND	J0	5.00	1	04/20/2020 02:17	WG1463114
Vinyl chloride	ND		1.00	1	04/20/2020 02:17	WG1463114
(S) Toluene-d8	*103*		*80.0-120*		*04/20/2020 02:17*	WG1463114
(S) 4-Bromofluorobenzene	*98.1*		*77.0-126*		*04/20/2020 02:17*	WG1463114
(S) 1,2-Dichloroethane-d4	*103*		*70.0-130*		*04/20/2020 02:17*	WG1463114

Method Blank (MB)

(MB) R3520813-1 04/21/20 13:25

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TOC (Total Organic Carbon)	369	J	102	1000

L1210202-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1210202-03 04/21/20 22:03 • (DUP) R3520813-5 04/21/20 22:16

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	ND	562	1	23.5	J P1	20

L1210202-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1210202-09 04/22/20 01:51 • (DUP) R3520813-8 04/22/20 02:05

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	ND	655	1	28.3	J P1	20

Laboratory Control Sample (LCS)

(LCS) R3520813-2 04/21/20 14:04

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TOC (Total Organic Carbon)	75000	73400	97.9	85.0-115	

L1210202-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1210202-02 04/21/20 21:08 • (MS) R3520813-3 04/21/20 21:29 • (MSD) R3520813-4 04/21/20 21:50

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC (Total Organic Carbon)	50000	ND	48800	49100	96.8	97.3	1	80.0-120			0.490	20

L1210202-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1210202-05 04/22/20 00:01 • (MS) R3520813-6 04/22/20 00:29 • (MSD) R3520813-7 04/22/20 00:51

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC (Total Organic Carbon)	50000	2070	51500	52300	98.8	100	1	80.0-120			1.52	20

Method Blank (MB)

(MB) R3521408-2 04/19/20 19:45

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Bromodichloromethane	U		0.136	1.00
Bromoform	U		0.129	1.00
Bromomethane	U		0.605	5.00
Carbon tetrachloride	U	J0	0.128	1.00
Chlorobenzene	U		0.116	1.00
Chlorodibromomethane	U		0.140	1.00
Chloroethane	U		0.192	5.00
Chloroform	U		0.111	5.00
Chloromethane	U		0.960	2.50
1,2-Dichlorobenzene	U		0.107	1.00
1,3-Dichlorobenzene	U		0.110	1.00
1,4-Dichlorobenzene	U		0.120	1.00
Dichlorodifluoromethane	U	J0	0.374	5.00
1,1-Dichloroethane	U		0.100	1.00
1,2-Dichloroethane	U		0.0819	1.00
1,1-Dichloroethene	U		0.188	1.00
cis-1,2-Dichloroethene	U		0.126	1.00
trans-1,2-Dichloroethene	U		0.149	1.00
1,2-Dichloropropane	U		0.149	1.00
cis-1,3-Dichloropropene	U		0.111	1.00
trans-1,3-Dichloropropene	U		0.118	1.00
Methylene Chloride	U		0.430	5.00
1,1,2,2-Tetrachloroethane	U		0.133	1.00
Tetrachloroethene	U		0.300	1.00
1,1,2-Trichlorotrifluoroethane	U	J0	0.180	1.00
1,1,1-Trichloroethane	U		0.149	1.00
1,1,2-Trichloroethane	U		0.158	1.00
Trichloroethene	U		0.190	1.00
Trichlorofluoromethane	U	J0	0.160	5.00
Vinyl chloride	U		0.234	1.00
(S) Toluene-d8	*104*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.6*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*91.6*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3521408-1 04/19/20 19:07

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromodichloromethane	5.00	4.36	87.2	75.0-120	
Bromoform	5.00	5.52	110	68.0-132	
Bromomethane	5.00	4.85	97.0	10.0-160	
Carbon tetrachloride	5.00	3.55	71.0	68.0-126	
Chlorobenzene	5.00	5.54	111	80.0-121	
Chlorodibromomethane	5.00	4.92	98.4	77.0-125	
Chloroethane	5.00	5.01	100	47.0-150	
Chloroform	5.00	3.78	75.6	73.0-120	
Chloromethane	5.00	3.77	75.4	41.0-142	
1,2-Dichlorobenzene	5.00	5.51	110	79.0-121	
1,3-Dichlorobenzene	5.00	5.33	107	79.0-120	
1,4-Dichlorobenzene	5.00	4.83	96.6	79.0-120	
Dichlorodifluoromethane	5.00	3.74	74.8	51.0-149	
1,1-Dichloroethane	5.00	4.00	80.0	70.0-126	
1,2-Dichloroethane	5.00	3.51	70.2	70.0-128	
1,1-Dichloroethene	5.00	3.93	78.6	71.0-124	
cis-1,2-Dichloroethene	5.00	4.32	86.4	73.0-120	
trans-1,2-Dichloroethene	5.00	4.57	91.4	73.0-120	
1,2-Dichloropropane	5.00	6.31	126	77.0-125	J4
cis-1,3-Dichloropropene	5.00	5.90	118	80.0-123	
trans-1,3-Dichloropropene	5.00	5.48	110	78.0-124	
Methylene Chloride	5.00	4.02	80.4	67.0-120	
1,1,2,2-Tetrachloroethane	5.00	5.49	110	65.0-130	
Tetrachloroethene	5.00	4.63	92.6	72.0-132	
1,1,2-Trichlorotrifluoroethane	5.00	3.66	73.2	69.0-132	
1,1,1-Trichloroethane	5.00	4.05	81.0	73.0-124	
1,1,2-Trichloroethane	5.00	4.62	92.4	80.0-120	
Trichloroethene	5.00	5.17	103	78.0-124	
Trichlorofluoromethane	5.00	3.13	62.6	59.0-147	
Vinyl chloride	5.00	5.32	106	67.0-131	
(S) Toluene-d8			*105*	*80.0-120*	
(S) 4-Bromofluorobenzene			*97.8*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*89.9*	*70.0-130*	

Method Blank (MB)

(MB) R3521536-3 04/24/20 00:28

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Tetrachloroethene	U		0.300	1.00
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00
(S) Toluene-d8	*111*			*80.0-120*
(S) 4-Bromofluorobenzene	*103*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*99.2*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3521536-1 04/23/20 23:07 • (LCSD) R3521536-2 04/23/20 23:27

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Tetrachloroethene	5.00	5.12	5.37	102	107	72.0-132			4.77	20
1,1,2-Trichlorotrifluoroethane	5.00	5.49	5.09	110	102	69.0-132			7.56	20
(S) Toluene-d8				*107*	*113*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*105*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*101*	*98.4*	*70.0-130*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J0	J0: The identification of the analyte is acceptable, but the reported concentration is an estimate. The calibration met method criteria.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

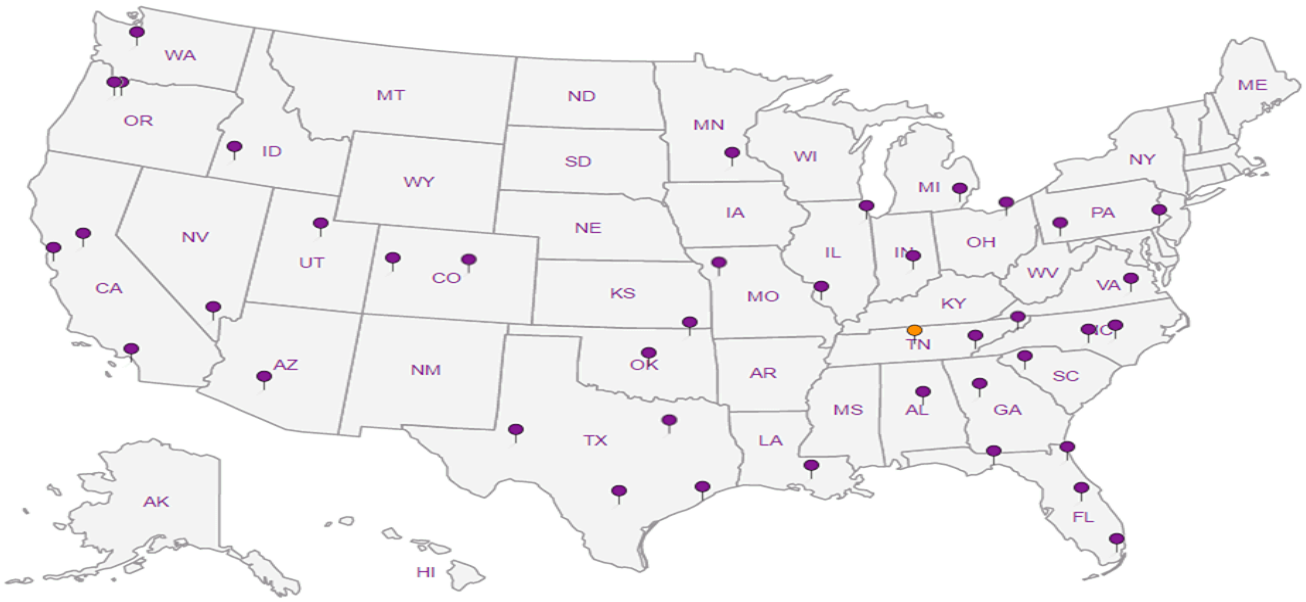
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



CRB Geological - UTC Greenville, SC

5000 Old Buncombe Road
Suite 21
Greenville, SC 29617

Billing Information:
Accounts Payable
8744 SW 133rd St.
Miami, FL 33176

Report to: Robert Workman

Email To: rworkman@crbgeo.net

Project Description: RCI 414-26

City/State Collected: Simsonville, SC

Please Circle: PT MT CT (ET)

Phone: 864-283-2000
Fax:

Client Project # RCI 414-26

Lab Project # UTCCRBGSC-VOC

Collected by (print): Sloane Brandon

Site/Facility ID #

P.O. #

Collected by (signature): Sloane Brandon

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	V8260VOH 40mlAmb-HCl	TOC 4x1 Amb-HCl	Pres Chk	Remarks	Sample # (lab only)
MW-5	G	GW		4/14/20	9:27	3	X				-01
MW-4	G	GW		4/14/20	10:40	3	X	X			-02
MW-4T	G	GW		4/14/20	13:00	3	X	X			-03
MW-8	G	GW		4/14/20	14:02	3	X				-04
MW-7	G	GW		4/14/20	15:01	3	X				-05
MW-6S	G	GW		4/14/20	15:31	3	X	X			-06
MW-6I	G	GW		4/14/20	16:30	3	X	X			-07
MW-10I	G	GW		4/15/20	9:25	3	X				-08
MW-10T	G	GW		4/15/20	10:51	3	X				-09
MW-10S	G	GW		4/15/20	11:17	3	X				-10

Chain of Custody Page 1 of 2

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 209919
G209

Acctnum: UTCCRBGSC
Template: T162886
Prelogin: P755468
PM: 526 - Chris McCord
PB: 2-10-20 20Gm
Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS X FedEx __ Courier _____

Tracking # 166357637420

Sample Receipt Checklist
COC Seal Present/Intact: __NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Sloane Brandon	4/16/20	13:00	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 4.2°C Bottles Received: 48
1.5-.1=1.4

Date: 4-17-20 Time: 830

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

CRB Geological - UTC Greenville, SC

5000 Old Buncombe Road
Suite 21
Greenville, SC 29617

Billing Information:
Accounts Payable
8744 SW 133rd St.
Miami, FL 33176

Report to: **Robert Workman**

Email To: **rworkman@crbgeo.net**

Project Description: RCI 414-26

City/State Collected: Simsonville, SC

Please Circle: PT MT CT (ET)

Phone: **864-283-2000**
Fax:

Client Project #: RCI 414-26

Lab Project #: **UTCCRBGSC-VOC**

Collected by (print): Sloane Brandon

Site/Facility ID #

P.O. #

Collected by (signature): Sloane Brandon
Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Pres Chk	V8260VOH 40mlAmb-HCl	TOC 40-1 Amb-HCl								Remarks	Sample # (lab only)
MW-6T	G	GW		4/15/20	13:10	3		X	X									-11
MW-6D	G	GW		4/15/20	15:15	3		X	X									-12
MW-9S	G	GW		4/15/20	16:10	3		X										-13
MW-9T	G	GW		4/16/20	10:20	3		X										-14
MW-9D	G	GW		4/16/20	11:25	3		X										-15
Field Blank	G	GW		4/16/20	11:35	3		X										-16

4/17

Chain of Custody Page 2 of 2

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 120919

Table #

Acctnum: **UTCCRBGSC**

Template: **T162886**

Prelogin: **P755468**

PM: **526 - Chris McCord**

PB: 2-10-2020

Shipped Via: **FedEX Ground**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS X FedEx __ Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Sloane Brandon	4/16/20	13:00	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 1.5-1=1.4 °C Bottles Received: 48

Date: 4-17-20 Time: 0830

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

APPENDIX V

MICROBIOLOGICAL LABORATORY ANAYLTICAL RESULTS

AND

CHAIN OF CUSTODY

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Rob Workman
CRB Geological & Environmental Services, Inc
5000 Old Buncombe Rd #21
Greenville, SC 29617

Phone: 305-366-9089

Fax:

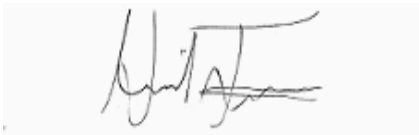
Identifier: 046RD **Date Rec:** 04/16/2020 **Report Date:** 04/23/2020

Client Project #: RCI 414-26 **Client Project Name:** RCI 414-26

Purchase Order #:

Analysis Requested: CENSUS, Special Studies

Reviewed By:



NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: **CRB Geological & Environmental Services, In**
Project: RCI 414-26

MI Project Number: **046RD**
Date Received: 04/16/2020

Sample Information

Client Sample ID:		**MW-4**	**MW-4T**	**MW-6I**	**MW-10i**
Sample Date:		04/14/2020	04/14/2020	04/14/2020	04/15/2020
Units:		cells/mL	cells/mL	cells/mL	cells/mL
Analyst/Reviewer:		HT	HT	HT	HT
Dechlorinating Bacteria					
Dehalococcoides	*DHC*	**5.00E-01 (J)**	**2.00E-01 (J)**	<5.00E-01	<5.00E-01
Functional Genes					
Sulfate Reducing Bacteria	APS	**3.55E+04**	**2.07E+04**	<4.70E+00	**3.82E+03**
Methanogens	MGN	**4.96E+04**	**1.19E+01**	<4.70E+00	<4.70E+00
Other Genera					
Geobacter spp.	*GEO*	**1.10E+00 (J)**	**2.19E+01**	<4.70E+00	<4.70E+00

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received **4/16/2020**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
GEO	04/16/2020	04/21/2020	0 °C	107%	non-detect	non-detect
DHC	04/16/2020	04/21/2020	0 °C	103%	non-detect	non-detect
MGN	04/16/2020	04/21/2020	0 °C	95%	non-detect	non-detect
APS	04/16/2020	04/21/2020	0 °C	106%	non-detect	non-detect

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

SITE LOGIC Report

Abiotic Potential

Contact: Rob Workman
Phone: 305-366-9089
Address: CRB Geological & Environmental Services, In
5000 Old Buncombe Rd #21,
Greenville, SC 29617
Email: rworkman@crbgeo.net

MI Identifier: 046RD

Report Date: 4-21-2020

Project Name: RCI 414-26

Comments:

Overview

Although not always fully considered, abiotic degradation can be a substantial or even the primary process for chlorinated hydrocarbon destruction at sites undergoing or transitioning to monitored natural attenuation (MNA). A variety of iron-bearing minerals including iron sulfides (mackinawite and pyrite), iron oxides (magnetite), green rust, and iron-bearing clays are capable of complete or nearly complete degradation of PCE, TCE, and carbon tetrachloride (He et al. 2009). Some iron-bearing minerals also catalyze the degradation of chlorinated ethanes and the lesser chlorinated ethenes cis-dichloroethene (DCE) and vinyl chloride. While the quantities and types will vary, these reactive iron minerals are frequently identified in subsurface environments under iron reducing and sulfate reducing conditions.

Brown et al. (2007) recommend four avenues for evaluating the role of abiotic processes in contaminant attenuation. First, examining contaminant concentrations along the flow path - decreasing parent compound concentrations with no evidence of accumulation of chlorinated transformation products like cis-DCE and vinyl chloride suggest abiotic degradation. Performing compound specific isotope analysis (CSIA) or monitoring for products unique to abiotic reactions such as acetylene can also provide a strong line of evidence. Microcosm studies with native sediment and killed controls can also be performed. Finally, Brown et al. (2007) suggest performing mineralogical analyses on aquifer sediment to characterize reactive minerals such as magnetite or iron monosulfides

Magnetic Susceptibility - Magnetite

Magnetite (Fe_3O_4) is a mixed valence iron mineral shown to react with PCE, TCE, and carbon tetrachloride. Furthermore, Ferrey et al. (2004) conclusively linked the observed degradation of cis-DCE at a former ammunition plant to magnetite in the subsurface. No direct chemical test is available for quantification of magnetite. However, magnetite is the most abundant mineral in natural sediments that exhibits magnetic behavior. Therefore, magnetic susceptibility provides an inexpensive and valuable estimate of the quantity of magnetite in environmental samples.

X-ray Diffraction (XRD) - Mackinawite, Pyrite, Magnetite and Green Rust

XRD is one of the primary techniques used to identify unknown crystalline materials. Most minerals are crystalline and will scatter X-rays in a regular, characteristic manner dependent on their crystal structure.

- Mackinawite is the most reactive of the iron-bearing minerals and a crystalline form (tetragonal FeS) can be detected by XRD. Mackinawite will transform PCE and TCE primarily by elimination to acetylene. Carbon tetrachloride is transformed mainly to chloroform but carbon dioxide, formate, and carbon disulfide have also been detected. Finally, the more heavily chlorinated ethanes including hexachloroethane, pentachloroethane, and tetrachloroethanes react to form chlorinated ethenes which can be further degraded.
- Pyrite (FeS_2) catalyzes beta elimination transforming PCE, TCE, and cis-DCE to acetylene and ethene. Vinyl chloride is transformed to ethene and ethane. Pyrite is also capable of degradation of carbon tetrachloride potentially forming a number of products including chloroform, carbon dioxide, carbon disulfide, and formate depending on reaction conditions.
- While not quantitative like the magnetic susceptibility test, XRD can also detect magnetite when present at between 2% and 5% on a weight basis.
- Green rusts have been reported to transform a number of common chlorinated contaminants including cis-DCE, vinyl chloride, trichloroethanes, and tetrachloroethanes. While special sample care to prevent oxidation would be needed, XRD can be used to detect green rust.

Percent Clay

Clays have large surface areas, balanced by exchangeable cations, which can bind a large number of both organic and inorganic molecules impacting their availability and reactivity in the subsurface. While less well studied than the other iron-bearing minerals, various phyllosilicate clays have been shown to be capable of degradation of PCE, TCE, cis-DCE, vinyl chloride, and carbon tetrachloride

Sample Location	S-1	S-2
Date Sampled	04/14/2020	04/14/2020
Magnetic Susceptibility Analysis		
Magnetic Susceptibility (m3/kg)	6.7E-8 ± 2.3E-9	2.7E-8 ± 3.1E-9

* Analysis performed in triplicate and results reported as the mean followed by +/- standard deviation.

References

Brown, R. A., J. T. Wilson and M. Ferrey (2007). "Monitored natural attenuation forum: The case for abiotic MNA." Remediation Journal **17**(2): 127-137.

Ferrey, M. L., R. T. Wilkin, R. G. Ford and J. T. Wilson (2004). "Nonbiological Removal of cis-Dichloroethylene and 1,1-Dichloroethylene in Aquifer Sediment Containing Magnetite." Environmental Science & Technology **38**(6): 1746-1752.

He, Y., C. Su, J. T. Wilson, R. T. Wilkin, C. Adair, T. Lee, P. Bradley and M. Ferrey (2009). Identification and characterization of methods for reactive minerals respnsible for natural attenuation of chlorinated organic compounds in ground water, US EPA.

Liu, Y., S. A. Majetich, R. D. Tilton, D. S. Sholl and G. V. Lowry (2005). "TCE Dechlorination Rates, Pathways, and Efficiency of Nanoscale Iron Particles with Different Properties." Environmental Science & Technology **39**(5): 1338-1345.

Song, H. and E. R. Carraway (2005). "Reduction of Chlorinated Ethanes by Nanosized Zero-Valent Iron: Kinetics, Pathways, and Effects of Reaction Conditions." Environmental Science & Technology **39**(16): 6237-6245.

Abiotic Reactions of Chlorinated Compounds with Iron Bearing Minerals and Zero Valent Iron (ZVI). Summaries for iron bearing minerals are based on He et al. (2009) and references therein. He et al. available at http://nepis.epa.gov/. Summary of ZVI based on Liu et al. (2005) and Song et al. (2005).

Contaminant	Mineral	Degradation	Reported Degradation Intermediates and Products[1]
PCE	FeS	Yes	Acetylene, TCE, cis-DCE, 1,1-DCE, ethene
	Pyrite	Yes	TCE, acetylene, ethene
	Magnetite	Yes	Unknown[2]
	[3]GR(SO_4)	Reports Differ	
	phyllosilicate clays	Yes	TCE, 1,1-DCE, vinyl chloride, 1,1,2-TCA, 1,1-DCA, chloroacetylene, acetylene, ethene, ethane
	ZVI	Yes	Ethene and ethane
TCE	FeS	Yes	Acetylene, cis-DCE, vinyl chloride, 1,1-DCE
	Pyrite	Yes	Acetylene, ethene, cis-DCE, (organic acids with DO present)
	Magnetite	Yes	Unknown[1]
	GR(SO_4), GR(CO_3)	No	Only observed degradation when Cu(II) added
	phyllosilicate clays	Yes	cDCE, vinyl chloride, acetylene, ethene, ethane
	ZVI	Yes	Ethane, ethene, acetylene with minor amounts of DCE, VC depending on conditions
cis-DCE	FeS	No	None detected
	Pyrite	Yes	Acetylene, ethene
	Magnetite	Yes	Unknown[2]
	GR(SO_4)	Yes	
	phyllosilicate clays	Yes	
	ZVI	Yes	Primarily acetylene and ethene but also much lesser amounts of ethane and VC and traces of methane, propane, propene, butane and butene
Vinyl chloride	FeS	Unknown	
	Pyrite	Yes	Ethene, ethane
	Magnetite	Yes	Unknown[2]
	GR(SO_4)	Yes	
	phyllosilicate clays	Yes	
	ZVI	Yes	Ethene, ethane, (no evidence of acetylene)

Contaminant	Mineral	Degradation	Reported Degradation Intermediates and Products[1]
1,1-DCA	FeS	Not Significant	None detected
1,1-DCA	GR(SO_4)	Low conversion	Ethene and ethane (w/ Cu or Ag)
1,1-DCA	ZVI	Yes (low)	Ethane
1,2-DCA	FeS	Not Significant	None detected
1,2-DCA	FeS (Biogenic)	Yes	Not monitored
1,2-DCA	GR(SO_4)	No	
1,2-DCA	ZVI	No	
1,1,1-TCA	FeS	Yes	1,1-DCA, ethene, 2-butyne
1,1,1-TCA	GR(SO_4)	Yes	1,1-DCA, CA, ethene ethane
1,1,1-TCA	ZVI	Yes	1,1-DCA, ethane
1,1,2-TCA	FeS	Rate not significant	Small amounts of 1,1-DCE and vinyl chloride but rate not significant
1,1,2-TCA	GR(SO_4)	Yes	Vinyl chloride, 1,1-DCE, ethene, ethane
1,1,2-TCA	ZVI	Yes	Ethane
1,1,1,2-TeCA	FeS	Yes	1,1-DCE
1,1,1,2-TeCA	GR(SO_4)	Yes	1,1-DCE and minor (<1%) vinyl chloride, ethene, ethane
1,1,1,2-TeCA	phyllosilicate clays	Yes	1,1-DCE
1,1,1,2-TeCA	ZVI	Yes	TCE, 1,1-DCE
1,1,2,2-TeCA	FeS	Yes	TCE, cis-DCE, trans-DCE, acetylene
1,1,2,2-TeCA	GR(SO_4)	Yes	TCE (major), cis-DCE, trans-DCE
1,1,2,2-TeCA	phyllosilicate clays	Yes	TCE
1,1,2,2-TeCA	ZVI	Yes	TCE, trans-DCE, cis-DCE
Carbon Tetrachloride	FeS	Yes	Chloroform, carbon disulfide, possibly methane, ethene, ethane
CT	Pyrite	Yes	Chloroform , CO_2, carbon disulfide, formate (highly dependent on conditions)
CT	Magnetite	Yes	Chloroform , carbon monoxide, methane, formate (highly dependent on conditions)
CT	GR(SO_4)	Yes	Chloroform and hexachloroethane; Chloroform, DCM, methane, ethene
CT	phyllosilicate clays	Yes	Chloroform
CT	ZVI	Yes	Chloroform, dichloromethane, methane (depending on conditions)

Notes: GR(SO_4) sulfate green rust. GR(CO_3) carbonate green rust. ZVI zero valent iron

[1]Compilation of reported degradation products. Mass recovery of products typically low --- additional undetected and unreported products are likely. Reported reaction products or proportions of reaction products were often a function of environmental conditions.

[2]No published studies that identify the transformation products of PCE, TCE, cis-DCE or vinyl chloride with magnetite. Ferrey et al (2004) analyzed for products of cis-DCE dechlorination including vinyl chloride, ethene, and ethane and did not find them. If Fe^{2+} sorbed to magnetite stabilizes carbene ions, the ultimate degradation product of cis-DCE on magnetite would be CO_2.

REPORT TO:

Name: Robert Workman
Company: CRB Geological
Address: 5000 Old Buncombe Rd
Ste 21
Greenville, SC 29617
email: rworkman@crbgeo.com
Phone: 864-283-2000
Fax:

INVOICE TO: (For Invoices paid by a third party it is imperative that all information be provided)

Name: Robert Workman
Company: CRB Geological
Address: 5000 Old Buncombe Rd
Ste 21
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Project Manager: Robert Workman
Project Name: RC1 414-26
Project No.: RC1 414-26

Purchase Order No.
Subcontract No.
MI Quote No.

Please Check One:
☐ More samples to follow
☑ No Additional Samples

Report Type: ☑ Standard (default) ☐ Microbial Insights Level III raw data(15% surcharge) ☐ Microbial Insights Level IV (25% surcharge) ☐ Comprehensive Interpretive(15%) ☐ Historical Interpretive (35%)

EDD type: ☑ Microbial Insights Standard (default) ☐ All other available EDDs (5% surcharge) Specify EDD Type:

Please contact us with any questions about the analyses or filling out the COC at (865) 573-8188 (9:00 am to 5:00 pm EST, M-F). After hours email: customerservice@microbe.com

Sample Information						Analyses				CENSUS: Please select the target organism/gene																					
MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	Total Number of Containers	PLFA	NGS	QuantArray Chlor	QuantArray Petro	DHC (Dehalococcoides)	DHC Functional genes (bvc, tce, vcr)	DHBt (Dehalobacter)	DHG (Dehalogenimonas)	DSM (Desulfuromonas)	DSB (Desulfitobacterium)	EBAC (Total)	SRB (Sulfate Reducing Bacteria-APS)	MGN (Methanogens)	MOB (Methanotrophs)	SMMO	DNF (Dentrifiers-nirS and nirK)	AMO (ammonia oxidizing bacteria)	PM1 (MTBE aerobic)	RMO (Toluene Monooxygenase)	RDEG (Toluene Monooxygenase)	PHE (Phenol Hydroxylase)	NAH (Napthalene-aerobic)	BSSA (Toluene/Xylene-Anaerobic)	add. qPCR:	RNA (Expression Option)*	Other: APS	Other: MGN	Other: Anaerobic substrate stability
046RD 1	MW-4	4/14/20	10:45	GW	1					X							X	X													X	X	
2	MW-4T	4/14/20	13:00	GW	1					X							X	X													X	X	
3	MW-6I	4/14/20	16:30	GW	1					X							X	X													X	X	BW 4/15
4	S-1	4/14/20	10:17	soil	1																												X
5	S-2	4/14/20	10:28	soil	1																												X
6	MW-10i	4/15/20	9:25	GW	1					X							X	X													X	X	

Relinquished by: Date 4/15/20
Received by: Date 4/16/20

It is vital that chain of custody is filled out correctly & that all relative information is provided.
Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable.