



# **IN-SITU CHEMICAL OXIDATION TREATABILITY STUDY EVALUATION REPORT**

## **CTS OF ASHEVILLE, INC. SUPERFUND SITE**

**235 Mills Gap Road  
Asheville, Buncombe County, North Carolina  
EPA ID: NCD003149556  
Consent Decree – Civil Action No. 1:16-cv-380**

### **Prepared for:**

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**Wood Project 6252-16-2012**

**May 3, 2019**



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May 3, 2019

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RE: In-situ Chemical Oxidation Treatability Study Evaluation Report  
CTS of Asheville, Inc. Superfund Site  
235 Mills Gap Road, Asheville, Buncombe County, North Carolina  
EPA ID: NCD003149556  
Consent Decree – Civil Action No. 1:16-cv-380  
Wood Project 6252-16-2012

Dear Mr. Zeller:

Please find attached the In-situ Chemical Oxidation Treatability Study Evaluation Report (ISCO TS Evaluation Report) for the above-referenced Site. Wood Environment & Infrastructure Solutions, Inc. prepared this ISCO TS Evaluation Report on behalf of CTS Corporation to comply with the Consent Decree for Interim Remedial Design/Remedial Action at the CTS of Asheville, Inc. Superfund Site between the United States of America and CTS Corporation, Mills Gap Road Associates, and Northrop Grumman Systems Corporation (entered on March 7, 2017).

If you have questions regarding this ISCO TS Evaluation Report, please contact us at (828) 252-8130.

Sincerely,

**Wood Environment & Infrastructure Solutions, Inc.**

  
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## ACRONYMS

bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
CD	Consent Decree
DHS	Department of Homeland Security
ECD	electron capture device
ERH	electrical resistance heating
FSAP	Field Sampling and Analysis Plan
ft/ft	feet per foot
g/kg	grams per kilogram
HASP	Health and Safety Plan
IDW	investigative derived waste
ISCO	in-situ chemical oxidation
MDL	method detection limit
MIP	membrane interface probe
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
NAPL	non-aqueous phase liquid
NCDEQ	North Carolina Department of Environmental Quality
NOI	Notice of Intent
PNOD	permanganate natural oxidant demand
PDI	Pre-design Investigation
psi	pounds per square inch
PWR	partially weathered rock
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RAO	remedial action objective
RDWP	Remedial Design Work Plan
TCE	trichloroethene (also, trichloroethylene)
TSWP	Treatability Study Work Plan
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

## **1.0 INTRODUCTION**

Wood Environment & Infrastructure Solutions, Inc. (Wood) prepared this In-situ Chemical Oxidation (ISCO) Treatability Study Evaluation Report (TS Evaluation Report) for the CTS of Asheville, Inc. Superfund Site (Site). The activities described in this TS Evaluation Report have been performed to comply with Paragraph 3.4 of the Statement of Work to the Consent Decree for Interim Remedial Design/Remedial Action (CD) at the Site between the United States of America and CTS Corporation, Mills Gap Road Associates, and Northrop Grumman Systems Corporation.

### **1.1 Site Description**

The approximate center of the Site is located at north latitude 35°29'36" and west longitude 82°30'25" (Figure 1). The Site formerly contained an approximate 95,000-square foot, single-story brick and metal structure on the southern portion of the Site. The building was demolished in December 2011 and the concrete building pad remains intact. The northeastern portion of the Site contains an asphalt-paved parking area, and asphalt-paved driveways are located parallel to the north (front) of the building pad and southeast (rear) of the building pad. A six-foot high chain-link fence surrounds the Site and a locked gate at the north end of the Site controls access to the Site from Mills Gap Road. The Site is unoccupied. The Site and adjacent property boundaries are illustrated on Figure 2.

### **1.2 Background**

Previous investigations have identified a dissolved-phase volatile organic compound (VOC) groundwater plume in the Northern Area of the Site, with trichloroethene (TCE) being the primary contaminant. A Non-aqueous Phase Liquid (NAPL) Area Focused Feasibility Study Addendum was conducted to evaluate potential remedial alternatives for the Northern Area of the Site. ISCO was selected as the recommended alternative (Wood, 2015a).

ISCO using emplaced potassium permanganate has been proposed in the Northern Area to reduce TCE concentrations in groundwater. The remedial action objective (RAO) is to reduce TCE concentrations in groundwater in the Northern Area by 95 percent.

A Pre-design Investigation (PDI) was performed in May and June 2017 to collect additional information regarding the vertical and horizontal extent of contamination in the Northern Area. Data regarding the potassium permanganate natural oxidant demand (PNOD) of the subsurface materials were also collected. These data were used to develop a Treatability Study Work Plan (TSWP) that was submitted to the United States Environmental Protection Agency (USEPA) on November 7, 2017. The TSWP was approved by the USEPA and the North Carolina Department of Environmental Quality (NCDEQ) on November 20, 2017.

This TS Evaluation Report presents the results and recommendations from the ISCO Treatability Study.

### **1.3 Basis of ISCO Remediation**

The proposed interim remedial action is hydraulic emplacement of potassium permanganate resulting in the oxidation/destruction of TCE in groundwater. Potassium permanganate is hydraulically emplaced in the subsurface as a slurry of granular potassium permanganate, water, and a carrier fluid creating a sheet-like sub-horizontal disc in the subsurface. Because of the concentration gradient between the potassium permanganate and surrounding groundwater, the potassium permanganate will diffuse over time into the soil/groundwater surrounding the emplacement. In addition, the potassium permanganate emplacement will be more permeable than the surrounding formation, so groundwater will preferentially flow through the emplacement. Contaminants in groundwater that migrate through the zone of solid potassium permanganate are then oxidized (i.e. destroyed). Also, the potassium permanganate dissolves into the groundwater in the surrounding formation and, via advection and dispersion, creates an "oxidative zone" that oxidizes contaminants in this zone. The potassium permanganate will continue to oxidize VOCs until the oxidative capacity is exhausted.

### **1.4 ISCO Treatability Study Objectives**

The objective of the Treatability Study was to collect information to determine if the proposed remedial action is effective to meet the RAO and, if so, to develop parameters to be used in the full-scale remedial action design. The objectives of the Treatability Study included:

- Evaluate the distribution of the emplaced potassium permanganate.

- Evaluate the diffusive zone created from the emplaced potassium permanganate.
- Evaluate TCE concentrations downgradient of the emplacements.
- Collect/interpret data for implementation of the full-scale ISCO remedial design.

## **2.0 NORTHERN AREA CONCEPTUAL SITE MODEL**

The following Conceptual Site Model is based on data collected to date related to the overburden formation in the Northern Area of the Site.

### **2.1 Site Physical Setting**

The area surrounding the Site is considered rural and contains residential and light commercial properties. The Site is situated on a topographic "saddle" between two prominent mountains - Busbee Mountain to the north and Brown Mountain to the south and southwest. Properties northwest and southeast are topographically downgradient of the Site. The majority of the Site is relatively flat and natural surface drainage at the Site is to the northwest. The surrounding area contains mountains and rolling hills, typical of the eastern flank of the Appalachian Mountain range.

### **2.2 Geology**

Fill material and residual soil (overburden) have been identified in the Northern Area of the Site. Fill material, consisting of loose silty sand with gravel, has been observed to a depth of approximately 20 feet below ground surface (bgs) in the northwestern portion of the Site where two apparent natural intermittent surface water drainage channels were historically backfilled for development/grading. Overburden is located below the fill material, where present, and has been observed to a maximum depth of approximately 81 feet bgs (monitoring well MW-6A) in the Northern Area of the Site, where the apparent top of bedrock is encountered.

The uppermost zone of overburden generally consists of fine to medium sand with 10 to 15 percent silt. The overburden "fabric" ranges from massive (i.e., no apparent geologic structure) to strongly foliated. Foliated zones were observed to be approximately horizontal to steeply dipping. Quartz veins ranging in thickness from less than 0.5 inches to approximately 12 inches, and consisting of sand to gravel-sized fragments, have been observed in the overburden. The partially weathered rock (PWR), which is a zone of less weathered rock than the shallower overburden, has been observed to be approximately 15 feet thick in the Northern Area and typically consists of fine to coarse sand with minor amounts of silt and gravel-sized rock fragments. The fabric of the PWR is similar to the overburden fabric (Wood, 2009).

The depth to bedrock in the Northern Area ranges from approximately 70 feet bgs to approximately 81 feet bgs, based on the depth to drilling refusal using rotary/roller cone drilling equipment (Wood, 2009).

## **2.3 Hydrogeology**

A generally north to south trending groundwater divide is present in the overburden in the north-central portion of the Site. As previously discussed, the Site is located on a topographic saddle between mountains to the north and south. A portion of groundwater that is flowing from each mountain (i.e., from a higher elevation) is presumed to be toward the saddle. Therefore, a groundwater divide has developed where groundwater in the overburden flows from the mountains and turns east or west to respective discharge zones. The position and shape of the groundwater divide likely changes in response to precipitation/infiltration.

The direction of shallow groundwater flow (water table) and groundwater flow in the PWR zone are similar. Groundwater flow in the southern portion of the Site appears to flow radially, to the north and east. From the north/central portion of the Site, groundwater flows northwest and east/southeast toward the respective groundwater discharge zones.

In November/December 2018, the depth to the water table in the Northern Area ranged from approximately 17 to 33 feet bgs in monitoring wells MW-7 and MW-6, respectively. Considering the depth to the water table and the depth to bedrock, the aquifer thickness ranges from approximately 30 to 60 feet.

Based on depth to water measurements collected in 2015, the horizontal hydraulic gradient in the shallow overburden from the source area to the Northern Area is approximately 0.031 feet per foot (ft/ft). The horizontal hydraulic gradient in the shallow overburden in the Northern Area of the Site toward the discharge zone east of the Site is approximately 0.066 ft/ft and the horizontal gradient from Northern Area of the Site toward the discharge zone west of the Site is approximately 0.015 ft/ft (Wood, 2015a).

The horizontal hydraulic gradient in the PWR from the source area to the Northern Area is approximately 0.018 ft/ft. The horizontal hydraulic gradient in the PWR from the Northern Area of

the Site toward the discharge zone east of the Site is approximately 0.063 ft/ft and the horizontal gradient from the Site toward the spring west of the Site is approximately 0.014 ft/ft (Wood, 2015a).

Upward vertical hydraulic gradients were observed in the Northern Area between proximal overburden shallow and PWR monitoring wells, based on the November/December 2017 monitoring events. An upward gradient (-0.055 ft/ft) was measured at the MW-6/6A well pair and a relatively small upward vertical gradient (-0.001 ft/ft) was measured at the MW-7/7A well pair, which is located at/near the groundwater divide.

Groundwater elevations have fluctuated since monitoring wells were installed in 2009. From 2009 to 2013, groundwater elevations in the Northern Area increased 10.8 feet and 12.5 feet at monitoring wells MW-7A and MW-6A, respectively. This period represents a transition from generally drought conditions to above-average rainfall conditions. Groundwater elevation increases in the shallow (water table) monitoring wells were similar during this period (i.e., 11.1 feet at MW-7 and 11.2 feet at MW-6). From 2013 to 2017, groundwater elevations decreased approximately 7 to 8 feet and increased approximately 6 feet in the first half of 2018.

The groundwater seepage velocity ( $v$ ) is calculated as:

$$v = ki/n_e, \text{ where}$$

$k$  = hydraulic conductivity  
 $i$  = hydraulic gradient  
 $n_e$  = effective porosity

Based on the average hydraulic conductivity of  $2.3 \times 10^{-4}$  cm/sec determined by slug testing conducted for the non-aqueous phase liquid (NAPL) Area FFS Report (Wood, 2015a) and an assumed effective porosity of 0.25, the groundwater seepage velocity from the Northern Area (monitoring well pairs MW-6/6A and 7/7A) ranges from 13 feet per year to the western discharge zone, to 63 feet per year to the eastern discharge zone (monitoring well pairs MW-5/5A and MW-7/7A).

## **2.4 Nature and Extent of Contamination**

As determined from previous investigations, and confirmed during the 2013/2014 NAPL Investigation, the contamination source area is located below the south-central portion of the

former building and extends to the immediate south. The nature of the chlorinated VOC contamination, whether from pure product or from a mixed material/liquid containing a portion of chlorinated VOCs, is unknown. The primary release mechanism(s) associated with the chlorinated VOC contamination at the Site is also unknown.

The petroleum contamination identified in the source area at the Site consisted primarily of fuel oil. The primary release mechanism(s) associated with the petroleum contamination observed at the Site is unknown; however, the petroleum is suspected of originating from an aboveground fuel oil storage tank formerly used to store and supply fuel oil to the facility's boiler.

In 2018, electrical resistance heating was implemented to remediate the LNAPL source area. Concentrations of TCE in saturated soil, groundwater, and LNAPL were reduced greater than 95 percent, indicating that the source area has largely been removed.

Based on results from the NAPL Investigation, a significant portion of TCE partitioned into (i.e., dissolved into) the petroleum light NAPL (LNAPL). Based on geochemical parameters, primarily the octanol-water coefficient, TCE more readily partitions into LNAPL than it dissolves into groundwater; however, via equilibrium conditions, the TCE will dissolve into groundwater over time (Wood, 2014). Therefore, TCE in the LNAPL acted as the primary source to the dissolved-phase groundwater plume, which extends generally north to east from the LNAPL zone. From the Northern Area of the Site, the dissolved-phase groundwater plume extends east and west to discharge zones. Based on previous investigations, there is no evidence of NAPL (either light or dense) in the overburden in the Northern Area of the Site.

#### **2.4.1 Unsaturated Soil**

Unsaturated soil samples collected to date from the overburden in the Northern Area do not indicate a source of soil contamination that contributes to the contaminated groundwater plume in the Northern Area.

#### **2.4.2 Saturated Soil**

Saturated soil samples were collected during the NAPL Investigation and PDI. TCE concentration in saturated soil samples collected from the Northern Area are relatively low (up to 5,000 micrograms



per kilogram, mg/kg) compared to TCE concentrations in saturated soil samples collected in the LNAPL source area prior to remediation (up to 1,120,000 mg/kg), which is indicative of the majority of the TCE mass being dissolved in groundwater and not sorbed to soil.

### **2.4.3 Groundwater**

The dissolved-phase chlorinated VOC plume in overburden extends from the source NAPL Area to the Northern Area and then east and west toward groundwater discharge zones. Based on data collected during the NAPL Investigation (Wood, 2014) and the Western Area Remedial Investigation (Wood, 2015b), the Northern Area dissolved-phase chlorinated VOC groundwater plume likely does not extend north of Mills Gap Road.

TCE is the primary chlorinated VOC present in groundwater in the Northern Area. Minor concentrations of chlorinated VOC degradation products, such as 1,2-cis-dichloroethene (cis-1,2-DCE), have been detected in groundwater samples collected from the Northern Area. The lack of elevated concentrations of degradation products indicates that natural biodegradation is not readily occurring in the Northern Area. The pH of groundwater in the Northern Area is generally between 5 and 6. Furthermore, the aquifer is mildly aerobic (i.e., dissolved oxygen generally between 1 and 4 milligrams per liter) and reducing conditions are not present (i.e., oxidation reduction potential generally in the 100 to 300 millivolt range). These aquifer conditions could be factors limiting the ability of microbes to anaerobically biodegrade TCE to cis-1,2-DCE.

Concentrations of TCE vary horizontally and vertically in the Northern Area (from tens of micrograms per liter [ $\mu\text{g/L}$ ] to tens of thousands  $\mu\text{g/L}$ ). Based on TCE concentrations in collected groundwater samples and electron capture device (ECD) responses measured during the NAPL Investigation and the ISCO PDI, chlorinated VOC concentrations generally increased with depth (Note: the ECD probe did not advance to the depth of bedrock due to limitations of the drilling equipment; the ECD probe generally advanced to a depth of approximately 40 to 50 feet bgs). Nearest the source area, VOC concentrations increased rapidly at the water table based on ECD response data. However, farther away from the source area, VOC concentrations began to increase 5 to 20 feet below the water table. For example, at MIP-80 near the source/LNAPL area, the water table is estimated to be at 19 feet bgs, and the ECD response immediately increased to a maximum reading just below this depth. Conversely, at MIP-100 in the downgradient plume area (Northern

Area), the water table is at approximately 20 feet bgs, but the ECD responses began to increase at approximately 35 feet bgs and maximum readings were not obtained until a depth of approximately 42 feet bgs. Figure 3 of the ISCO PDI Evaluation Report depicts the soil boring locations referenced in this section (Wood, 2017).

In the west-central area of the Site, VOC concentrations began to decrease after a zone of elevated readings. For example, at MIP-105, ECD responses increased at approximately 30 feet bgs, but began to decline at approximately 45 feet bgs. Two drainage swales formed by intermittent streams were formerly located in this area of the Site, indicating that there was at one time an upward gradient and discharge zone. This 'upwelling' could be inhibiting the downward migration of groundwater containing VOCs in this area.

Based on the results of the NAPL Investigation, an area generally to the east and northeast of the former building was identified where groundwater was not highly contaminated (i.e. outside of the dissolved-phase TCE plume core). However, data collected for the ISCO PDI identified elevated TCE concentrations in this area deeper than during the NAPL Investigation. For example, MHP-11 was advanced in this area during the NAPL Investigation to a refusal depth of approximately 42 feet bgs, and a groundwater sample collected at 42 feet bgs indicated a TCE concentration of 419 µg/L. During advancement of MIP-102 and MIP-103 in this area for the ISCO PDI, ECD responses began to increase at 40 feet bgs and maximum responses were measured at 45 to 48 feet bgs. A groundwater sample collected at 52 feet bgs at MIP-102 indicated a TCE concentration of 17,800 µg/L.

Petroleum constituents have not been detected at elevated concentrations in groundwater samples collected in the Northern Area of the Site. Relatively minor concentrations of petroleum constituents (i.e., compared to reported TCE concentrations) were detected in soil and groundwater samples collected nearest the NAPL source area. In general, the petroleum constituents that have been detected/estimated are ring-structured hydrocarbons (e.g., benzene, toluene, and xylenes) which more readily dissolve into groundwater from a petroleum fuel source. Petroleum constituents in groundwater in the Northern Area are not considered to contribute significant mass to the overall contaminated groundwater plume.

## **2.5 Potassium Permanganate Natural Oxidant Demand**

In addition to the contaminants present in the area to be treated, the subsurface formation contains organic and inorganic materials that will be oxidized by the chemical oxidant (potassium permanganate). This natural oxidant demand will consume some portion of the injected oxidant. Therefore, the PNOD was measured during the ISCO PDI to determine the magnitude of the PNOD that will potentially be consumed by the potassium permanganate, in conjunction with the contaminants present in the groundwater.

PNOD samples were collected from the saturated zone in the ISCO treatment area. Each soil sample was analyzed in triplicate. The average PNOD results for each sample ranged from 0.9 grams per kilogram (g/kg) to 2.2 g/kg (Wood, 2017). The results indicate that the PNOD does not vary greatly in the Northern Area and is relatively low; therefore, PNOD would not be expected to consume a significant portion of the potassium permanganate.

## **2.6 Fate and Transport**

The fate and transport of contaminants in soil and groundwater is influenced by numerous factors, including the primary and secondary release mechanisms; the physical and chemical properties of the constituents that were released; and the characteristics of the subsurface medium through which the contaminants migrate.

### **2.6.1 Contaminant of Concern**

The primary contaminant of concern for the Northern Area is TCE.

### **2.6.2 Contaminant Transport Pathways**

The primary transport pathway for contamination in the overburden in the Northern Area is via groundwater. The unsaturated soil pathway, where contaminants leach from the soil to the underlying groundwater, is not considered a transport pathway, as evidence of contamination in the unsaturated soil has not been identified in the Northern Area. The dissolved-phase groundwater plume in the Northern Area discharges at surface water features east and west of the Site resulting in an airborne contaminant pathway via volatilization of VOCs, as well as a surface water contaminant transport pathway.

### **2.6.3 Mass Distribution**

The NAPL source area at the Site contains the largest mass of contaminants. The downgradient dissolved-phase plume contains chlorinated VOC degradation compounds and minor concentrations of petroleum constituents. Groundwater in the Northern Area contains concentrations of TCE ranging from hundreds µg/L to tens of thousands µg/L. As previously described, concentrations of TCE vary horizontally and vertically in groundwater in the Northern Area.

### **3.0 TREATABILITY STUDY ACTIVITIES**

The ISCO Treatability Study was conducted to collect data for the full-scale remedial design. Copies of the field logbook and field data records generated during the Treatability Study are included in Appendix A.

#### **3.1 Treatability Study Location**

The Treatability Study was conducted in the north-central area of the Site within the Northern Area. This location was selected for the following reasons:

- The Treatability Study area was located downgradient of the electrical resistance heating (ERH) remediation area, such that upgradient groundwater remediation activities would not influence TCE groundwater concentrations that 'entered' the treatment area during the evaluation period.
- The Treatability Study area was located in the vicinity of a groundwater divide, where groundwater flow diverges and flows to the east and west. The greatest certainty of the direction of groundwater flow was in the Treatability Study area.
- The Treatability Study area was located outside of where construction activities for the ERH remediation that were on-going during the evaluation period.
- Existing monitoring wells MW-7 and MW-7A with historical groundwater concentration data are located in the Treatability Study area.

#### **3.2 Monitoring Well Installation**

Eight monitoring wells were installed in the Treatability Study area to monitor VOC concentrations and geochemical parameters during performance of the Treatability Study (Figure 3). Monitoring wells were installed in pairs, with one shallow and one deep well per location. Monitoring well construction details are summarized in Table 1. Monitoring well construction diagrams and NCDEQ GW-1 well construction records are included in Appendix B.

Borings for the monitoring wells were advanced using nominal 4.25-inch inner diameter hollow stem augers. The borings were advanced to the proposed depths and a Type II monitoring wells were installed. A two-inch diameter Schedule 40 polyvinyl chloride (PVC) riser pipe and two-inch diameter, five-foot long, Schedule 40 PVC 0.010-inch slotted screen was installed in each of the borings. The annulus of each well was filled with filter sand and topped with a bentonite seal and grout in accordance with North Carolina Well Construction Standards. Monitoring wells were

developed by the pump and surge method using a submersible pump. Water quality parameters (pH, temperature and conductivity) were monitored during development.

The wells were completed with a flush-mount wellhead and equipped with a locking well cap. An approximate four square-foot concrete pad was placed around each wellhead and well identification labels were placed inside the wellheads. The monitoring wells were surveyed by a North Carolina Professional Land Surveyor.

### **3.3 Emplacement Well Installation**

The three emplacement wells/casings were installed to advance the emplacements (Figure 3). The emplacement well borings were advanced using a sonic drill rig and an 8-inch nominal diameter casing bit. The boreholes were extended to apparent bedrock, which was approximately 75 feet. The emplacement wells consist of a solid (un-screened) 4-inch diameter, schedule 40, PVC flush-threaded casing. Centralizers were installed at an approximate 15-foot spacing in the annulus of the borehole. The surrounding approximate 2-inch annular space between the casing and soil was pressure grouted from the bottom of the borehole to ground surface using a tremie pipe and grout pump. The emplacement wells were completed flush with ground surface and be equipped with a locking cap. Emplacement well construction diagrams are included in Appendix B.

### **3.4 Emplacement Installation**

FRx, Inc., an environmental injection contractor, mobilized equipment and materials for the emplacement activities. Granular research-grade potassium permanganate, which is marketed as RemOx<sup>®</sup> S by Carus Corporation, was delivered in 2,000-pound weather-proof 'super sacks' and stored on wooden pallets.

The emplacement process occurred in two steps. First, a high velocity water jet was used to cut the PVC casing/grout at the target depth and create a kerf, or notch, in the surrounding formation. Second, the potassium permanganate was mixed with water and bentonite and the slurry was injected into the formation using a positive displacement pump. During both processes, inflatable packers were used to isolate the emplacement interval. The emplacements were completed at six-foot intervals from the deepest target depth to the shallowest target depth. Table 2 contains a summary of the quantities of potassium permanganate emplaced at each location.

Potassium permanganate in quantities exceeding the screening threshold quantity of 400 pounds is regulated by the Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards. Upon receipt of the potassium permanganate at the Site, a Top-Screen survey was completed and submitted to DHS. Upon completion of the emplacements, DHS was notified that the potassium permanganate had been used/injected into the subsurface and was no longer stored at the Site.

### **3.5 Performance Monitoring**

Performance monitoring was conducted using several methods, as described below.

#### **3.5.1 Groundwater Monitoring**

Performance groundwater monitoring was conducted to determine the effectiveness of the emplaced potassium permanganate at reducing TCE concentrations in groundwater. Groundwater samples were collected from the eight new monitoring wells and existing monitoring wells MW-7 and MW-7A. Baseline groundwater sampling was conducted in December 2017, and quarterly groundwater sampling was conducted in May, August, and November 2018.

The groundwater samples were collected using low-flow purging/sampling techniques, as described in the Remedial Design Work Plan (RDWP) Field Sampling and Analysis Plan (FSAP). Water quality parameters (pH, temperature, conductivity, oxidation reduction potential, dissolved oxygen and turbidity) were monitored during purging. The presence of potassium permanganate in the purged groundwater was measured using a colorimeter. The groundwater samples were submitted for analysis of Site-specific VOCs (TCE, cis-1,2-DCE, trans-1,2-dichloroethene [trans-1,2-DCE], and vinyl chloride) via USEPA Method 8260. Quality assurance/quality control procedures were implemented in accordance with the RDWP Quality Assurance Project Plan (QAPP); however, the groundwater samples were submitted for a Level 2 data package and abbreviated data validation was conducted. The groundwater sampling field data records are included in Appendix A and the analytical reports are included in Appendix C.

#### **3.5.2 Potassium Permanganate Distribution Evaluation**

In December 2018, the distribution of the emplacements was investigated. A direct-push technology rig was used to collect continuous soil samples in the vicinity of the emplacements.

Borings were advanced at 15 locations surrounding the emplacement wells and the soil was visually observed to identify potassium permanganate. The soil boring locations are depicted in Figure 4 and soil boring logs are included in Appendix D.

### **3.5.3 Additional Groundwater Sampling**

Based on the groundwater analytical data collected from December 2017 to November 2018, additional groundwater data was collected in March 2019 to support the development of the design for full-scale implementation of ISCO in the Northern Area of the Site. The activities included collection of groundwater samples in zones where potassium permanganate was visually identified in soil, and collection of groundwater samples from monitoring wells where concentrations of TCE had decreased since implementation of the ISCO Treatability Study.

A direct-push technology rig was mobilized to the Site for the additional groundwater sampling activities. Soil borings were advanced at four locations (Figure 5; one location had two soil borings advanced to different depths). A temporary monitoring well consisting of one-inch diameter PVC well screen (five feet in length) and casing was placed in each boring at the target depths.

The groundwater samples were collected using low-flow purging/sampling techniques, as described in the RDWP FSAP. Water quality parameters (pH, temperature, conductivity, oxidation reduction potential, and dissolved oxygen) were monitored during purging. The presence of potassium permanganate in the purged groundwater was measured using a colorimeter. The groundwater samples were submitted for analysis of Site-specific VOCs (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride) via USEPA Method 8260.

Where potassium permanganate was identified in groundwater during purging, ascorbic acid was added to the sample container to neutralize the potassium permanganate, as described in USEPA's Groundwater Issue: Ground Water Sample Preservation at In-Situ Chemical Oxidation Sites – Recommended Guidelines, dated August 2012. Quality assurance/quality control procedures were implemented in accordance with the RDWP QAPP; however, due to the addition of ascorbic acid added to the sample containers, unpreserved sample containers (i.e., not containing hydrochloric acid) were used and the laboratory was notified that a seven-day hold time was applicable. Also, the groundwater samples were submitted for a Level 2 data package and abbreviated data



validation was conducted. The groundwater sampling field data records are included in Appendix A and the analytical report is included in Appendix C.

Upon completion of the groundwater sampling activities, the temporary monitoring well materials were removed from the borings and the borings were backfilled with bentonite.

### **3.6 Investigation Derived Waste**

Investigative derived waste (IDW), such as soil cuttings and purged groundwater were managed in accordance with the RDWP FSAP. The completed manifests for IDW are included in Appendix E.

## **4.0 TREATABILITY STUDY EVALUATION**

The following sections describe the results from the ISCO Treatability Study.

### **4.1 Potassium Permanganate Distribution**

Fifteen soil borings were advanced in the vicinity of the potassium permanganate emplacements (Figure 4) to collect data regarding the potassium permanganate emplacements (e.g., presence and aperture) and the diffusion zone that developed vertically above and below the emplacements. Table 3 and Figure 4 contain a summary of the observations and photographs are included in Appendix F.

Potassium permanganate exhibits a distinct pink to dark color purple color (see Photograph 1) depending on the concentration. Although the color of soil at the Site generally ranges from red to orange to brown, zones containing potassium permanganate were readily identifiable in the soil cores. Potassium permanganate was identified in 12 of the 15 borings. At two locations where potassium permanganate was not identified, SB-126 and SB-130, the borings were located 10 feet from the nearest emplacement wells, EPW-1 and EPW-2, respectively. A third location (SB-123) was located 18 feet from the nearest emplacement well EPW-3. These three borings were generally located east/northeast of the nearest emplacement well.

Potassium permanganate was identified at 24 intervals in the 12 borings where potassium permanganate was observed. Potassium permanganate emplacement material (e.g., granular potassium permanganate) was identified at 6 locations (see Photograph 2). The aperture of the observed potassium permanganate emplacements ranged from 0.01 feet at SB-122 (depth of 44.2 feet) to 0.13 feet at SB-132 (depth of 43.7 feet).

Potassium permanganate diffusion zones were identified where the six emplacements were observed and at locations where emplacements were not observed. Potassium permanganate diffusion zones ranged in thickness from 0.1 feet (SB-129) to 12.8 feet (SB-132) and ranged in color from pink to dark purple. In general, where an emplacement was observed, the diffusion zone below the emplacement was thicker than above the emplacement. Where an emplacement was not observed but potassium permanganate diffusion was observed, the aperture of the emplacement

could have been so thin that it was not readily identified in the soil core, or the diffusion zone was the result of the migration of groundwater containing dissolved potassium permanganate. The latter is the likely scenario where the observed potassium permanganate was light to medium purple (see Photographs 3 and 4, respectively).

Based on visual identification of the potassium permanganate in six of the soil cores, the radius of the emplacements is approximately ten feet. The radius and shape of the emplacements is expected to vary at each location, but generally have an oval shape and dip upward away from the emplacement well to some degree.

## **4.2 Groundwater Monitoring Results**

Baseline and quarterly groundwater monitoring were conducted between December 2017 and November 2018, and additional groundwater monitoring was conducted in March 2019. Table 4 and Figure 5 contain a summary of the analytical results and Table 5 contains a summary of groundwater elevations and water quality parameters. A graph of the TCE concentrations detected in groundwater samples collected during the Treatability Study is included in Figure 6.

Monitoring wells MW-19 and MW-19A were installed upgradient of the Treatability Study area. Groundwater remediation was conducted from June to November 2018 upgradient of MW-19 and MW-19A. Concentrations of TCE in groundwater samples collected from MW-19 and MW-19A were generally similar during the upgradient remediation period, so it does not appear that the upgradient groundwater remediation influenced TCE concentrations in groundwater samples collected during performance of the Treatability Study.

Concentrations of TCE in the baseline groundwater samples ranged from 55.9 µg/L (MW-7) to 36,600 µg/L (MW-20). TCE breakdown products (cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) were not detected in the baseline groundwater samples above the method detection limits (MDLs).

Concentrations of TCE decreased by 13 to 29 percent in groundwater samples collected from six of the eight monitoring wells (MW-7A, MW-20, MW-20A, MW-21, MW-21A, and MW-22) in the Treatability Study area (i.e., not including upgradient monitoring wells MW-19/19A) during the first quarterly groundwater monitoring event. Concentrations of TCE generally increased to near

baseline concentrations during the second quarterly groundwater monitoring event, with the exception of MW-7 and MW-21A. Potassium permanganate was identified in groundwater purged from MW-21A, which is the likely cause of the 96.6 percent decrease in TCE in groundwater collected from MW-21A (from 15,800 µg/L in May 2018 to 538 µg/L in August 2018; 538 µg/L is the average of the field and duplicate samples).

Concentrations of TCE decreased in groundwater samples collected from monitoring wells MW-7, MW-20, MW-20A, MW-22, and MW-22A in November 2018. Potassium permanganate was not identified in groundwater purged from these five wells, so the TCE concentration decreases might be due to the fluctuation of groundwater elevations and/or typical fluctuation of TCE concentrations within the dissolved phase plume.

The concentration of TCE detected in groundwater samples collected from MW-21 decreased by 63 percent from 33,900 µg/L in August 2018 to 12,400 µg/L in November 2018. The TCE concentration then decreased to 4.1 µg/L in March 2019, a 99.9 percent reduction from the baseline TCE concentration. Potassium permanganate was not observed in the May, August, and November sampling events, but was observed in the groundwater purged from MW-21 in March 2019, indicating the successful TCE concentration reduction in the presence of potassium permanganate.

The concentration of TCE detected in the groundwater samples collected from MW-21A decreased by 96.5 percent from 15,800 µg/L in May 2018 to 538 µg/L (average of the field sample and duplicate) in August 2018. Potassium permanganate was observed in the purged groundwater in August 2018, indicating the presence of potassium permanganate resulted in the TCE concentration reduction. The TCE concentration increased to 7,130 µg/L in the groundwater sample collected from MW-21A in November 2018 and then to 44,900 µg/L in March 2019. Only a slight purple coloration was observed in purge water during the March 2019 sampling event. The increases in TCE concentrations after a significant reduction at this location suggest that contaminated groundwater from upgradient (vertically or horizontally) has migrated to the monitoring well and/or the potassium permanganate in the vicinity of monitoring well MW-21A became depleted over time.

Concentrations of TCE in groundwater samples collected from the five temporary monitoring wells in March 2019 ranged from non-detect (i.e., not detected above the MDL) to 1,610 µg/L. Potassium permanganate was observed in groundwater purged from each of the temporary wells. Baseline TCE concentrations in groundwater in the Treatability Study area at the depths of the temporary monitoring wells ranged from 13,200 µg/L (MW-22A) to 36,600 µg/L (MW-20). Assuming the baseline TCE concentrations in the temporary wells were similar to concentrations in the monitoring wells, TCE was reduced from 87.8 percent (using the 13,200 µg/L and 1,610 µg/L TCE concentrations) to 100 percent, where TCE was not detected above the MDL.

In general, where potassium permanganate was not identified in a monitoring well, the TCE concentration did not decrease significantly. The monitoring wells are located 20 to 30 feet from the emplacement wells. Monitoring wells MW-21 and MW-21A are located approximately 20 feet southeast of EPW-1 and approximately 20 feet northeast of EPW-2. Potassium permanganate was observed in groundwater purged from MW-21 and MW-21A during at least one sampling event. Potassium permanganate was not observed in monitoring wells located further from the emplacement wells indicating more time is required for the dissolved potassium permanganate to migrate to the monitoring wells and/or the potassium permanganate is being depleted prior to groundwater migrating to the monitoring wells.

## **5.0 CONCLUSIONS AND PRELIMINARY REMEDIAL DESIGN PARAMETERS**

The results of the ISCO Treatability Study indicate that, where potassium permanganate was identified in groundwater, TCE concentrations were reduced an estimated 87 to 100 percent in approximately one year. The proposed remedial alternative relies on natural groundwater flow for the potassium permanganate from the emplacements to contact and oxidize TCE in the dissolved-phase groundwater plume. Based on the Treatability Study results, this approach will require time (i.e., on the order of three to five years) for the RAO to be achieved in the Northern Area of the Site.

Based on the soil evaluation, the radius of the emplacements was approximately 10 feet. In order to achieve a ten-foot radius or greater, at least 750 pounds of potassium permanganate are recommended for each emplacement. Additionally, to create greater viscosity of the slurry and potentially aid in the creation of emplacements with a greater radius, it is recommended that additional bentonite and/or sand be considered to be added to the potassium permanganate slurry.

Based on identification of potassium permanganate in two monitoring wells located 20 feet horizontally from the emplacement wells within one year, a 30- to 40-foot spacing between emplacement wells is recommended (and considering the longer timeframe of the full-scale implementation as compared to the timeframe of the Treatability Study). The 30- to 40-foot spacing confirms the preliminary spacing assumptions in the Focused Feasibility Study Addendum.

The emplacements for the Treatability Study were installed six feet apart vertically. The results of the soil evaluation, which was conducted 11 months after the emplacements were installed, indicated good development of diffusion zones above and below the emplacements where granular potassium permanganate was visually identified and where the granular potassium permanganate was not identified. A six-foot vertical emplacement spacing is recommended for the full-scale implementation.

## **6.0 REFERENCES**

- Wood, 2009. Report of Phase I Remedial Investigation. Mills Gap Road Site, July 27, 2009.
- Wood, 2012. NAPL Investigation Work Plan (Revision 1), CTS of Asheville, Inc. Superfund Site, November 9, 2012.
- Wood, 2015a. Final NAPL Area Focused Feasibility Study Report Addendum, CTS of Asheville, Inc. Superfund Site, November 25, 2015.
- Wood, 2015b. Western Area Remedial Investigation Report (October 9, 2015).
- Wood, 2017. ISCO Pre-Design Investigation Evaluation Report, CTS of Asheville, Inc. Superfund Site, September 11, 2017.

## **TABLES**



**TABLE 1**  
**Monitoring Well Construction Details**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Monitoring Well</b>	<b>Installation Date</b>	<b>Well Depth (bgs)</b>	<b>Screened Interval (bgs)</b>	<b>Northing</b>	<b>Easting</b>	<b>Ground Surface Elevation (feet MSL)</b>	<b>Top of Casing Elevation (feet MSL)</b>	<b>Depth to Groundwater 12-28-2017 (feet TOC)</b>	<b>Groundwater Elevation 12-28-2017 (feet MSL)</b>
MW-7	3/6/2009	30.4	20.4 - 29.8	653002.14	956615.19	2,412.04	2,411.86	19.00	2,392.86
MW-7A	3/6/2009	71.5	66.8 - 71.3	652995.30	956613.20	2,412.04	2,411.8	20.20	2,391.59
MW-19	11/30/2017	45.2	40.0 - 44.8	652910.26	956607.78	2,415.50	2,415.19	21.32	2,393.87
MW-19A	11/30/2017	64.9	59.7 - 64.5	652912.35	956610.29	2,415.54	2,415.36	21.30	2,394.06
MW-20	12/5/2017	50.5	45.3 - 50.1	652961.32	956614.24	2,413.48	2,413.24	19.45	2,393.79
MW-20A	12/6/2017	64.7	59.5 - 64.3	652965.29	956615.48	2,413.55	2,413.31	19.53	2,393.78
MW-21	12/4/2017	44.9	39.7 - 44.5	652980.11	956650.26	2,414.57	2,414.33	20.73	2,393.60
MW-21A	12/5/2017	60.7	55.5 - 60.3	652982.88	956651.78	2,414.54	2,414.07	20.20	2,393.87
MW-22	12/4/2017	55.7	50.5 - 55.3	652953.67	956646.62	2,415.59	2,415.24	21.60	2,393.64
MW-22A	12/1/2017	70.5	65.3 - 70.1	652949.68	956644.60	2,415.59	2,415.35	21.56	2,393.79

**Notes:**

1. bgs - below ground surface; MSL - mean sea level; TOC - top of casing

Prepared By: SEA 4/8/19

Checked By: GLH 4/16/19

**TABLE 2**  
**Summary of Potassium Permanganate Emplacements**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Date</b>	<b>Emplacement Depth (feet bgs)</b>	<b>Potassium Permanganate (pounds)</b>	<b>Bentonite Slurry (gallons)</b>
<b>Emplacement Well (EPW-1)</b>			
1/31/2018	68	1,000	140
1/31/2018	62	1,000	80
1/31/2018	56	1,000	80
1/31/2018	50	1,000	80
1/31/2018	44	1,000	80
1/31/2018	38	750	60
2/1/2018	32	500	60
<b>Emplacement Well (EPW-2)</b>			
2/1/2018	65	1,000	80
2/1/2018	59	1,000	80
2/1/2018	53	1,000	80
2/1/2018	47	1,000	80
2/1/2018	41	750	60
2/1/2018	35	500	40
<b>Emplacement Well (EPW-3)</b>			
2/1/2018	68	1,000	80
2/1/2018	62	1,000	80
2/3/2018	56	1,500	110
2/3/2018	50	1,600	100
2/3/2018	44	1,400	90
2/3/2018	38	1,000	100
2/3/2018	32	1,000	130

**Note:**

bgs - below ground surface

Prepared By: SEA 3/22/19

Checked By: RMC 3/26/19

**TABLE 3**  
**Potassium Permanganate Distribution Observations**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Boring</b>	<b>Distance from Nearest EPW (feet)</b>	<b>Observed Emplacement Depth (feet bgs)</b>	<b>Emplacement Aperture (feet)</b>	<b>Diffusion Zone Depth (feet bgs)</b>	<b>Diffusion Zone Thickness (feet)</b>	<b>Diffusion Zone Permanganate Appearance</b>	<b>Drilling Refusal Depth (feet bgs)</b>	<b>Comments</b>
SB-121	6	not identifiable	N/A	38.2 - 38.7	0.5	light	50	
		44.2	0.08	43.3 - 46.6	3.3	light to dark		no recovery from 40 to 42.5 feet
SB-122	11	44.2	0.01	43.7 - 47.8	4.1	light to dark	48	
SB-123	18	potassium permanganate not observed					48	
SB-124	5	36.5	0.03	34.8 - 38.0	3.2	light to dark	44	
SB-125	10	32.3	0.08	30.0 - 37.0	7.0	light to dark	48	no recovery from 30 to 31 feet and 35 to 36 feet
SB-126	10	potassium permanganate not observed					48	
SB-127	10	not identifiable	N/A	33.6 - 39.0	5.4	light to dark	45	
SB-128	15	not identifiable	N/A	29.2 - 30.8	1.6	light	45	saturated with permanganate stained groundwater from 30 to 30.8 feet
		not identifiable	N/A	42.6 - 43.4	0.8	light		
SB-129	15	not identifiable	N/A	28.6 - 28.7	0.1	light	55	
		not identifiable	N/A	33.9 - 34.4	0.5	light		
		not identifiable	N/A	38.7 - 39.2	0.5	light		
		not identifiable	N/A	42.8 - 43.3	0.5	light		
		not identifiable	N/A	44.2 - 46.4	2.2	light to medium		saturated/water from 45 to 46.4; no recovery from 45 to 46 feet
SB-130	10	potassium permanganate not observed					50	
SB-131	5	not identifiable	N/A	39.8 - 44.6	4.8	light to medium	62.5	
		not identifiable	N/A	45.8 - 46.3	0.5	light		
		not identifiable	N/A	54.4 - 62.5+	>8.1	light to dark		

**TABLE 3**  
**Potassium Permanganate Distribution Observations**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

Boring	Distance from Nearest EPW (feet)	Observed Emplacement Depth (feet bgs)	Emplacement Aperture (feet)	Diffusion Zone Depth (feet bgs)	Diffusion Zone Thickness (feet)	Diffusion Zone Permanganate Appearance	Drilling Refusal Depth (feet bgs)	Comments
SB-132	5	not identifiable	N/A	39.3 - 39.8	0.5	light	60	
		43.7	0.13	40.0 - 52.8	12.8	medium to dark		no recovery from 50 to 51.3 feet (saturated)
		not identifiable	N/A	55 - 60 (see comment)	>1.0	medium to dark		no recovery from 55 to 59 feet ; liner is stained purple from groundwater; no permanganate in drill rod shoe
SB-133	10	not identifiable	N/A	43.9 - 46.0	2.1	medium	60	
SB-134	10	58.3	0.04	57.8 - 60.0+	>2.2	medium to dark	60	
SB-135	10	not identifiable	N/A	34.0 - 35.0	1.0	light	59	
		not identifiable	N/A	39.2 - 43.3	4.1	light to dark		no recovery from 40 to 41 feet
		not identifiable	N/A	58.8 - 59.0+	>0.2	light		

- Notes:**
1. EPW - emplacement well; bgs - below ground surface.
  2. "not identifiable" - potassium permanganate emplacement could not be identified in the diffusion zone.
  3. Where potassium permanganate was observed at the depth of drilling refusal, a '+' is indicated for the bottom of the diffusion zone depth, and '>' is indicated for the diffusion zone thickness.

Prepared By: SEA 3/26/19  
Checked By: RMC 3/26/19

**TABLE 4**  
**Summary of Groundwater Analytical Results**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

Monitoring Well	Date	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
MW-7	12/28/2017	55.9	<0.19	<0.49	<0.62
	5/3/2018	1,250	<2.4	<6.1	<7.8
	8/8/2018	177	<0.38	<0.98	<1.2
	11/6/2018	86.5	<0.19	<0.49	<0.62
MW-7A	12/29/2017	25,000	<47.5	<122	<155
	5/3/2018	20,300	<38.0	<98.0	<124
	8/8/2018	23,500	<38.0	<98.0	<124
	11/6/2018	28,600	57.2 J	<98.0	<124
MW-19 (upgradient)	12/28/2017	2,770	<7.6	<19.6	<24.8
	5/3/2018	3,730	<9.5	<24.5	<31.0
	8/8/2018	6,380	<7.6	<19.6	<24.8
	11/7/2018	4,590	15.6 J	<19.6	<24.8
MW-19A (upgradient)	12/28/2017	15,800	<23.8	<61.2	<77.5
	12/28/17 (duplicate)	16,700	<23.8	<61.2	<77.5
	5/3/2018	10,600	2,610	<49.0	<62.0
	8/8/2018	13,200	3,300	<49.0	<62.0
	11/7/2018	12,400	3,090	<49.0	<62.0
	11/7/2018 (duplicate)	14,800	3,550	<49.0	<62.0
MW-20	12/29/2017	36,600	<76.0	<196	<248
	5/2/2018	29,300	<47.5	<122	<155
	8/8/2018	33,900	<47.5	<122	<155
	11/7/2018	22,600	<38.0	<98.0	<124
MW-20A	12/29/2017	18,800	<19.0	<49.0	<62.0
	5/2/2018	13,300	<19.0	<49.0	<62.0
	8/8/2018	17,500	<19.0	<49.0	<62.0
	11/7/2018	16,800	<19.0	<49.0	<62.0
MW-21	12/28/2017	33,100	<38.0	<98.0	<124
	5/2/2018	28,800	530	<122	<155
	8/7/2018	33,900	452	<122	<155
	11/7/2018	12,400	<19.0	<49.0	<62.0
	3/11/2019	4.1	<0.29	<0.25	<0.24
	3/11/19 (duplicate)	12.7	<0.29	<0.25	<0.24

**TABLE 4**  
**Summary of Groundwater Analytical Results**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

Monitoring Well	Date	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
MW-21A	12/28/2017	19,300	<23.8	<61.2	<77.5
	5/2/2018	15,800	<19.0	<49.0	<62.0
	8/7/2018	424	<0.48	<1.2	<1.6
	8/7/18 (duplicate)	652	<0.95	<2.4	<3.1
	11/6/2018	7,130	<9.5	<24.5	<31.0
	3/12/2019	44,900	<116	<102	<96.8
MW-22	12/28/2017	28,800	<47.5	<122	<155
	5/2/2018	21,500	<47.5	<122	<155
	8/7/2018	29,600	325	<122	<155
	11/7/2018	24,300	<38.0	<98.0	<124
MW-22A	12/28/2017	13,200	<19.0	<49.0	<62.0
	5/2/2018	13,900	550	<49.0	<62.0
	5/2/18 (duplicate)	12,300	515	<49.0	<62.0
	8/7/2018	18,400	206	<49.0	<62.0
	11/7/2018	17,300	73.2 J	<49.0	<62.0
GW-121-45	3/12/2019	<0.22	<0.29	<0.25	<0.24
GW-122-46	3/12/2019	<0.22	<0.29	<0.25	<0.24
GW-131-59	3/11/2019	<0.22	<0.29	<0.25	<0.24
GW-132-48	3/11/2019	1,610	<3.6	<3.2	<3.0
GW-132-58	3/11/2019	160	<0.29	<0.25	<0.24

**Notes:**

1. Concentrations are in micrograms per liter (µg/L).
2. '<' - Constituent not detected above the indicated method detection limit.
3. J - Concentration is estimated.

Prepared By: SEA 4/2/19

Checked By: RMC 4/12/19

**TABLE 5**  
**Summary of Groundwater Elevations and Water Quality Parameters**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Monitoring Well (screened interval, feet bgs)</b>	<b>Sample Date</b>	<b>Groundwater Elevation (feet MSL)</b>	<b>TCE Concentration (µg/L)</b>	<b>pH</b>	<b>ORP (mV)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Permanganate Concentration (mg/L)</b>
MW-7 (20.4 - 29.8)	12/28/2017	2,392.86	55.9	5.5	178	3.6	DNM
	5/3/2018	2,395.57	1,250	5.7	111	3.6	DNM
	8/8/2018	2,399.26	177	4.3	-181	4.3	0.1
	11/6/2018	2,395.18	86.5	5.2	182	3.9	1.2
MW-7A (66.8 - 71.3)	12/29/2017	2,391.59	25,000	7.3	87	0.4	DNM
	5/3/2018	2,395.42	20,300	7.7	31	2.8	DNM
	8/8/2018	2,398.54	23,500	7.0	7.0	7.0	7.0
	11/6/2018	2,395.24	28,600	7.4	159	0.5	0.3
MW-19 (40.0 - 44.5) upgradient	12/28/2017	2,393.87	2,770	4.9	195	0.3	DNM
	5/3/2018	2,396.40	3,730	4.9	186	0.6	DNM
	8/8/2018	2,399.35	6,380	3.8	-258	0.3	0.5
	11/7/2018	2,395.35	4,590	5.6	148	??	1.6
MW-19A (59.7 - 64.5) upgradient	12/28/2017	2,394.06	16,250*	5.8	-283	1.5	DNM
	5/3/2018	2,395.93	10,600	6.3	-7	0.5	DNM
	8/8/2018	2,399.21	13,200	5.1	-280	0.4	0.5
	11/7/2018	2,395.46	13,600*	6.5	-2	2.5	0.0
MW-20 (45.3 - 50.1)	12/29/2017	2,393.79	36,600	4.3	148	2.1	DNM
	5/2/2018	2,395.99	29,300	5.6	90	0.4	DNM
	8/8/2018	2,399.70	33,900	4.9	-257	1.1	1.1
	11/7/2018	2,395.67	22,600	5.9	172	??	0.7
MW-20A (59.5 - 64.3)	12/29/2017	2,393.78	18,800	7.2	18	0.5	DNM
	5/2/2018	2,396.19	13,300	6.8	30	1.0	DNM
	8/8/2018	2,398.76	17,500	6.1	-286	0.7	0.1
	11/8/2018	2,395.56	16,800	7.0	349	0.7	3.2

**TABLE 5**  
**Summary of Groundwater Elevations and Water Quality Parameters**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Monitoring Well (screened interval, feet bgs)</b>	<b>Sample Date</b>	<b>Groundwater Elevation (feet MSL)</b>	<b>TCE Concentration (µg/L)</b>	<b>pH</b>	<b>ORP (mV)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Permanganate Concentration (mg/L)</b>
MW-21 (39.7 - 44.5)	12/28/2017	2,393.60	33,100	4.9	132	0.7	DNM
	5/2/2018	2,396.14	28,800	4.9	138	1.9	DNM
	8/7/2018	2,400.13	33,900	4.4	-264	1.8	1.3
	11/7/2018	2,395.70	12,400	4.9	434	5.8	0
	3/11/2019	2,401.37	8.4*	4.0	905	15.6	113 - 151**
MW-21A (55.5 - 60.3)	12/28/2017	2,393.87	19,300	5.9	80	2.0	DNM
	5/2/2018	2,396.41	15,800	5.6	45	0.3	DNM
	8/7/2018	2,400.07	538*	6.3	-123	0.8	7.7
	11/6/2018	2,395.74	7,130	6.0	681	0.7	9.8
	3/12/2019	2,400.99	44,900	6.3	DNM	DNM	0.2
MW-22 (50.5 - 55.3)	12/28/2017	2,393.64	28,800	5.8	95	0.6	DNM
	5/2/2018	2,396.10	21,500	12.2	-118	0.8	DNM
	8/7/2018	2,399.84	29,600	6.8	-342	0.9	0.0
	11/7/2018	2,395.39	24,300	11.4	108	0.9	2.9
MW-22A (65.3 - 70.1)	12/28/2017	2,393.79	13,200	6.4	-274	0.3	DNM
	5/2/2018	2,396.14	13,100*	5.8	24	1.4	DNM
	8/7/2018	2,399.95	18,400	5.3	-350	0.6	0.2
	11/7/2018	2,395.50	17,300	6.5	225	0.8	0.6
GS-132-48 (45 - 50)	3/11/2019	DNM	1,610	4.7	837	2.8	113 - 151**
GW-132-58 (55 - 60)	3/11/2019	DNM	160	4.3	903	3.8	151 - 188**
GW-131-59 (56 - 61)	3/11/2019	DNM	<0.22	5.7	815	7.2	151 - 188**



**TABLE 5**  
**Summary of Groundwater Elevations and Water Quality Parameters**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**

<b>Monitoring Well (screened interval, feet bgs)</b>	<b>Sample Date</b>	<b>Groundwater Elevation (feet MSL)</b>	<b>TCE Concentration (µg/L)</b>	<b>pH</b>	<b>ORP (mV)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Permanganate Concentration (mg/L)</b>
GW-121-45 (42 - 47)	3/12/2019	DNM	<0.22	4.0	DNM	DNM	188 - 376 **
GW-122-46 (43 - 48)	3/12/2019	DNM	<0.22	3.7	DNM	DNM	188 - 376 **

**Notes:**

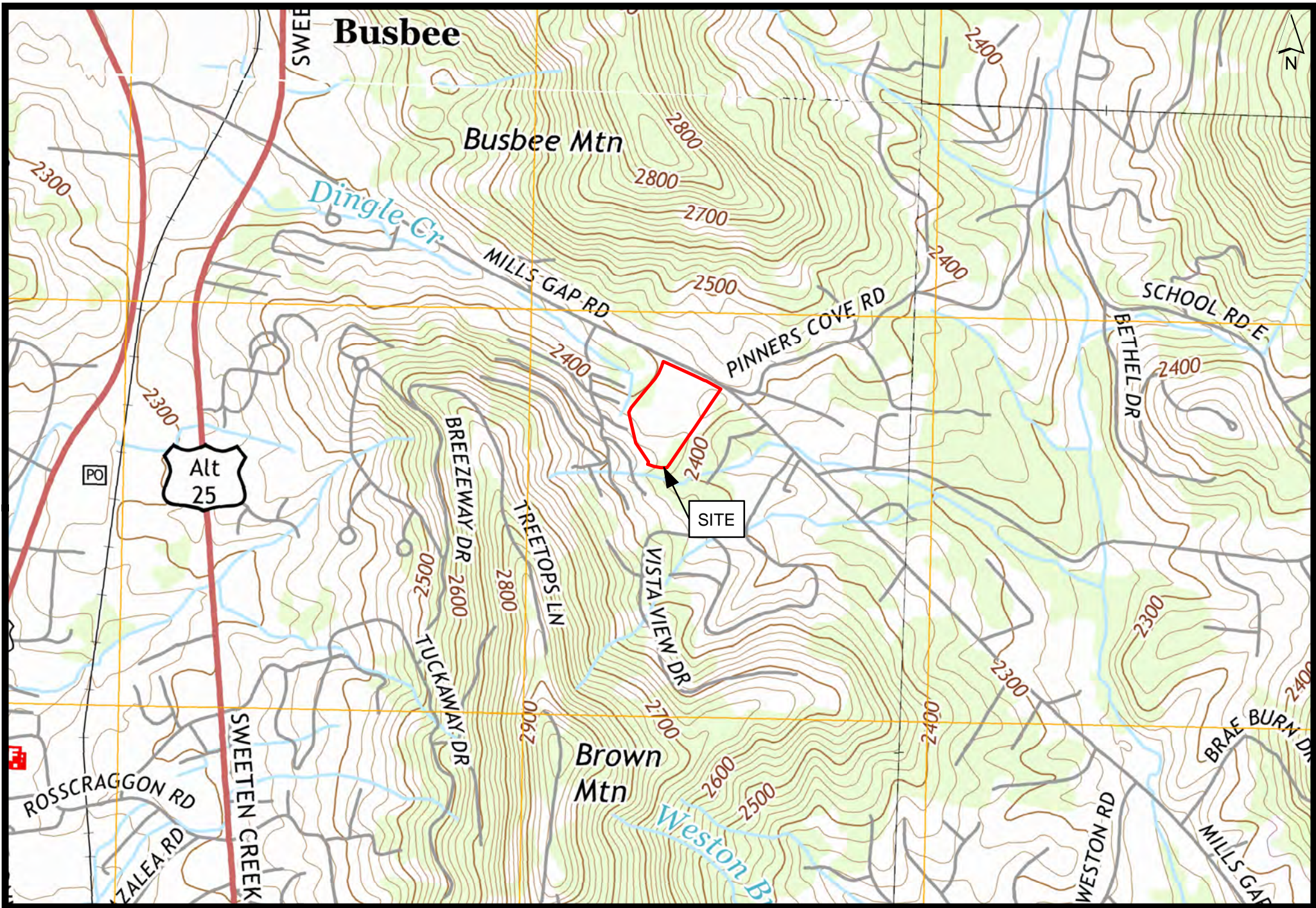
1. bgs - below ground surface; MSL - mean sea level; µg/L - micrograms per liter; ORP - oxidation reduction potential; mV - millivolts; mg/L - milligrams per liter; DNM - did not measure
2. \* - where a duplicate groundwater sample was collected, the average TCE concentration of the field sample and duplicate is indicated.
3. \*\* - permanganate concentration exceeded measurement with colorimeter. Concentration is based on a color chart in EPA's "Ground Water Sample Preservation at ISCO Sites Recommended Guidelines," dated August 2012.
4. '<' - concentration is less than the indicated method detection limit.

Prepared By: SEA 4/2/19

Checked By: RMC 4/12/19

## **FIGURES**





Topographic Site Map  
CTS of Asheville, Inc. Superfund Site  
Asheville, North Carolina

Project 6252162012  
Drawn By: GLH 02/25/19  
Approved By: SEA 02/25/19  
Figure 1  
1:12,000 0 1,000 2,000 Feet

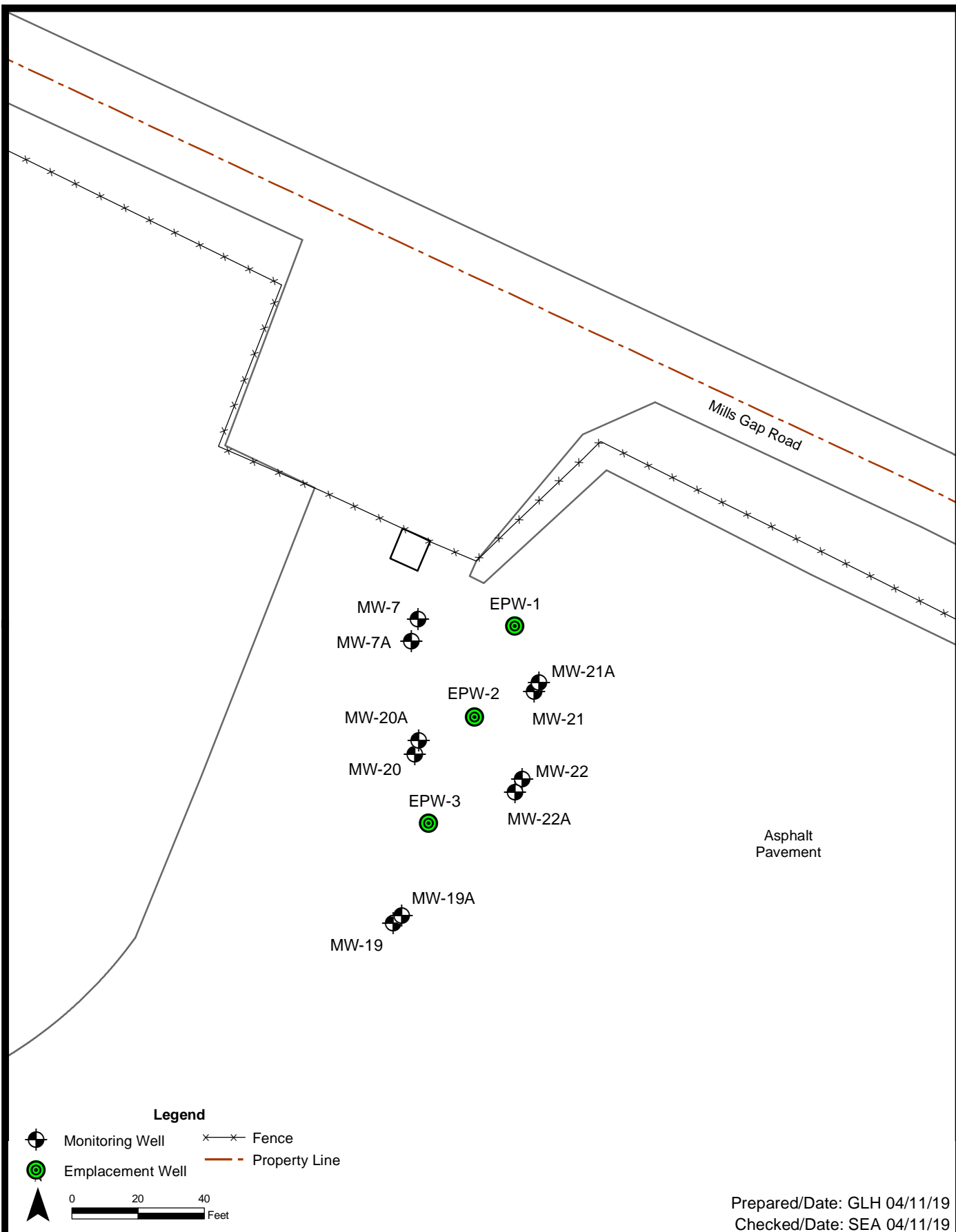




Prepared/Date: GLH 2/12/18  
Checked/Date: SEA 2/12/18



Document: P:\Projects\CTS Corporation\4.0 Project Deliverables\4.5 Databases\GIS\MapDocuments\Treatability Study\Treatability Study Figure 3 - Proposed Treatability Study Layout.pdf 11/02/2017 8:20 AM Brian Peters

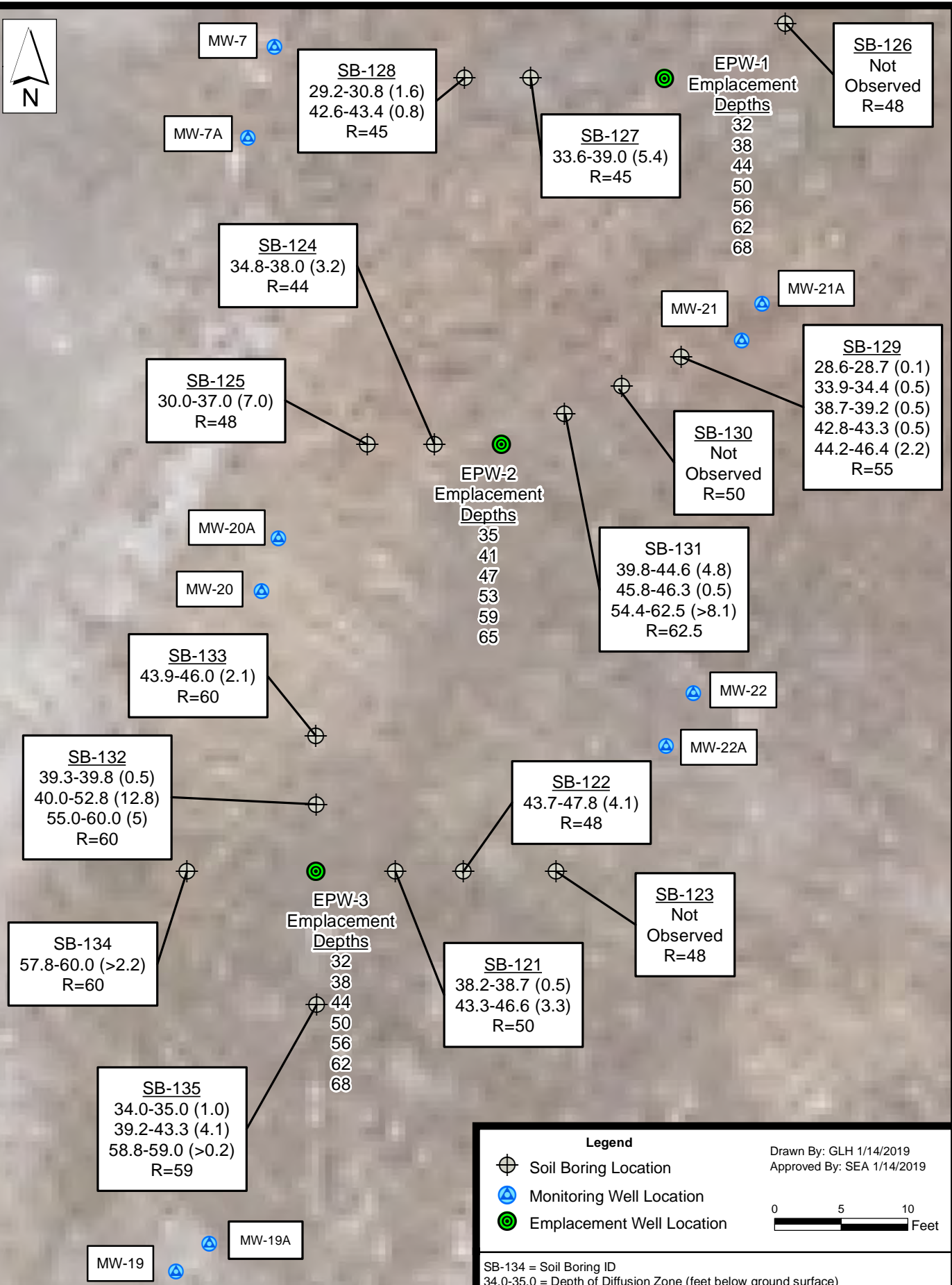


CTS of Asheville, Inc. Superfund Site  
Asheville, North Carolina

wood.

ISCO Treatability Study Layout  
Project 6252162012

Figure 3



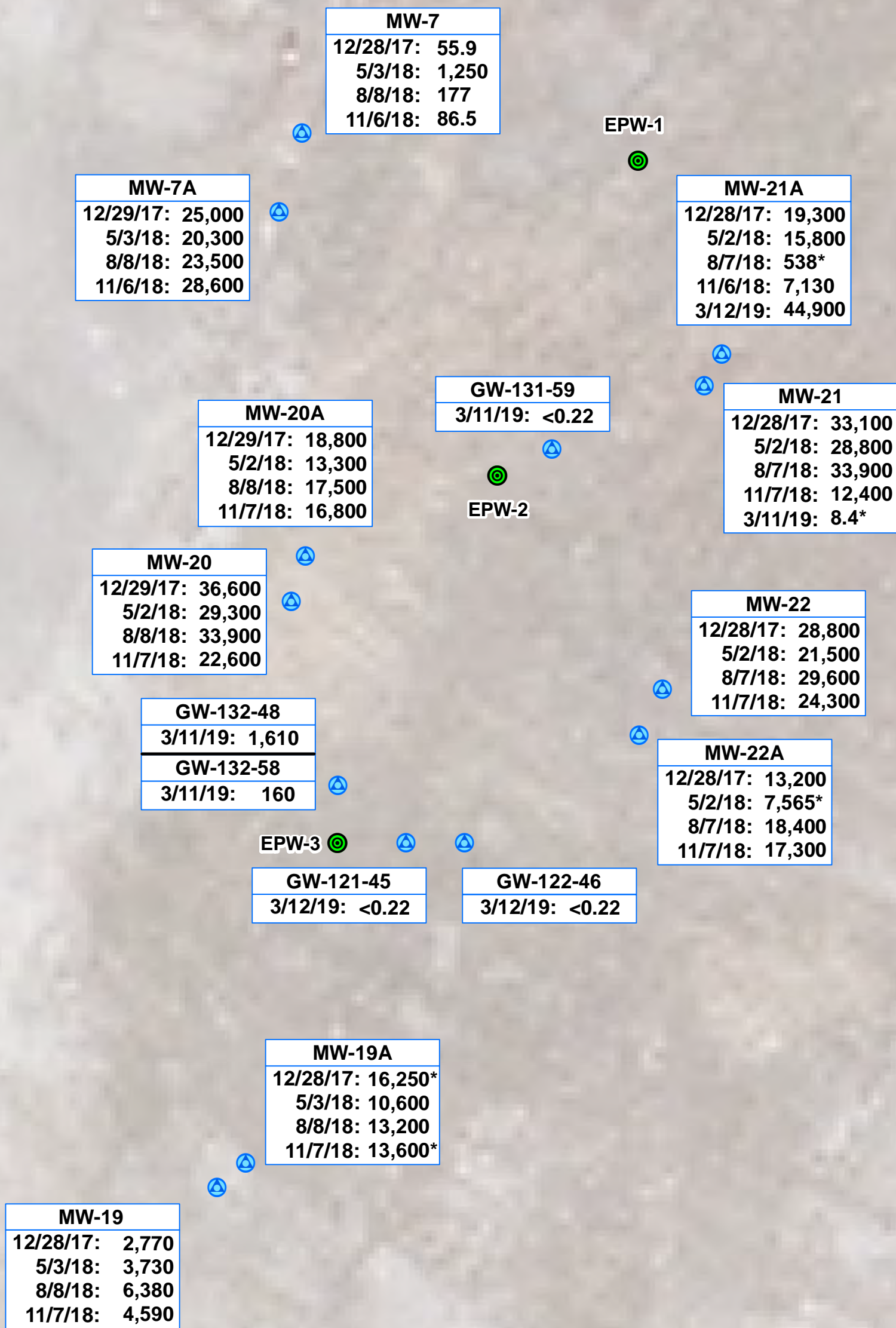
Map of Potassium Permanganate  
Observations in Soil  
CTS of Asheville, Inc. Superfund Site  
Asheville, North Carolina

SB-134 = Soil Boring ID  
34.0-35.0 = Depth of Diffusion Zone (feet below ground surface)  
(1.0) = Thickness of Diffusion Zone (feet)  
"Not observed" indicates potassium permanganate was not observed in soil boring.  
R = Depth of Geoprobe refusal (feet below ground surface)  
> = Diffusion zone extends below Geoprobe refusal

Project 6252-16-2012

Figure 4





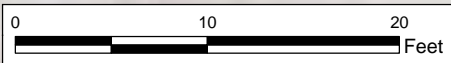
**Legend**

- Groundwater Sample Location
- Emplacement Well

Sample Date      Sample ID      Trichloroethene Concentration (µg/L)

	<b>MW-22</b>	
	12/28/17: 28,800	
	5/2/18: 21,500	
	8/7/18: 29,600	
	11/7/18: 24,300	

µg/L = micrograms per liter  
\* = The average of the field sample and duplicate is indicated  
< = Constituent not detected above the indicated method detection limit



Prepared/Date: GLH 4/16/19  
Checked/Date: SEA 4/16/19



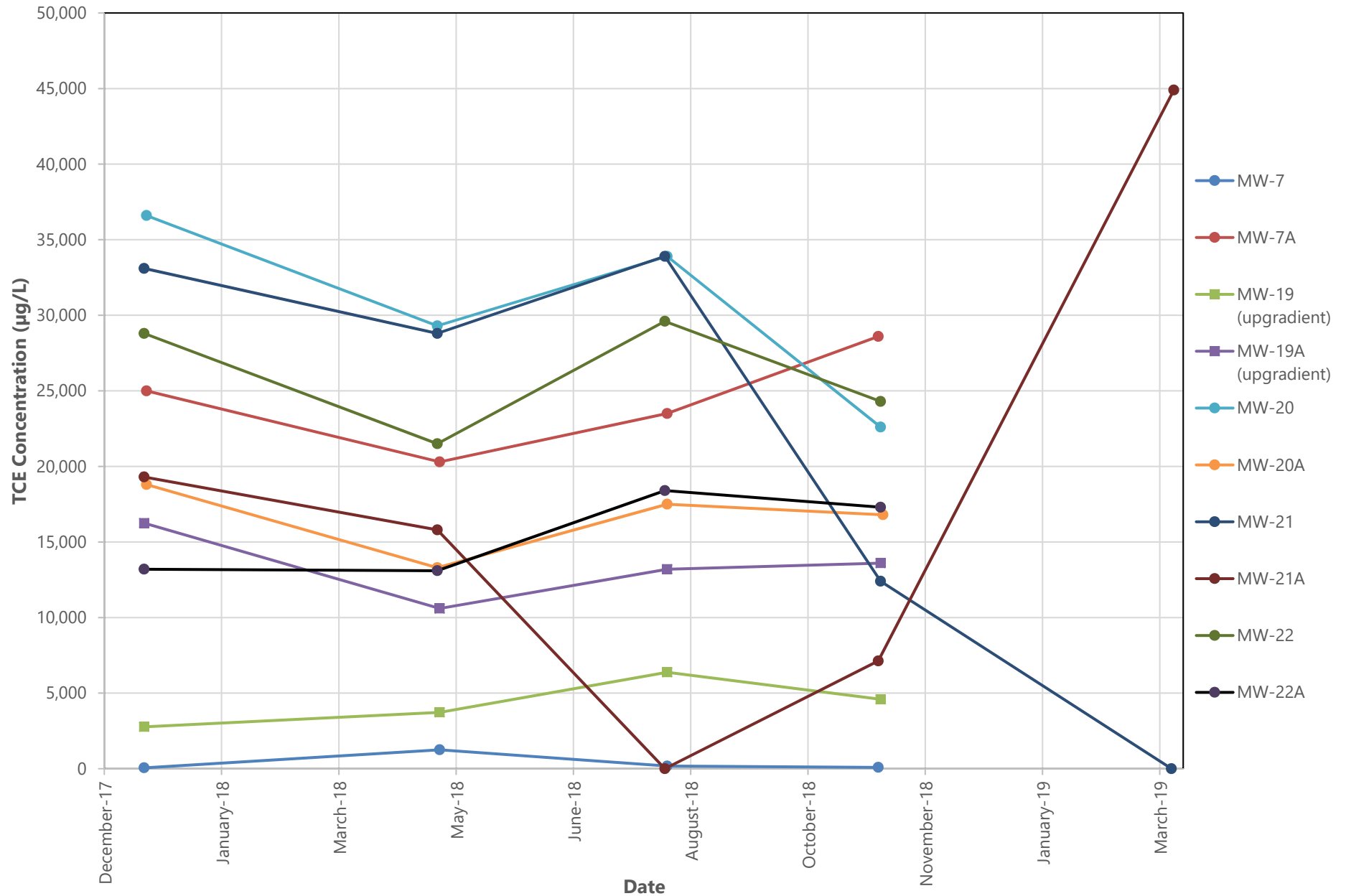
CTS of Asheville, Inc. Superfund Site  
Asheville, North Carolina

TCE Concentrations in Groundwater

Project 6252162012

Figure 5

**FIGURE 6**  
**Concentrations of TCE in Groundwater During the Treatability Study**  
**CTS of Asheville, Inc. Superfund Site**  
**Asheville, North Carolina**  
**Wood Project 6252-16-2012**





**APPENDIX A**  
**LOGBOOK AND FIELD DATA RECORDS**


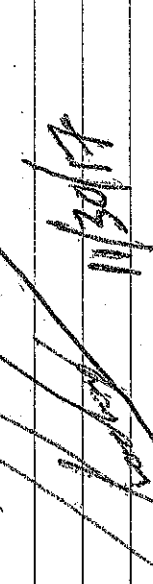
2 CTS of Asheville, Superfund Site  
11/30/17 6252-16-2012 RMC

DAILY FIELD NOTES Page 2 of 2

- 0800 - Arrived onsite. GEX drill crew onsite. Auec Foster Wheeler surveyors onsite.
- Conduct H#5 meeting
- Surveyors begin surveying ISCO monitoring wells location. GEX decontaminate HSA's.
- 0900 - Surveyors complete survey locations for ISCO wells.
- 1015 - GEX sets up to drill MW-19 w/ 4.25" HSA's.
- 1130 - Attempt to install 2" PVC well. While adding sand, well becomes stuck inside HSA. Pull HSA's & remove well material.
- 1200-1300 - Lunch
- 1300 - GEX clean out augers & recharter augers in same boring to 45 ft bgs.
- Install monitoring well (see form)
- Install tremie pipe for grouting MW-19
- Containerize drill cuttings (see form)

CTS of Asheville, Inc Superfund Site  
11/30/17 6252-16-2012 RMC

- GEX sets up to drill MW-19A w/ 4.25" HSA's. Page 2 of 2
- 1500 - Begin monitoring well installation to ~65 ft. bgs.
- 1630 - Begin tremie grouting MW-19 B. MW-19A
- Containerize drill cuttings (see form)
- 1730 - Surveyors leave the site
- 1820 - Complete grouting / clean out grout
- 1835 Leave site

  
  
11/30/17

4 CTS of Asheville, Inc. Superfund Site  
12/11/17 65216-2012

DAILY FIELD NOTES Page 1 of 2  
0930-R. Clark arrives on site.

CEX S. Kelly & G. Hublins w/  
Amecw onsite.

CEX is setup on MW-22A,  
and begins drilling with HSA.  
1015-1035 CEX repairs broken  
shore bolts on coupling.  
1035-Resume drilling MW-22A  
to ~20' bgs.

1105-Postall monitoring  
well (see form)

-Install filter pack & seal  
1248-1325 Lunch

1325-Setup to tremie-  
ground MW-22A annulus

-Pull 10 ft of HSA, tremie grout

-Pull 10 ft of HSA, tremie grout

-Containerize soil cuttings &  
sewer flow from tremie grouting

-Pull 10' of HSA & tremie grout.

-Pull remaining HSA's & tremie grout.

-Measured depth to grout in  
MW-22A is 23' bgs.

-Measured depth to grout in  
MW-19 is 13' bgs & MW-19 is 13' bgs.

CTS of Asheville, Inc. Superfund Site  
12/11/17 65216-2012

DAILY FIELD NOTES Page 2 of 2

-Continue grouting MW-22A

1546 Tremie grout MW-19 & MW-19A.

1535-CEX cleans grout & completely  
containerizes soil cuttings & stage drums

1615-CEX leaves site for the day

1640-Sureties & R. Clark w/  
Amecw leave site for the  
day

R. Clark

8 CTS of Asheville, Inc Superfund Site  
12/4/17 652-16-2012

DAVE FIELD NOTES Page 1 of 2

0815 - R. Clark w/ AMECFW onsite  
0830 - J. Helton (surveyor) w/ AMECFW  
onsite.

0850 - GEX drill crew onsite  
(David Hall, Jacob Messick, Eduardo Chavez)  
- Conduct #5 Meeting

0900 - Drillers obtain Greater  
and setup to drill MW-22

0920 - Patriot Concrete Cutting  
(Cleared) onsite for ERH activities.

0925 - James Pearson (surveyor)  
AMECFW onsite

- GEX setup to drill  
MW-22 boring to approx 55'  
w/ 4.25" HSA's.

- Surveyors survey ERH related  
boring locations

1100 - GEX completes drilling  
MW-22. Contain soil cuttings.  
(see form)

- Install monitoring well  
(see form)

1130 - GEX begins tremie  
grouting in stages removing

CTS of Asheville, Inc Superfund Site

12/4/17 652-16-2012

DAVE FIELD NOTES Page 2 of 2

10' of HSA during each stage  
~~1440~~ - GEX

1200 - GEX offsite for lunch

1248 - GEX onsite / Decontaminate HSA's

- GEX sets up on MW-21  
3 begins drilling to ~ 45'

begs w/ 4.25" HSA's

- GEX continues tremie  
grouting MW-22

1600 - Complete drilling MW-21

- Install monitoring well (see form)

- Begin tremie grouting MW-21

- Contaminated soil cuttings

1730 - Complete tremie grouting

in stages, Patriot Concrete offsite

1735 - Clean grader out

1740 - Decontaminates augers

1755 - Drillers remove water meter

at hydrocrack for the day

1805 - GEX personnel R. Clark &

AMECFW leave site

~~R. Clark~~  
12/4/17

Return to Plan

8 CTS of Asheville, Inc. Superfund Site  
12/15/17 6252-16-2012 ~~RM~~

DAILY FIELD NOTES Page 201  
0715-R. Clark w/ AMECFw & GEX

Personnel (D. Hall, J. Messick, C. Chavez)  
and Patriot Concrete (G. Carter) onsite.

- Conduct H & S Meeting / GEX installs meter.  
- Measured depth to top of grout.

in MW-21 (8'), MW-22 (10'), MW-22A (i)  
- GEX sets up to drill MW-21A

to depth of ~ 60';  
0940 - Install monitoring well  
(see form).

1015 - Begin tremie grouting  
in stages of 10' HSA  
removed at MW-21A.

- Containerize soil cuttings  
and ~~water~~ <sup>water</sup> overflow (see form)

1130 - Complete tremie grouting  
- GEX cleans out grout

- GEX decontaminates HSA's  
1205 - GEX leaves for lunch

1250 - GEX returns from lunch  
- Setup on MW-20

1330 - Complete drilling to  
approx 50 w/ 4.25" HSA's

- Install monitoring well  
(see form)

<sup>Asheville</sup>  
CTS of Superfund, Inc. Superfund Site  
12/15/17 6252-16-2012 ~~RM~~

DAILY FIELD NOTES Page 201  
- Containerize drill soil cuttings

1430 - Begin tremie grouting  
in stages of 10' HSA <sup>separately</sup>  
~~at~~ MW-20; containerize ~~and~~ <sup>water</sup> overflow

1615 - GEX completes tremie  
grouting at MW-20

1625 - GEX decontaminates  
HSA's at decon pad.

- GEX ~~unloads~~ <sup>cleans</sup> out grout.  
1635 - GEX removes water

meter for the day  
1645 - GEX, Patriot, & R. Clark  
w/ AMECFw leave site for  
the day

~~RM~~ 12/15/17

~~RM~~ 12/15/17

~~RM~~ 12/15/17

~~RM~~ 12/15/17

~~RM~~ 12/15/17

~~RM~~ 12/15/17

CTS of Asheville, Inc. Superfund Site  
12/6/17 6252-16-2012 HMC

DAILY FIELD NOTES Page 1 of 2

0715 - R. Clark w/ AMEC, GEX,  
# Patriot onsite

- Conduct H & S Meeting  
- GEX installs water meters  
for the day

- GEX sets up on MW-20A  
boring w/ 4 25" HSA's.

0740 - Begin drilling to  
~ 55' bgs. Contain  
soil cuttings (see form)  
0848 - Install monitoring  
well (see form)

- Tremie grout MW-20A  
in stages of 10" HSA  
removal to water table.

- Contain water/mud overflow  
1150 - GEX decontaminates  
HSA's.

1208-1243 - lunch

1245 - GEX begins developing  
monitoring wells (see form)

- Setup on MW-19/19A  
w/ 2 separate submersible  
pumps. Containerize purge  
water (see forms).

CTS of Asheville, Inc. Superfund Site  
12/6/17 6252-16-2012 RMC

DAILY FIELD NOTES Page 2 of 2

1340 - Decontaminate pumps.

1400 - Setup on MW-20A and  
MW-22 w/ 2 separate submersible  
pumps. Containerize purge water  
(see forms)

1505 Decontaminate Pumps

1515 - Setup on MW-21A and  
MW-21 w/ 2 submersible pumps  
Containerize purge water  
(see forms).

1600 - Decontaminate pumps.

- GEX deconstructs decon pad  
and contains <sup>MUD</sup> ~~settling~~ and water  
in drums. Plastic from

decon pad also containerized.

1610 - Setup on MW-20 and MW-  
20A w/ two submersible pumps.

- Containerize purge water.

1700 - GEX removes water meter  
for the day

1705 - Patriot, GEX, and R. Clark  
w/ AMEC leave site for the day.

Rodney M. Clark  
12/6/17

CTS of Asheville, Inc. Superfund Site

12/17/17 6/25/16-2012 RMC

DAILY FIELD NOTES

0730 - R. Clark arrives onsite. Patient personnel onsite. GEX arrives at 0740 - Conduct #75 Meeting

- GEX stages drums in drum staging area.
- GEX begins constructing well pads for MW-70/LOA
- GEX cuts stickup on MW-70 to -0.2' lgs. (see forms).
- ~~GEX~~ GEX performs other site work relative to GEM project

1045 - Patient leaves site  
1100 - Drillers leave for lunch

CTS of Asheville, Inc. Superfund Site

12/17/17 6/25/16-2012 RMC

DAILY FIELD NOTES

1500 - Arrive onsite. Calibrate water quality meters. Set up on MW-7A w/a peristaltic pump for low-flow sampling. Add ice to cooler.

1645 - Collect groundwater sample from MW-7A via peristaltic.

1700 - Leave Site / R. Clark / AMEQU

RMC



CTS of Asheville, Inc. Superfund Site

12/28/17 6252162012

DAVE FIELD NOTES

0800 R. Clark / G. Hutchins w/ AMECFW arrive onsite. Calibrate water quality meters (see form).  
 - Setup on MW-7 w/ a peristaltic pump for low flow sampling.  
 - 1000 - Collect groundwater sample from MW-7 / Containerize purge water.  
 - 1005 - Setup on MW-19 w/ a peristaltic pump.  
 - 1050 - Collect groundwater sample from MW-19  
 - 1100 - Setup on MW-19 w/ peristaltic pump.  
 - 1200 - Collect groundwater sample from MW-19A  
 - 1300 - Setup on MW-22 w/ a peristaltic pump.  
 - 1350 - Collect groundwater samples from MW-22  
 - 1400 - Setup on MW-22A w/ a peristaltic pump.  
 - 1445 - Collect groundwater samples from MW-22A  
 - 1500 - Setup on MW-21A w/ a peristaltic pump.  
 - 1545 - Collect groundwater sample from MW-21A  
 - 1550 - Setup on MW-21 w/ a peristaltic pump  
 - 1618 - Collect groundwater sample from MW-21.

- Containerize purge water in a 55 gallon drum onsite  
 1700 - leave site

*[Signature]* 12/28/17

CTS of Asheville, Inc. Superfund Site

12/29/17 6252162012

DAVE FIELD NOTES

0800 R. Clark / G. Hutchins w/ AMECFW onsite.  
 - Calibrate water quality meters  
 - 0910 - Setup on MW-20A w/ a peristaltic pump.  
 - 1003 - Collect a groundwater sample from MW-20A  
 - 1010 - Setup on MW-20 w/ a peristaltic pump.  
 - 1112 - Collect a groundwater sample from MW-20  
 - Package samples on ice / remove melted water.  
 - Containerize purge water in a 55-gallon drum onsite  
 - Package water quality meters for return 5:15 p.m.  
 1445 - leave site

*[Signature]* 12/29/17



Asheville 85  
CTC

*Rite in the Rain*

*Rite in the Rain*

1/8/18

EPH-1 cont

20-30 cont

22-30 Tan brown to orange  
brown. silty fine sand (sm),  
micaceous, saprolite

30-40 4' Rec

30-42 Tan brown, DK brown  
+ orange silty m-f sand (sm)  
moist, micaceous, saprolite

155 GEX begins setting  
up cont around Pak side pit + b  
is not working to contain all water.

40-50 3' Rec

42-50 Brown + tan brown  
silty f-m sand (sm), micaceous,  
moist, saprolite

130-135 GEX starts to pick up  
Hay Bales

50-60 6' Rec

50-63 DK brown + light  
brown silty m-f sand (sm)  
wet, micaceous, saprolite  
~ 68-69 Harder drilling, possible cull

Ashville  
CTC

1/8/18

EPH-1 cont

60-70 6' Rec

68-70 highly weathered rock,  
gray + white Gneiss, dry  
1515 Drill indicates ke rocks

water is coming from under contained  
via cracks in pavement. will drill  
an 8" casing down. Driller  
however doesn't have correct  
thread for 8" & will have to make  
arrangements to get one.

~~70-75~~

Drillers having had time  
removing Rod due to grip pads  
70-75 1.5' Rec

70-75 Weathered Rock  
DK Brown Schist to Gneiss

1630 begin cleanup  
1715 11:15/10

Return to the Rain

CTC

1/4/18

Asterville  
CTC

0700 o-side  
0715 Attend AT's meeting  
Sachs (6EX) indicates Andrew  
(Sonic driller) is out getting part  
at Stateville  
0835 Sonic Rep Driller on-site  
conduct AT's meeting  
Crew will run 10" casing in to  
seal off to star water  
0900 Begin drilling 10" from to 10'  
on EPH-1 then continue w/ 8"  
to 75'  
0946 Driller indicates he is having  
a hard time clearing out hole at  
~30', will keep trying  
1030 8" tooling is stuck; Andrew  
calls office to come up w/ plan indicating  
that "chug" is building up around  
side & formation is taking water  
& not allowing pressure to be built up  
1040 Driller mix bentonite mud  
1100 8" is still stuck Driller  
says he doesn't have any ideas  
Shop is working on 15" load, Driller  
gets to lunch, frustrated

Asterville  
89  
CTC

1/4/18

1200 Sonic Driller back o-side,  
he indicates that they are working  
on building up 10" casing & in morning  
he will keep trying to remove 8"  
1205 Drillers remove 6" casing  
but still can't get 8" casing out  
1345 Andrew indicates that  
they have the trailer loaded w/  
15" & will be here in 2 hours  
1450 Chris Schreck o-side  
w/ some drilling fluid  
1600 call from Jill - MF to work  
at Duke 8AR cup trailer  
1740 10" Pipe o-side  
1800 at 45.0

Return the Plan

<sup>16</sup> CTS of Asheville P. 1/4

1/8/18 6252-16-2012 S. Arvitt / AmecFW

820 - arrive at site

915 - Geologic Exploration crew arrives and unloads equipment

930 - M. Flannik / AmecFW arrives

- conduct health and safety

meeting and discusses scope

of work for emplacement

well installation using sonic

rig

- set up EPN-1 and begin

drilling

- M. Flannik taking notes in

a separate log book.

1/10/18

~~Arvitt~~

~~Arvitt~~

CTS of Asheville

P. 1/2 <sup>17</sup>

1/10/18 6252-16-2012 S. Arvitt / AmecFW

745 - S. Arvitt / AmecFW arrives at site

- GET view is on site and

attended health and safety

meeting with P. Black / AmecFW

- R. Stubbs / OTE is at site

750 - GEPX is advancing 10"  $\phi$

casing to get the 8"  $\phi$  casing

unstuck

805 - 8"  $\phi$  casing is unstuck and

they advance casing to target

depth of 75 ft bgs

900 at target depth, set up to

install casing EPN-1

- install casing with centralizers

set at 10', 25', 40', 55' and 70' bgs

1030 - tremie grouting casing

$\rightarrow$  borehole is 10"  $\phi$  from ground to

30 ft and 8"  $\phi$  from 30' to 75' ft

- remove casing from borehole

1215 - casing grouted up to 30 ft; clean

up work area

1240 - 1335 drillers take lunch

- move equipment and tooling to

EPN-2

Arvitt

GTS of Asheville

P. 2/2

1/10/18 0252162012 S. Arvitt / AmecFW

1430 - advancing tooling at EPW-2  
 - advance 10"  $\phi$  casing to 20 ft  
 without obtaining soil core

- advance 6"  $\phi$  and 8"  $\phi$  casings

1700 - at 70 ft with 6" & 8"  $\phi$  casings

- top off grout at EPW-1

1745 - clean up drilling area

1815 - S. Arvitt and GEX leave site

GTS of Asheville

P. 1/1

19

1/11/18 0252162012 S. Arvitt / AmecFW

715 - S. Arvitt arrives at site; GEX crew  
 is at site

- R. Clark / AmecFW conducts safety  
 meeting

740 - GEX sets up and advances 6"  $\phi$   
 and 8"  $\phi$  casings to 75 ft bays

820 - at 75 ft; set up to install casing

- install 9"  $\phi$  casing with central-  
 izers at 15, 30, 42, 55, and  
 70 ft

- begin tremie grouting casing

1045 - finish grouting

- set up at EPW-3

1100 - advancing 6"  $\phi$  and 10"  $\phi$   
 casings

1200 - 1230 - drillers take lunch

1230 - continue advancing casings

1430 - at 75 ft; set up to install casing

- set centralizers at 10, 25, 40,

55 and 70 ft. bays

1500 - tremie ~~set~~ <sup>set</sup> grout casing

1615 - finished grouting; clean up

and load equipment

1715 - S. Arvitt leave site

1/11/18  
 S. Arvitt

1/10/18

~~Handwritten signature/initials~~

CTS of Asheville

P. V. 2

1/23/18 625262012 S. Arvitt / Amec FW

1430 - S. Arvitt / Amec FW arrives on site

- get set up with R. Clark / Amec FW to pump out water from drums that have "bulged" due to the water turning to ice; pump water from ~~bulging~~ bulged drums to new drums using a

sump pump and garden hose - while R. Clark pumps drums

S. Arvitt collects samples of water generated during

installation of emplacement casings, which consists

primarily of potable water - collect IDW-15C0-1 (14:45)

and IDW-15C0-2 (15:00) for total VOC analysis

- Note: drums R. Clark is pumping out are from installation of 15C0 monitoring wells and are considered "hazardous waste"; they are from well

CTS of Asheville

P. 2/21

1/23/18 625262012 S. Arvitt / Amec FW

development and purging for sampling and water from clean pad

- will deliver samples in the

morning (1/24/18) to Pace Analytical in Asheville for carrier delivery

to the Charlotte lab

- continue on site for EPH activities

- 175 - leave site

1/23/18

~~Amec FW~~

CTS of Asheville

P. 1/3

1/29/18 0252102012 S. Avitt / AmecFW

1015 - arrive at site, FRX personnel are at site

- conduct health and safety meeting and discuss scope of work

- FRX unloads equipment and prepares tooling

1200 - 1300 lunch

1500 - S. Avitt accepts delivery of 20,000 lbs of potassium permanganate in 10, 2000 lb totes

- FRX unloads permanganate  
1815 - all personnel leave site~~1/29/18~~~~FRX and Avitt~~

CTS of Asheville

P. 1/1

1/31/18 0252102012 S. Avitt / AmecFW

0845 - arrive at site, FRX at site

Setting up

- power blaster frozen unfreeze

- S. Avitt puts bailers in 10 monitoring wells in pilot study area

Study area

1115 - M. Wallace / AmecFW arrives and survey temporary points in pilot study area

1150 - leak test packers

- attempt to jet casing, but there is a clog in the system

1315 - 1415 lunch

1415 - Get up and jet / emplace at 68 ft at EPW-1

1515 - jet / emplace at 62 ft

1545 - jet / emplace at 56 ft

1615 - jet / emplace at 50 ft

1650 - jet / emplace at 44 ft

1715 - jet / emplace at 38 ft

1735 - done for the day, clean

up and winterize equipment

1800 - leave site

AmecFW 1/31/18

Ben. Avitt



GTS of Asheville

P. 1/2

2/1/18 6252162012 S. Avitt/AneCFW

800 - arrive at site; FRx is at site; some hoses are frozen  
 so FRx gets them unfrozen

830 - M. Wallace/AneCFW and

A. Warren/GTS arrive at site

900 - C. Zeller/EPA and Daving/EPA arrive

1000 - congressional senate representatives are here to meet with EPA

1000 - jet emplacement at 32 ft (EPW-1)

1035 - move tooling to EPW-2

1120 - jet emplacement at 65 ft

1205 - jet emplacement at 59 ft

1335 - 1300 lunch

1330 - jet emplacement at 53 ft

1400 - jet emplacement at 47 ft

1430 - jet emplacement at 41 ft

1445 - move tooling to EPW-3;

check bailers in monitoring wells; no indication of potassium permanganate

1545 - jet emplacement at 60 ft

1610 - jet emplacement at 62 ft

GTS of Asheville

P. 2/2

2/1/18 6252162012 S. Avitt/AneCFW

1620 - clean up/winterize equipment

1700 - fire hydrant valve is broken

- call city of Asheville

water to come turn off hydrant

1800 - FRx leaves site

1830 - city of Asheville personnel here and ~~set~~ turns off hydrant

1900 - leave site

2/1/18



CTS of Asheville P.V.1  
2/3/18 6:52 102012 S. Arritt / AmeriFW

1000 - arrive at site JFR  
personnel arrive

- conduct safety meeting  
- set up equipment, tooling, etc.

1150 - jet emplacement at 57 ft (1500 lb)

1225 - jet emplacement at 57 ft (1500 lb)

1255 - jet emplacement at 42 ft (1500 lb)

1325 - jet emplacement at 38 ft (1000 lb)

1415 - jet emplacement at 32 ft (1000 lb)

1435 - 1330 lunch

1330 - pull tooling, inventory  
permanganate on equipment  
and tools

- check bailers to look for  
evidence of permanganate  
in monitoring wells, none  
observed

- load equipment, etc.

1400 - all personnel leave site

~~Project 2/3/18~~

~~Project 2/3/18~~

CTS of Asheville Page 1/1  
5/2/18 6:52 102012 R. Clark / AmeriFW

### DAILY FIELD NOTES

1030 - Onsite for GRH activities  
in morning. Calibrate WQ meter.

- Setup on MW-21 for low flow  
peristaltic pump & new tubing

1130 - Collect groundwater (GW) sample  
from MW-21 for analysis of site specific

(SS) VOCs (Pack all samples collected on immediate)

- Setup on MW-21A w/peri. pump & new tubing

1215 - Collect GW Sample from MW-21A for

analysis S.S. VOCs

1235 - Setup on MW-22 w/peri. pump & new tubing

1322 - Collect GW Sample from MW-22 for analysis

of S.S. VOCs

1330 - Setup on MW-22A w/peri. pump & new tubing

1420 - Collect GW Sample from MW-22A for S.S. VOCs (SS)

1430 - Setup on MW-20A w/peri. pump & new tubing

1520 - Collect GW Sample from MW-20A for S.S. VOCs

1530 - Setup on MW-20 w/peri. pump & new tubing

1610 - Collect GW Sample from MW-20 for S.S. VOCs

- Containerize purge water generated

into a 55-gallon drum onsite (see for)

1700 - Leave site for the day

~~Project 5/2/18~~

38 CTS of Asheville

Page 1 of 1

5/3/18 6252162017

R. Clark/MW-19

DAY FIELD NOTES

0800- Arrive. Calibrate water quality meters (see form)

0815- Setup on MW-19 w/a peris pump & new tubing

0935- Collect Groundwater (GW) sample from MW-19 for site specific (SS) VOCs.

0945- Setup on MW-19A w/peris pump & new tubing.

1040- Collect GW sample from MW-19A for SS VOCs

1100- Setup on MW-7 w/peris pump & new tubing

1200- Collect GW sample from 7 for SS VOCs

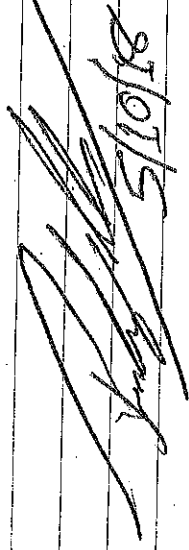
1215-1300 lunch

1300- Setup on MW-7A w/peris pump & new tubing

14128 Collect GW sample from MW-7A for site specific VOCs (see form)

1438- Package samples for shipping & transfer CAC to Susan Averitt

1445- Perform ERH related activities

  
John 5/10/18

CTS of Asheville

Page 1 of 1

8/7/18 6252162017

R. Clark/Wend

DAY FIELD NOTES

1100- Arrive onsite. Calibrate water quality meters (see form)

1300- Setup on MW-22A w/a peristaltic pump & new tubing. Read well tag incorrectly

1305 Collect groundwater (GW) sample from MW-22A for site-specific (SS) VOCs.

1330 Setup on MW-22 w/a peristaltic pump and new tubing. Read well tag incorrectly

1400 Collect GW sample from MW-24 for SS VOCs

1415-1445 - raining. Stop work

1445 Setup on MW-22A w/a peristaltic pump & new tubing

1545- Collect a GW sample from MW-22 for SS VOCs.

1550 Setup on MW-22 w/a peristaltic pump & new tubing

1630- Collect a groundwater sample from MW-22

- Contingency: Purge water collected for the day in a 55-gallon drum onsite

1700- Leave site for day

  
8/7/18 Return to Home

30 CTS of Ashville Page 2 of 2  
8/18/18 6/5/2017 R. Clark/Wood  
Daily Field Note

0745 - Arrive onsite. Calibrate water quality meter (see form)  
0820 - Setup on MW-20A w/a peristaltic pump & new tubing  
0920 - Collect a groundwater (GW) sample from MW-20A for (VOCs) site specific (SS) volatile organic compound  
0930 - Setup on MW-20 w/a peristaltic pump & new tubing  
1010 - Collect a GW sample from MW-20 for S.S. VOCs  
1020 - Setup on MW-19A w/a peristaltic pump & new tubing  
1115 - Collect a GW sample from MW-19A for S.S. VOCs  
1120 - Setup on MW-19 w/a peristaltic pump & new tubing  
1210 - Collect GW sample from MW-19 for S.S. VOCs  
1300 - Setup on MW-7A w/a peristaltic pump & new tubing  
1415 - Collect GW sample for S.S. VOCs  
1440 - Setup on MW-7 w/a peristaltic pump & new tubing  
1515 - Collect a GW sample for S.S. VOCs

CTS of Ashville Page 2 of 2  
8/18/18 6/5/2017 R. Clark/Wood  
Daily Notes

1530 - 1600 - Pack up sample supplies  
- Containerize purge water & label 55-gallon drum onsite  
1615 - Leave site  
1630 - At office, jurpack supplies & fill out Chain of Custody  
1655 - Deliver cooler w/ C.O.C. to PACE labs

8/18/18  
6/5/2017  
R. Clark/Wood

32 CTS of Asheville

Page 1 of 1

11/6/18 6252162017 R. Clark/Wood

### DAILY FIELD NOTES

1100 - R. Clark w/ Wood offices onsite

- Calibrate Water Quality Meters

- Open waste drum for purge water

1215 - Mus. Zund

12:50 - Setup on MW-7A w/ a

peristaltic pump & new tubing

13:50 Collect a GW sample

from MW-7A for S.S. VOCs

14:00 - Setup on MW-7 w/ a

peristaltic pump & new tubing

15:25 Collect a GW sample

from MW-7 for S.S. VOCs

16:00 - Setup on MW-21A w/

a peristaltic pump & new tubing

16:55 Collect a GW sample

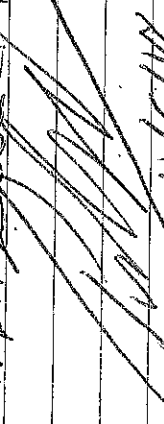
from MW-21A for S.S. VOCs

G.W. = groundwater

S.S. = Site - specific

VOCs = Volatile Organic Compounds

Contain purge water in waste drum



11/6/18

CTS of Asheville

Page 1 of 33

11/7/18 6252162012 R. Clark/Wood

### DAILY FIELD NOTES

07:30 R. Clark/Wood onsite / Calibrate

water quality meters

- Open waste drum for purge water

08:00 - Setup on MW-21 w/ a peristaltic

pump & new tubing

09:20 Collect a GW sample

from MW-21 for S.S. VOCs

10:30 - Setup on MW-22 w/ a

peristaltic pump & new tubing

10:30 - Collect a GW sample

from MW-22 for S.S. VOCs

10:30 - Setup on MW-22 w/ a

peristaltic pump & new tubing

11:30 Collect a GW sample

from MW-22A for S.S. VOCs

12:20 Setup on MW-19 w/ a peristaltic

pump & new tubing

13:30 Collect a GW sample from MW-22A for S.S. VOCs

13:50 Setup on MW-19 w/ a peristaltic pump & new tubing

14:30 Collect a GW sample

from MW-19 for S.S. VOCs

14:55 - Setup on MW-20 w/ a peristaltic

pump & new tubing

15:30 Collect a GW sample from MW-20 for S.S. VOCs

15:55 - Contain purge water in waste drum

<sup>34</sup> CTS of Asheville

Page 1 of 3

11/18/18 6/25/2012 R. Clark/Wood

### DAILY FIELD NOTES

0730 - Arrive onsite, perform ERH related activities

0920 - Setup on MW-20A w/a peristaltic pump & recirculating

1100 Collect a SW sample from MW-20A for site

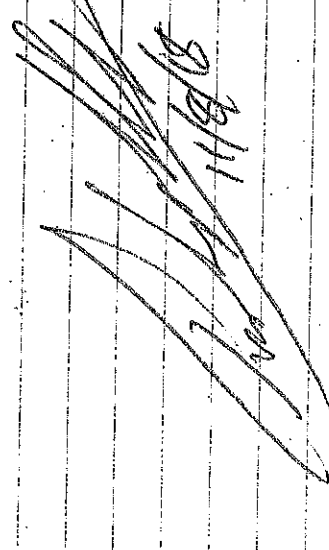
specific VOCs

- Contain purge water  
- Packup samples & fill out chain of custody

- Packup supplies

1230 Leave site

1305 - Deliver samples to RACE lab in Asheville, NC.

  
11/19/18

CTS of Asheville

P. 1/2

12/17/18 0252462012 S. Avriitt/Wood

815 - arrive at site

830 - Cascade arrives

- conduct health & safety mtg and discuss sampling plan

845 - Cascade unloads rig, fills water tank

- locate emplacements (2 have become filled in with soil)

930 - Set up at SB-121 and begin drilling with dual tube

- SB-121 is 6 ft east of EPW-3

1035 - refusal at 50 ft

1050 - Set up at SB-122, 11 ft east of EPW-3

1145 - refusal at 48 ft

1200 - 1245 lunch

1245 - Set up and drill SB-123, 18 ft east of EPW-3

1330 - refusal at 48 ft

1345 - move to SB-124, 5 ft west of EMP-2

1440 - refusal at 44 ft

1450 - move to SB-125, 10' east of EMP-2

1545 - refusal at 48'

*Return on Run*



CTS of Asheville

P. 2/2

12/17/18 6252162012 S. Avritt/Wood

1600 - move to SB-126, 10' N/NE

of EPW-1

1635 - refusal at 48 ft

1700 - leave site

12/18/18

12/18/18

CTS of Asheville

P. 1/1

12/18/18 6252162012 S. Avritt/Wood

BOS - arrive at site, J. R. Clark/Wood  
and Cascade at site

- conduct tailgate safety meeting

- move rig to SB-127, 10 feet <sup>WEST</sup> east SA 12110110

of EPW-1

945 - refusal at 45 ft

1000 - move to SB-128, 15' west of EPW-1

1045 - refusal at 45 ft

1100 - move to SB-129, 15' NE of EPW-2

(between EPW-2 and MW-21/21A

1150 - 1240 lunch

1240 - resume drilling at SB-129

1335 - refusal at 55 ft

1340 - S. Avritt offsite

1350 - Setup on SB-130, 10' NE of EPW-2

EPW-2, between MW-21/21A <sup>AWC</sup> 12118110

EPW-2

1530 - Refusal @ 50' 695

1540 - Setup of SB-131, 5' NE

of EPW-2, between MW-21/21A &amp; EPW-2

1630 - Refusal @ 62.5'

1710 - Drillers offsite

1720 - R. Clark/Wood offsite

Rite in the Rain

CTS of Asheville

P. 1/1

12/19/18 1252162012

S. Avett/Wood

0815 - arrive at site; unscade on site

- travel to store to purchase index cards

- conduct tailgate safety meeting

0845 - move to SB-132, 5 ft north of EPW-3

0945 - refusal at 60 ft (SB-132)

- move to SB-133, 10 ft north of EPW-3

1120 - refusal at SB-133 at 60 ft

1130 - 1200 lunch

1200 - move to SB-134, 10 ft west of EPW-3

1400 - refusal at 60 ft at SB-134

- move to SB-135, 10 ft south of EPW-3

1515 - refusal at 59 ft (SB-135)

- pull rods and begin grouting

boreholes and then load equipment

1730 - all personnel leave site

12/19/18

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

~~12/19/18~~

CTS of Asheville

Page 1/2

3/11/19 G52162012

R. Clark/Wood

0815 - Arrive onsite / layout borings

1030 - Geologic Exploration (GEX) arrives onsite / Conduct H&S Meeting

1030 - Calibrate Water Quality Meter

1030 - Setup on MW-21 w/ a peristaltic pump

& new tubing for low flow groundwater (GW) sampling

1030 - GEX unloads drilling rig 7822 DT

Geoprobe & equipment

- Set up on GW-132 w/ 7822 DT

- Advanced macrocore to 50' bgs

& install a 1" temp. PVC well w/ 5' screen

11:15 - R. Clark collects GW sample from MW-21 for site specific (SS) VOCs

- Setup on GW-132-48 w/ peristaltic pump & new tubing for low flow GW sampling

14:10 - Collect GW-132-48 GW sample

14:20 - GEX advances solid point to 60'

& installs 1" temp. PVC well w/ 5' screen

- Set up on GW-132-58 w/ a peristaltic pump & new tubing for low flow GW sampling

15:30 Collect GW-132-58 GW sample

- Containerize soil & purge water in onsite drums

15:40 - GEX advances macrocore to 35' bgs @ GW-131 & solid point to 61' bgs

- Setup on GW-131-58 w/ a peristaltic pump

CTS of Asheville

Page 2/2

3/11/19 6252-16-2012 R. Clark/Wood  
pump and new tubing for low flow GW sample  
17:20 Collect GW-131-59 groundwater  
sample.

- Containerize soil & purge water into  
respective drums onsite.  
17:30 GEX/R. Clark leave site for  
the day

CTS of Asheville

Page 1/2

3/12/19 6252-16-2012 R. Clark/Wood

### DAILY FIELD NOTES

0800-R. Clark w/wood onsite

- Receive call GEX will be late.

Setup on MW-21A w/a peristaltic  
pump & new tubing for low flow GW sample

- Water quality meter not working

Leave site to obtain pH meter from office

1000 - Return to site. Calibrate water quality meter

1005 - GEX arrives onsite.

- Set up on GW-121 w/ 7822PT

Advance macrocore to 30' & solid

point to 47' logs & install a 1" temp.

PVC well w/ 5' screen to sample groundwater (GW)

- Set up on GW-121-45 w/a peristaltic

pump & new tubing for low flow GW sample

12:10 Collect GW-121-45 GW sample.

- GEX sets up on GW-122 w/ 7822PT

& advances macrocore to 30' logs

& solid point to 48' logs.

14:00 Collect <sup>312/119</sup> GW sample. Setup on

GW-122-46 w/a peristaltic

pump & new tubing.

14:40 Collect GW-122-46 GW sample.

- Containerize soil & GW into respective

drums onsite

- GEX pulls PVCs wells & abandon <sup>312/119</sup> GW in the Run



CTS of Asheville

Page 2/2

3/12/19

6252-16-2012

P. Blake/Wood

DAILY FIELD NOTES

boreholes w/ bentonite chips &amp; backfill

16:00 Set up on MW-21A w/ a

peristaltic pump &amp; new tubing.

Far low flow groundwater

sampling. 16:15 - GEX leaves site.

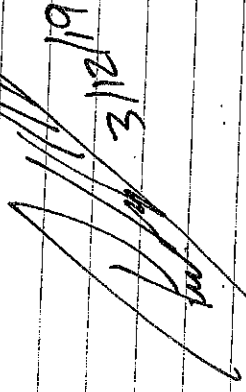
16:40 Collect groundwater

samples from MW-21A.

- Canturize pergenwater in

on site, drum.

17:00 Leave site for day


 3/12/19

Rita in the Rain

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date:

12/27/17

Project Number: 6252-16-2012

Name:

Rodney Clark

## Water Quality Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: YSI	pH: 4 SU (low)	pH: 4.01 SU	+/- 10% of standard
Model No.: 556 MPS	pH: 7 SU (med)	pH: 7.03 SU	+/- 10% of standard
Unit ID: 5603 <sup>BMC</sup> 26450	pH: 10 SU (high)	pH: 10.05 SU	+/- 10% of standard
	Conductivity: 1.413 mS/cm	Conductivity: 1.413 mS/cm	+/- 10% of standard
	ORP: 240 mV	ORP: 240.2 mV	+/- 10% of standard

## Turbidity Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: Hach	10 NTU (low)	10.2 NTU	+/- 10% of standard
Model No.: 2100Q	20 NTU (med)	20.1 NTU	+/- 10% of standard
Unit ID: 20557 <sup>BMC</sup> 20875	100 NTU (high)	101 NTU	+/- 10% of standard
	800 NTU (high)	793 NTU	+/- 10% of standard

## Photoionization Detector

### Acceptance Criteria

Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value		Lot Number	Expiration Date
pH (low)	PINE	4	SU	7GF303	6/19
pH (med)	PINE	7	SU	7GF329	6/19
pH (high)	PINE	10	SU	7GG543	7/19
Conductivity	PINE	1.413	mS/cm	6GD766	3/18
ORP:	PINE	240	mV	0207	5/31/21 <sup>BMC</sup>
Turbidity (low)	HACH	10	NTU	A7227	Nov/18
Turbidity (med):	HACH	20	NTU	A7102	Jul/18
Turbidity (high):	HACH	100	NTU	A7126	Aug/18
Turbidity (high):	HACH	800	NTU	A7124	Aug/18
PID gas:			ppmv		

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 12/28/17

Project Number: 6252-16-2012

Name: RMC

## Water Quality Meter Calibration

	Standard Value		Meter Value	Acceptance Criteria
Manufacturer: YSI	pH: 4 SU (low)		pH: 4.00 SU	+/- 10% of standard
Model No.: 556 MPS	pH: 7 SU (med)		pH: 7.21 SU	+/- 10% of standard
Unit ID: <del>5863</del> 26450	pH: 10 SU (high)		pH: 10.44 SU	+/- 10% of standard
	Conductivity: 1.413 mS/cm		Conductivity: 1.438 mS/cm	+/- 10% of standard
	ORP: 240 mV		ORP: 240.1 mV	+/- 10% of standard
			Temp: 14.20	

## Turbidity Meter Calibration

	Standard Value		Meter Value	Acceptance Criteria
Manufacturer: Hach	10 NTU (low)		10.4 NTU	+/- 10% of standard
Model No.: 2100Q	20 NTU (med)		20.0 NTU	+/- 10% of standard
Unit ID: <del>29537</del> 70875	100 NTU (high)		106 NTU	+/- 10% of standard
	800 NTU (high)		802 NTU	+/- 10% of standard

## Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value		Lot Number	Expiration Date
pH (low)	PINE	4	SU	7GF303	6/19
pH (med)	PINE	7	SU	7GF779	6/19
pH (high)	PINE	10	SU	7GG543	7/19
Conductivity	PINE	1.403	mS/cm	GGD766	3/18
ORP:	PINE	240	mV	0207	5/13/21
Turbidity (low)	HACH	10	NTU	A7227	Nov. 18
Turbidity (med):	HACH	20	NTU	A7102	Jul. 18
Turbidity (high):	HACH	100	NTU	A7126	Aug 18
Turbidity (high):	HACH	800	NTU	A7124	Aug. 18
PID gas:			ppmv		

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 12/29/17

Project Number: 6252-16-2012

Name: RMC

## Water Quality Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: <u>YSI</u>	pH: <u>4</u> SU (low)	pH: <u>4.02</u> SU	+/- 10% of standard
Model No.: <u>556 MPS</u>	pH: <u>7</u> SU (med)	pH: <u>7.00</u> SU	+/- 10% of standard
Unit ID: <u>5888</u> <u>RMC 12/29/17</u> <u>26450</u>	pH: <u>10</u> SU (high)	pH: <u>10.02</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.415</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.1</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: <u>Hach</u>	<u>10</u> NTU (low)	<u>10.5</u> NTU	+/- 10% of standard
Model No.: <u>2100Q</u>	<u>20</u> NTU (med)	<u>20.2</u> NTU	+/- 10% of standard
Unit ID: <u>20507</u> <u>RMC 12/29/17</u> <u>20875</u>	<u>100</u> NTU (high)	<u>107</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>798</u> NTU	+/- 10% of standard

## Photoionization Detector

### Acceptance Criteria

Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value		Lot Number	Expiration Date
pH (low)	<u>PINE</u>	<u>4</u>	SU	<u>7GF303</u>	<u>6/19</u>
pH (med)	<u>PINE</u>	<u>7</u>	SU	<u>7GF779</u>	<u>6/19</u>
pH (high)	<u>PINE</u>	<u>10</u>	SU	<u>7GGS43</u>	<u>7/19</u>
Conductivity	<u>PINE</u>	<u>1.413</u>	mS/cm	<u>GGD766</u>	<u>3/18</u>
ORP:	<u>PINE</u>	<u>240</u>	mV	<u>0207</u>	<u>5/13/21</u>
Turbidity (low)	<u>HACH</u>	<u>10</u>	NTU	<u>A7227</u>	<u>Nov. 18</u>
Turbidity (med):	<u>HACH</u>	<u>20</u>	NTU	<u>A7102</u>	<u>Jul. 18</u>
Turbidity (high):	<u>HACH</u>	<u>100</u>	NTU	<u>A7126</u>	<u>Aug 18</u>
Turbidity (high):	<u>HACH</u>	<u>800</u>	NTU	<u>A7124</u>	<u>Aug 18</u>
PID gas:			ppmv		

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	12/28/12
WELL / SAMPLE NUMBER	MW-17 MW-7	ACTIVITY TIME	Start 0900 End 1000	TIME	1000
QC SAMPLES COLLECTED	—	ASSOCIATED TRIP BLANK	TB-11		

INITIAL DTW	19.00 ft (loc)	FINAL DTW	19.10 ft (loc)
SCREENED INTERVAL	20.4 - 29.8 ft (bgs)	DEPTH OF INTAKE	~25 ft (loc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

AMOUNT PURGED  
~ 2.5 gal.

[illegible]

**SIGNATURE:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	12/27/12
WELL / SAMPLE NUMBER	W-17A <sup>same as W-17</sup> W-17A	ACTIVITY TIME	Start 1600 End 1645	TIME	1545
QC SAMPLES COLLECTED		ASSOCIATED TRIP BLANK	TB-11		

## WATER LEVEL / PUMP DATA

INITIAL DTW 20.20 ft (toc)

FINAL  
DTW

20.75 ft (toc)
----------------

PUMP TYPE

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

AMOUNT PURGED

3.5 gal.

SCREENED  
INTERVAL

66-71.3	ft (bgs)
---------	----------

DEPTH OF INTAKE ~69 ft (toc)

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 12/28/17

WELL / SAMPLE NUMBER MW-19A ACTIVITY TIME Start 1200 End 1200 TIME 1200

QC SAMPLES COLLECTED FD-13 ASSOCIATED TRIP BLANK TB-11

## WATER LEVEL / PUMP DATA

INITIAL DTW 21.30 ft (toc)

FINAL DTW 24.05 ft (toc)

SCREENED INTERVAL 60-65 ft (bgs)

DEPTH OF INTAKE 62.5 ft (toc)

## PUMP TYPE

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

## AMOUNT PURGED

~2.5 gal.

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
11:18	22.42	0.25	15.83	0.101	5.82	2.97	64.5	-70.4	
11:22	23.39	0.25	15.72	0.097	5.74	2.26	71.1	-102.5	
11:26	23.96	0.25	15.72	0.089	5.82	1.82	70.9	-144.7	
11:30	24.58	0.25	15.74	0.085	5.77	1.47	37.5	-174.6	Beige turbidity collected before flow through etc!!
11:34	25.00	0.25	16.01	0.082	5.79	0.99	29.7	-220.3	
11:38	25.05	0.15	15.88	0.080	5.82	1.57	16.4	-248.7	slow flow rate
11:42	25.02	0.15	15.83	0.078	5.82	1.60	16.3	-261.7	
11:46	24.92	0.15	15.93	0.078	5.80	0.94	16.1	-273.1	
11:50	24.72	0.15	15.73	0.077	5.85	2.28	11.8	-282.1	
11:55	24.05	0.15	15.73	0.077	5.84	1.49	13.3	-282.9	

ANALYSES: EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES:

SIGNATURE: 



# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 12/29/17  
WELL / SAMPLE NUMBER MW-20 ACTIVITY TIME Start 10:10 End 11:12 TIME 11:12  
QC SAMPLES COLLECTED                      ASSOCIATED TRIP BLANK +B-11

WATER LEVEL / PUMP DATA  
INITIAL DTW 19.45 ft (toc) FINAL DTW 20.01 ft (toc) PUMP TYPE ☒ Peristaltic AMOUNT PURGED 4 gal.  
SCREENED INTERVAL 45-50 ft (bgs) DEPTH OF INTAKE ~47.5 ft (toc) ☐ Variable-speed submersible ☐ Bladder

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
10:16	19.95	0.25	15.28	0.080	5.68	3.71	4.94	57.2	
10:20	19.98		15.45	0.079	5.37	3.52	3.40	64.5	
10:24	19.98		15.49	0.078	5.19	3.49	1.75	74.8	
10:28	20.00		15.57	0.077	5.07	3.37	1.51	83.3	
10:32	20.01		15.77	0.077	5.27	3.32	1.22	91.4	
10:36	20.02		15.71	0.077	5.21	3.26	0.79	100.5	
10:40	20.02		15.78	0.075	5.14	3.17	0.83	105.9	
10:44	20.03		15.62	0.073	5.01	2.82	0.66	113.7	
10:48	20.03		15.37	0.072	4.85	2.62	0.68	121.0	
10:52	20.03		15.47	0.071	4.56	2.46	1.09	125.7	
10:56	20.03		15.14	0.070	4.43	2.33	0.94	134.2	
11:00	20.03		15.78	0.069	4.37	2.25	0.85	139.3	
11:05	20.03		15.45	0.069	4.33	2.14	0.66	143.6	
11:10	20.01		15.43	0.068	4.70	2.08	0.32	148.4	

ANALYSES: EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES:

SIGNATURE: 

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 12/27/17

WELL / SAMPLE NUMBER MW-20A ACTIVITY TIME Start 9:18 End 10:03 TIME 10:03

QC SAMPLES COLLECTED                      ASSOCIATED TRIP BLANK TB-11

## WATER LEVEL / PUMP DATA

INITIAL DTW 19.53 ft (toc)

FINAL DTW 20.06 ft (toc)

## PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

## AMOUNT PURGED

4 gal.

SCREENED INTERVAL 60-65 ft (bgs)

DEPTH OF INTAKE 62.5 ft (toc)

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
9:20	20.05	0.3	14.98	0.140	8.15	1.74	29.5	124.6	
9:24	20.05	0.3	15.16	0.170	8.15	0.65	15.6	125.8	Slow down slightly
9:28	20.12	0.3	15.55	0.158	7.80	0.46	21.0	109.2	
9:32	20.12	0.3	15.45	0.152	7.61	0.38	23.0	97.8	
9:36	20.13	0.3	15.59	0.141	7.42	0.36	26.2	82.2	
9:40	20.15	0.3	15.45	0.134	7.29	0.32	14.8	68.8	
9:44	20.15	0.3	15.44	0.131	7.24	0.30	15.2	56.6	
9:48	20.12	0.3	15.30	0.131	7.21	0.37	11.8	46.6	
9:52	20.03	0.3	15.34	0.128	7.20	0.42	11.5	34.9	Speed up slightly
9:56	20.06	0.3	15.27	0.127	7.16	0.45	10.8	25.2	
10:00	20.06	0.3	15.16	0.127	7.17	0.54	10.7	18.3	

ANALYSES: EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES:

SIGNATURE: 

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	12/28/17
WELL / SAMPLE NUMBER	MW-21	ACTIVITY TIME	Start 15:50 End 16:18	TIME	1618
QC SAMPLES COLLECTED	<del>FD-13</del> RMC 12/28/17	ASSOCIATED TRIP BLANK	TB-11		

INITIAL DTW	20.73 ft (toc)	FINAL DTW	21.23 ft (toc)
SCREENED INTERVAL	40-45 ft (bgs)	DEPTH OF INTAKE	42.5 ft (toc)

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

~ 1.75 gal.

[illegible]

**SIGNATURE:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	12/28/17
WELL / SAMPLE NUMBER	MW 21A	ACTIVITY TIME	Start 15:00 End 15:45	TIME	15:45
QC SAMPLES COLLECTED	MSD	ASSOCIATED TRIP BLANK	TB-11		

WATER LEVEL / PUMP DATA		PUMP TYPE		AMOUNT PURGED
INITIAL DTW	20.20 ft (toc)	FINAL DTW	22.19 ft (toc)	
SCREENED INTERVAL	55-60 ft (bgs)	DEPTH OF INTAKE	57.5 ft (toc)	
		<input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Variable-speed submersible <input type="checkbox"/> Bladder		gal.

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site		JOB NUMBER	6252-16-2012		DATE	12/20/17	
WELL / SAMPLE NUMBER	Mw-22		ACTIVITY TIME	Start 13:15	End 13:47	TIME	13:50	
QC SAMPLES COLLECTED	—		ASSOCIATED TRIP BLANK	TB-11				

## WATER LEVEL / PUMP DATA

INITIAL  
DTW

21.60	ft (toc)
-------	----------

FINAL  
DTW 21.70 ft (loc)

PUMP TYPE

☒ Peristaltic

AMOUNT PURGED

0.75 cal

SCREENED INTERVAL	50.55 ft (bgs)
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DEPTH OF INTAKE 52.5 ft (toc)

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

*[Signature]*

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 12/28/17

WELL / SAMPLE NUMBER MW-22A ACTIVITY TIME Start 14:00 End 14:45 TIME 14:45

QC SAMPLES COLLECTED                      ASSOCIATED TRIP BLANK TB-11

WATER LEVEL / PUMP DATA

INITIAL DTW 21.56 ft (toc) FINAL DTW 21.97 ft (toc)

SCREENED INTERVAL 70-65 ft (bgs) DEPTH OF INTAKE 67.5 ft (toc)

PUMP TYPE ☒ Peristaltic ☐ Variable-speed submersible ☐ Bladder

AMOUNT PURGED                      gal.

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
14:07	22.13	0.25	16.00	0.080	6.40	1.47	72.6	-15.0	Inhibit Pump rate too high
14:11	21.93	0.25	15.81	0.083	6.44	0.89	65.1	-173.3	
14:15	21.94	0.25	16.04	0.082	6.46	0.74	43.8	-236.8	
14:19	21.94	0.25	16.11	0.081	6.47	0.66	30.4	-260.5	
14:23	21.95	0.25	15.88	0.080	6.46	0.48	23.2	-263.5	
14:27	21.97	0.25	16.06	0.078	6.42	0.38	15.6	-263.4	
14:31	21.97	0.25	15.96	0.077	6.40	0.36	14.6	-266.3	
14:35	21.97	0.25	16.05	0.077	6.37	0.34	12.5	-267.5	
14:39	21.97	0.25	16.05	0.076	6.36	0.35	12.8	-270.9	
14:43	21.97	0.25	16.19	0.075	6.36	0.32	12.9	-273.6	

ANALYSES: EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES:

SIGNATURE: 

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 5/2/19

Project Number: 6252-16-2012

Name: Rodney Clark

## Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>YSI</u>	pH: <u>4</u> SU (low)	pH: <u>4.00</u> SU	+/- 10% of standard
Model No.: <u>556 MPS</u>	pH: <u>7</u> SU (med)	pH: <u>7.01</u> SU	+/- 10% of standard
Unit ID: <u>Pine R16097</u>	pH: <u>10</u> SU (high)	pH: <u>10.06</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.423</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>239.8</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Hach</u>	<u>10</u> NTU (low)	<u>9.9</u> NTU	+/- 10% of standard
Model No.: <u>2100Q</u>	<u>20</u> NTU (med)	<u>20.3</u> NTU	+/- 10% of standard
Unit ID: <u>Pine 26433</u>	<u>100</u> NTU (high)	<u>101</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>805</u> NTU	+/- 10% of standard

## Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>Ricca Chemical</u>	<u>4</u> SU	<u>7GI006</u>	<u>9/2019</u>
pH (med)	<u>Aqua Phoenix</u>	<u>7</u> SU	<u>8GA687</u>	<u>1/2020</u>
pH (high)	<u>Aqua Phoenix</u>	<u>10</u> SU	<u>8GA543</u>	<u>1/2020</u>
Conductivity	<u>Aqua Phoenix</u>	<u>1.413</u> mS/cm	<u>8GA835</u>	<u>1/2019</u>
ORP:	<u>Hanna</u>	<u>240</u> mV	<u>2062</u>	<u>10/2022</u>
Turbidity (low)	<u>Hach (formazin)</u>	<u>10</u> NTU	<u>A7362</u>	<u>3/2019</u>
Turbidity (med):	<u>Hach (formazin)</u>	<u>20</u> NTU	<u>A7348</u>	<u>3/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>100</u> NTU	<u>A7346</u>	<u>3/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>800</u> NTU	<u>A7362</u>	<u>4/2019</u>
PID gas:	_____	_____ ppmv	_____	_____

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	5/3/18
WELL / SAMPLE NUMBER	Mw-7	ACTIVITY TIME	Start End	TIME	1200
QC SAMPLES COLLECTED	None	ASSOCIATED TRIP BLANK	TB-18		

## WATER LEVEL / PUMP DATA

INITIAL DTW 16.50 ft (toc)

FINAL DTW	16.68 ft (toc)
--------------	----------------

**PUMP TYPE**

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

AMOUNT PURGED

22 gal

SCREENED  
INTERVAL

20.9-29.8 ft (bags)

DEPTH OF INTAKE 25.1 ft (top)

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**



## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	5/3/18
WELL / SAMPLE NUMBER	MW. 7A	ACTIVITY TIME	Start 17:56 End 14:28	TIME	14:28
QC SAMPLES COLLECTED	None	ASSOCIATED TRIP BLANK	TB-18		

WATER LEVEL / PUMP DATA		PUMP TYPE		AMOUNT PURGED
INITIAL DTW	16.62	<input checked="" type="checkbox"/> Peristaltic		~ 2 gal.
SCREENED INTERVAL	17.7 ft (toc)	<input type="checkbox"/> Variable-speed submersible		
FINAL DTW	18.41 ft (toc)	<input type="checkbox"/> Bladder		
DEPTH OF INTAKE	66.8-71.3 ft (bgs)			

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	5/3/18
WELL / SAMPLE NUMBER	NW-19	ACTIVITY TIME	Start 09:00 End 09:35	TIME	09:35
QC SAMPLES COLLECTED	None	ASSOCIATED TRIP BLANK	TB-18		

### WATER LEVEL / PUMP DATA

INITIAL  
DTW

19.12 ft (toc)
----------------

FINAL  
DTW

19.49	ft (toc)
-------	----------

**PUMP TYPE**

☐ Peristaltic

☐ Variable-speed submersible

AMOUNT PURGED

22 gal.

SCREENED  
INTERVAL 40.0-44.5 ft (bas)

DEPTH OF INTAKE ✓ 42.2 ft (toc)

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

Receives of Charles

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 5/3/18  
 WELL / SAMPLE NUMBER MW-19A ACTIVITY TIME Start 0.950 End 10.40 TIME 10.35  
 QC SAMPLES COLLECTED None ASSOCIATED TRIP BLANK TB-18

WATER LEVEL / PUMP DATA  
 INITIAL DTW 19.66 ft (toc) FINAL DTW 27.63 ft (toc) PUMP TYPE ☒ Peristaltic AMOUNT PURGED ~2 gal.  
 SCREENED INTERVAL 59.7-64.5 ft (bgs) DEPTH OF INTAKE ~62.1 ft (toc) ☐ Variable-speed submersible  
☐ Bladder

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
9.57	20.50	0.3	17.05	0.247	6.07	2.27	33.1	69.8	1.81
10.04	22.05	0.15	17.44	0.238	6.38	1.41	18.1	-10.3	1.12
10.08	22.55	0.25	17.30	0.193	6.37	0.85	12.4	-15.8	0.68
10.12	23.00	0.15	17.32	0.186	6.34	0.62	9.57	-12.3	0.33
10.16	23.22	0.35	17.71	0.175	6.45	0.50	5.98	-15.6	0.23
10.20	23.35	0.15	17.55	0.169	6.44	0.50	5.57	-15.5	0.26
10.24	23.53	0.15	17.45	0.174	6.39	0.35	3.98	-12.8	0.31
10.28	23.61	0.15	17.33	0.157	6.38	0.52	4.53	-10.9	0.13
10.33	27.63	0.15	17.38	0.148	6.32	0.45	9.88	-6.7	0.35

ANALYSES: EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES:

SIGNATURE: [Signature]

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site		JOB NUMBER	6252-16-2012		DATE	5/2/18
WELL / SAMPLE NUMBER	NW-20		ACTIVITY TIME	Start	15:40	End	16:10
QC SAMPLES COLLECTED	MS/MSP		ASSOCIATED TRIP BLANK	TB-18			

### WATER LEVEL / PUMP DATA

INITIAL  
DTW

17.55	ft (toc)
-------	----------

FINAL  
DTW

17.95 ft (toc)

PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

AMOUNT PURGED

~ 1.0 gal

SCREENED  
INTERVAL

45.3-50.1 ft (bgs)

DEPTH OF INTAKE 47.7 ft (loc)

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

<b>PROJECT</b>	CTS of Asheville, Inc. Superfund Site
----------------	---------------------------------------

**JOB NUMBER** 6252-16-2012

DATE 5/2/10

WELL / SAMPLE NUMBER	NW-20A
----------------------	--------

ACTIVITY TIME Start 4:47 End 5:20

TIME 15:20

QC SAMPLES COLLECTED *None*

ASSOCIATED TRIP BLANK 713-18

### WATER LEVEL / PUMP DATA

INITIAL DTW 1737 ft (toc)

FINAL  
DTW

17.60 ft (toc)

☒ Peristaltic

AMOUNT PURGED

1.5 gal

SCREENED  
INTERVAL 9.5-64.3 ft (bgs)

DEPTH OF INTAKE 6.8 ft (toc)

☐ Variable-speed submersible

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	5/2/18
WELL / SAMPLE NUMBER	AW-21	ACTIVITY TIME	Start 11:00 End 11:30	TIME	11:30
QC SAMPLES COLLECTED	None	ASSOCIATED TRIP BLANK	TB-18		

### WATER LEVEL / PUMP DATA

INITIAL  
DTW

18.43	ft (toc)
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FINAL  
DTW 18.70 ft (toc)

PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

AMOUNT PURGED

nz gal

SCREENED  
INTERVAL

39.7-44.5 ft (bgs)

DEPTH OF INTAKE 42.1 ft (toc)

Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

FIELD DATA RECORD - GROUNDWATER SAMPLING									
PROJECT CTS of Asheville, Inc. Superfund Site		JOB NUMBER 6252-16-2012		DATE 5/2/18					
WELL / SAMPLE NUMBER MW-Z1A		ACTIVITY TIME Start 11:40 End		TIME 12:15					
QC SAMPLES COLLECTED None		ASSOCIATED TRIP BLANK TB-18							
WATER LEVEL / PUMP DATA				PUMP TYPE		AMOUNT PURGED			
INITIAL DTW 78.14 ft (toc)		FINAL DTW 18.95 ft (toc)		<input checked="" type="checkbox"/> Peristaltic		✓ 1.5 gal.			
SCREENED INTERVAL 55.5-60.3 ft (bgs)		DEPTH OF INTAKE 57.9 ft (toc)		<input type="checkbox"/> Variable-speed submersible					
				<input type="checkbox"/> Bladder					
PURGE DATA									
TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
11:46	18.78	0.2	16.65	0.108	5.82	2.08	14.3	119.6	2.32
11:50	18.83	0.2	16.69	0.108	6.17	1.79	10.1	105.7	1.98
11:54	18.88	0.2	16.65	0.118	6.29	1.44	8.89	97.8	1.43
11:58	18.91	0.2	16.65	0.125	6.44	0.83	6.14	88.5	1.04
12:02	18.95	0.2	16.63	0.109	6.60	0.75	5.95	75.1	1.08
12:06	18.95	0.2	16.53	0.129	6.58	0.42	5.87	69.3	1.16
12:10	18.98	0.2	16.63	0.129	6.60	0.44	2.83	53.1	2.22
12:14	18.95	0.2	16.72	0.127	6.58	0.32	1.77	45.2	1.26
ANALYSES:								EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)	
NOTES:									
SIGNATURE:								[Signature]	

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	5/2/18
WELL / SAMPLE NUMBER	MW-22	ACTIVITY TIME	Start 12:58 End	TIME	13:22
QC SAMPLES COLLECTED	NONE	ASSOCIATED TRIP BLANK	TB-18		

## WATER LEVEL / PUMP DATA

INITIAL  
DTW 19.50 ft (toc)

FINAL  
DTW

19.75 ft (toc)

PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

AMOUNT PURGED

~ 2.0 gal.

SCREENED  
INTERVAL 505-553 ft (bgs)

DEPTH OF INTAKE 52.3 ft (loc)

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE**



## FIELD DATA RECORD - GROUNDWATER SAMPLING

<b>PROJECT</b>	CTS of Asheville, Inc. Superfund Site
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**JOB NUMBER** 6252-16-2012

DATE 5/2/18

WELL / SAMPLE NUMBER	DATE	TIME	TESTER	REMARKS
1				
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## ACTIVITY TIME

Start 13:40 End 14:20

TIME 14:20

QC SAMPLES COLLECTED

ASSOCIATED TRIP BLANK

## WATER LEVEL / PUMP DATA

INITIAL DTW 19.56 ft (loc)

FINAL  
DTW

19.70	ft (toc)
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PUMP TYPE

☒ Peristaltic

AMOUNT PURGED

22 gal

SCREENED  
INTERVAL 355-553 ft (bgs)

DEPTH OF INTAKE 67.7 ft (toc)

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

**SIGNATURE:**

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 8/7/18

Project Number: 6252-16-2012

Name: Rodney M. Clark

## Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>YSI</u>	pH: <u>4</u> SU (low)	pH: <u>4.05</u> SU	+/- 10% of standard
Model No.: <u>556 MPS</u>	pH: <u>7</u> SU (med)	pH: <u>7.00</u> SU	+/- 10% of standard
Unit ID: <u>Pine R7508</u>	pH: <u>10</u> SU (high)	pH: <u>10.01</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.413</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>242.5</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Hach</u>	<u>10</u> NTU (low)	<u>10.1</u> NTU	+/- 10% of standard
Model No.: <u>2100Q</u>	<u>20</u> NTU (med)	<u>20.3</u> NTU	+/- 10% of standard
Unit ID: <u>Pine 30257</u>	<u>100</u> NTU (high)	<u>100</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>799</u> NTU	+/- 10% of standard

## Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>AquaPheonix</u>	<u>4</u> SU	<u>8GA273</u>	<u>1/2020</u>
pH (med)	<u>AquaPheonix</u>	<u>7</u> SU	<u>8GA687</u>	<u>1/2020</u>
pH (high)	<u>AquaPheonix</u>	<u>10</u> SU	<u>8GA543</u>	<u>1/2020</u>
Conductivity	<u>AquaPheonix</u>	<u>1.413</u> mS/cm	<u>8GA973</u>	<u>1/2019</u>
ORP:	<u>Hanna</u>	<u>240</u> mV	<u>2062</u>	<u>10/2022</u>
Turbidity (low)	<u>Hach (formazin)</u>	<u>10</u> NTU	<u>A7107</u>	<u>7/2018</u>
Turbidity (med):	<u>Hach (formazin)</u>	<u>20</u> NTU	<u>A8100</u>	<u>7/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>100</u> NTU	<u>A8092</u>	<u>7/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>800</u> NTU	<u>A8095</u>	<u>7/2019</u>
PID gas:	_____	_____ ppmv	_____	_____

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

## FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 8/8/18

Project Number: 6252-16-2012

Name: RMC

### Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>YSI</u>	pH: <u>4</u> SU (low)	pH: <u>4.00</u> SU	+/- 10% of standard
Model No.: <u>556 MPS</u>	pH: <u>7</u> SU (med)	pH: <u>7.01</u> SU	+/- 10% of standard
Unit ID: <u>Pine R7508</u>	pH: <u>10</u> SU (high)	pH: <u>10.03</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.413</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.0</u> mV	+/- 10% of standard

### Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Hach</u>	<u>10</u> NTU (low)	<u>10.1</u> NTU	+/- 10% of standard
Model No.: <u>2100Q</u>	<u>20</u> NTU (med)	<u>20.1</u> NTU	+/- 10% of standard
Unit ID: <u>Pine 30257</u>	<u>100</u> NTU (high)	<u>99.8</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>798</u> NTU	+/- 10% of standard

### Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

### Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>AquaPheonix</u>	<u>4</u> SU	<u>8GA273</u>	<u>1/2020</u>
pH (med)	<u>AquaPheonix</u>	<u>7</u> SU	<u>8GA687</u>	<u>1/2020</u>
pH (high)	<u>AquaPheonix</u>	<u>10</u> SU	<u>8GA543</u>	<u>1/2020</u>
Conductivity	<u>AquaPheonix</u>	<u>1.413</u> mS/cm	<u>8GA973</u>	<u>1/2019</u>
ORP:	<u>Hanna</u>	<u>240</u> mV	<u>2062</u>	<u>10/2022</u>
Turbidity (low)	<u>Hach (formazin)</u>	<u>10</u> NTU	<u>A7107</u>	<u>7/2018</u>
Turbidity (med):	<u>Hach (formazin)</u>	<u>20</u> NTU	<u>A8100</u>	<u>7/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>100</u> NTU	<u>A8092</u>	<u>7/2019</u>
Turbidity (high):	<u>Hach (formazin)</u>	<u>800</u> NTU	<u>A8095</u>	<u>7/2019</u>
PID gas:	_____	_____ ppmv	_____	_____

### NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

[illegible]

**ANALYSES:** TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

**NOTES:**

**SIGNATURE:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	8/8/18
WELL / SAMPLE NUMBER	MW-7A	ACTIVITY TIME	Start 13:00 End 14:20	TIME	14:15
QC SAMPLES COLLECTED	N/A	ASSOCIATED TRIP BLANK	TB-20		

INITIAL DTW	13.25 ft (toc)	FINAL DTW	13.25 ft (toc)
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☒ Peristaltic

~ 1.0 gal.

SCREENED  
INTERVAL 66.8-71.3 ft (bgs)

DEPTH OF INTAKE ~ 69 ft (toc)

☐ Variable-speed submersible

 Bladder[illegible]

**NOTES:**

**SIGNATURE:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	8/3/18
WELL / SAMPLE NUMBER	MW-19	ACTIVITY TIME	Start 11:25 End 12:10	TIME	12:10
QC SAMPLES COLLECTED	N/A	ASSOCIATED TRIP BLANK	TRIP.20		

INITIAL DTW	15.84 ft (toc)	FINAL DTW	16.40 ft (toc)
SCREENED INTERVAL	40-45 ft (bgs)	DEPTH OF INTAKE	42.5 ft (toc)

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

74 gal

[illegible]

**NOTES:**

**SIGNATURE:**

[illegible]

**ANALYSES:** TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

**NOTES:**

**SIGNATURE:**

[illegible]

**ANALYSES:** TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

**NOTES:**

**SIGNATURE:**



PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	8/8/18
WELL / SAMPLE NUMBER	MLW-204	ACTIVITY TIME	Start 08:30 End 09:30	TIME	09:20
QC SAMPLES COLLECTED	N/A	ASSOCIATED TRIP BLANK	TB-20		

INITIAL DTW	14.55 ft (toc)	FINAL DTW	14.87 ft (toc)
SCREENED INTERVAL	60-65 ft (bgs)	DEPTH OF INTAKE	62.5 ft (toc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

## 10 gal

[illegible]

**NOTES:**

SIGNATURE: \_\_\_\_\_

[illegible]

**ANALYSES:** TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

**NOTES:**

**SIGNATURE:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	8/7/18
WELL / SAMPLE NUMBER	<del>MW-24A</del> MW-21A Lmt 8/7/18	ACTIVITY TIME	Start 12:00 End 13:20	TIME	13:05
QC SAMPLES COLLECTED	FD-24	ASSOCIATED TRIP BLANK	TB-20		

INITIAL DTW 14.00 ft (toc)

FINAL  
DTW

14.40	ft (toc)
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☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

1.5 gal.

SCREENED INTERVAL	55-60 ft (bgs)
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DEPTH OF INTAKE	52.5 ft (toc)
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[illegible]

**SIGNATURE:**

FIELD DATA RECORD - GROUNDWATER SAMPLING					
PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	8/7/18
WELL / SAMPLE NUMBER	MW-22	ACTIVITY TIME	Start 15:50      End 16:30	TIME	16:30
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-20		

INITIAL DTW	15.40 ft (toc)	FINAL DTW	15.50 ft (toc)
SCREENED INTERVAL	50-55 ft (bgs)	DEPTH OF INTAKE	~52.5 ft (toc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

2.0 gal

[illegible]

**NOTES:**

**SIGNATURE:**

FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site

JOB NUMBER 6252-18-2012

DATE 8/7/18

WELL / SAMPLE NUMBER MW 22A

ACTIVITY TIME Start 15:00 End 15:45

TIME 15:45

QC SAMPLES COLLECTED N/A

ASSOCIATED TRIP BLANK TB 20

WATER LEVEL / PUMP DATA  
INITIAL DTW 15.36 ft (toc) FINAL DTW 15.70 ft (toc)  
SCREENED INTERVAL 65-70 ft (bgs) DEPTH OF INTAKE ~67.5 ft (toc)

PUMP TYPE  
☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

AMOUNT PURGED  
1.5 gal.

PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
15:08	15.86	0.1	18.82	0.078	4.26	11.52	17.1	-276.5	
15:12	15.70	0.1	18.36	0.078	3.50	1.38	6.26	-247.7	
15:17	15.70	0.1	18.39	0.077	3.78	1.05	7.54	-269.5	
15:21	15.70	0.1	18.33	0.076	4.15	0.89	8.85	-299.5	
15:27	15.70	0.1	18.25	0.074	4.65	0.77	7.38	-308.6	
15:33	15.70	0.1	18.32	0.070	5.13	0.69	8.16	-320.1	
15:38	15.70	0.2	18.38	0.069	5.25	0.66	7.85	-333.1	0
15:42	15.70	0.1	18.43	0.069	5.30	0.64	8.10	-349.7	0.20 w/R / 0.73 w/R

ANALYSES: TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

NOTES:

SIGNATURE: [Signature]

**ANALYSES:** TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride

**NOTES:**

**SIGNATURE:**

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 11/16/18

Project Number: 6252-16-2012

Name: Rodney Clark

## Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Horiba YSI Env.</u>	pH: <u>4</u> SU (low)	pH: <u>4.00</u> SU	+/- 10% of standard
Model No.: <u>YSI 556</u>	pH: <u>7</u> SU (med)	pH: <u>7.03</u> SU	+/- 10% of standard
Unit ID: <u>Pine</u>	pH: <u>10</u> SU (high)	pH: <u>10.00</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.413</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.0</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>HACH</u>	<u>10</u> NTU (low)	<u>10.6</u> NTU	+/- 10% of standard
Model No.: <u>2100 Q</u>	<u>20</u> NTU (med)	<u>20.7</u> NTU	+/- 10% of standard
Unit ID: <u>18139</u>	<u>100</u> NTU (high)	<u>103</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>806</u> NTU	+/- 10% of standard

## Photoionization Detector

		Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv +/- 10% of standard
Unit ID: _____		

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>PINE</u>	<u>4.0</u> SU	<u>86A973</u>	<u>Jan 2020</u>
pH (med)	<u>PINE</u>	<u>7</u> SU	<u>86A687</u>	<u>Jan 2020</u>
pH (high)	<u>PINE</u>	<u>10</u> SU	<u>86A543</u>	<u>Jan 2020</u>
Conductivity	<u>PINE</u>	<u>1.413</u> mS/cm	<u>86A635</u>	<u>Jan 2019</u>
ORP:	<u>PINE</u>	<u>240</u> mV	<u>3054</u>	<u>June 2023</u>
Turbidity (low)	<u>HACH</u>	<u>10</u> NTU	<u>A8232</u>	<u>Nov. 19</u>
Turbidity (med):	<u>HACH</u>	<u>100</u> NTU	<u>A8236</u>	<u>Nov. 19</u>
Turbidity (high):	<u>HACH</u>	<u>20</u> NTU	<u>A82484</u>	<u>Dec. 19</u>
Turbidity (high):	<u>HACH</u>	<u>800</u> NTU	<u>A8236</u>	<u>Nov. 19</u>
PID gas:		ppmv	<u>2660501</u>	<u>Nov. 19</u>

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 11/7/18

Project Number: 6252-16-2012

Name: Rodney Clark

## Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Horiba YSI ENV.</u>	pH: <u>4</u> SU (low)	pH: <u>4.01</u> SU	+/- 10% of standard
Model No.: <u>YSI 556</u>	pH: <u>7</u> SU (med)	pH: <u>7.00</u> SU	+/- 10% of standard
Unit ID: <u>Pine</u>	pH: <u>10</u> SU (high)	pH: <u>10.00</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.413</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.0</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>HACH</u>	<u>10</u> NTU (low)	<u>10.2</u> NTU	+/- 10% of standard
Model No.: <u>Z100Q</u>	<u>20</u> NTU (med)	<u>20.3</u> NTU	+/- 10% of standard
Unit ID: <u>18139</u>	<u>100</u> NTU (high)	<u>101</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>798</u> NTU	+/- 10% of standard

## Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>PINE</u>	<u>4.0</u> SU	<u>8GA973</u>	<u>Jan 2020</u>
pH (med)	<u>PINE</u>	<u>7.0</u> SU	<u>8GA687</u>	<u>Jan 2020</u>
pH (high)	<u>PINE</u>	<u>10.0</u> SU	<u>8GA543</u>	<u>Jan 2020</u>
Conductivity	<u>PINE</u>	<u>1.413</u> mS/cm	<u>8GA635</u>	<u>Jan 2019</u>
ORP:	<u>PINE</u>	<u>240</u> mV	<u>3054</u>	<u>June 2023</u>
Turbidity (low)	<u>HACH</u>	<u>10</u> NTU	<u>A8232</u>	<u>Nov. 19</u>
Turbidity (med):	<u>HACH</u>	<u>20</u> NTU	<u>A8248A</u>	<u>Dec 19</u>
Turbidity (high):	<u>HACH</u>	<u>100</u> NTU	<u>A8236</u>	<u>Nov 19</u>
Turbidity (high):	<u>HACH</u>	<u>800</u> NTU	<u>A8236</u>	<u>Nov. 19</u>
PID gas:		_____ ppmv		

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site  
 Project Number: 6252-16-2012

Date: 11/8/18  
 Name: Rodney Clark

## Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>Horiba YSI Env.</u>	pH: <u>4</u> SU (low)	pH: <u>4.01</u> SU	+/- 10% of standard
Model No.: <u>YSI 556</u>	pH: <u>7</u> SU (med)	pH: <u>7.00</u> SU	+/- 10% of standard
Unit ID: <u>Pine</u>	pH: <u>10</u> SU (high)	pH: <u>10.02</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.415</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.1</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>HACH</u>	<u>10</u> NTU (low)	<u>10.1</u> NTU	+/- 10% of standard
Model No.: <u>2100Q</u>	<u>20</u> NTU (med)	<u>20.2</u> NTU	+/- 10% of standard
Unit ID: <u>18139</u>	<u>100</u> NTU (high)	<u>101</u> NTU	+/- 10% of standard
	<u>800</u> NTU (high)	<u>796</u> NTU	+/- 10% of standard

## Photoionization Detector

		Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv +/- 10% of standard
Unit ID: _____		

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>PINE</u>	<u>4.0</u> SU	<u>8GA973</u>	<u>Jan. 20</u>
pH (med)	<u>PINE</u>	<u>7.0</u> SU	<u>8GA687</u>	<u>Jan. 20</u>
pH (high)	<u>PINE</u>	<u>10.0</u> SU	<u>8GA543</u>	<u>Jan. 20</u>
Conductivity	<u>PINE</u>	<u>1.413</u> mS/cm	<u>8GA635</u>	<u>Jan 19</u>
ORP:	<u>PINE</u>	<u>240</u> mV	<u>3054</u>	<u>Jan. 23</u>
Turbidity (low)	<u>HACH</u>	<u>10</u> NTU	<u>A8232</u>	<u>Nov. 19</u>
Turbidity (med):	<u>HACH</u>	<u>20</u> NTU	<u>A8248A</u>	<u>Dec 19</u>
Turbidity (high):	<u>HACH</u>	<u>100</u> NTU	<u>A8236</u>	<u>Nov. 19</u>
Turbidity (high):	<u>HACH</u>	<u>800</u> NTU	<u>A8236</u>	<u>Nov. 19</u>
PID gas:	_____	_____ ppmv	_____	_____

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.



[illegible]

**ANALYSES:** TCE according to EPA Method 8260

**NOTES:**

**SIGNATURE**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/6/18
WELL / SAMPLE NUMBER	MW-7A	ACTIVITY TIME	Start 13:00 End 13:50	TIME	13:50
QC SAMPLES COLLECTED	MS/MSD	ASSOCIATED TRIP BLANK	TB-32		

INITIAL DTW	16.55 ft (loc)	FINAL DTW	18.40 ft (loc)
SCREENED INTERVAL	66.8-71.3 ft (bgs)	DEPTH OF INTAKE	~69.0 ft (loc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

✓ 1.8 gal.

[illegible]

**NOTES:**

**SIGNATURE:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/7/18
WELL / SAMPLE NUMBER	MW-19	ACTIVITY TIME	Start 13:40 End 14:30	TIME	14:30
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-32		

INITIAL DTW	19.84 ft (loc)	FINAL DTW	20.18 ft (loc)
SCREENED INTERVAL	40-45 ft (bgs)	DEPTH OF INTAKE	~42.5 ft (loc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

1.8 gal.

[illegible]

**NOTES:**

**SIGNATURE:**

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 11/7/18  
WELL / SAMPLE NUMBER MW-19A ACTIVITY TIME Start 12:25 End 13:30 TIME 13:30  
QC SAMPLES COLLECTED FD-35 ASSOCIATED TRIP BLANK TB-32

## WATER LEVEL / PUMP DATA

INITIAL DTW 19.90 ft (toc) FINAL DTW 24.10 ft (toc) PUMP TYPE ☒ Peristaltic ☐ Variable-speed submersible ☐ Bladder AMOUNT PURGED ~ 2.0 gal.  
SCREENED INTERVAL 60-65 ft (bgs) DEPTH OF INTAKE 62.5 ft (toc)

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
12:40	22.45	0.2	17.52	0.237	7.11	3.64	1.52	-65.6	0.93 w/out R <sub>p</sub>
12:45	22.89		17.49	0.235	7.06	2.56	1.55	-67.5	
12:50	23.51		17.39	0.233	7.04	2.46	1.43	-68.1	
12:55	23.69		17.32	0.227	7.01	2.17	1.26	-66.8	0.35 w/out R <sub>p</sub>
13:00	23.93		17.05	0.196	6.63	1.79	2.01	-4.1	
13:05	24.05		16.99	0.190	6.55	1.83	1.85	-10.3	
13:10	24.08		16.96	0.186	6.46	1.88	1.43	-2.6	0.43 w/out R <sub>p</sub>
13:15	24.10		16.95	0.178	6.48	2.18	1.51	-3.3	
13:20	24.10		16.95	0.177	6.47	2.31	1.21	-2.5	
13:25	24.10	✓	16.93	0.177	6.49	2.45	1.36	-1.8	0.00 w/out R / 0.00 w/R

ANALYSES: TCE according to EPA Method 8260

NOTES:

SIGNATURE: Anthony M. McK

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/7/18
WELL / SAMPLE NUMBER	MW-20	ACTIVITY TIME	Start 14:35 End 15:30	TIME	15:30
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-32		

INITIAL DTW	17.57 ft (loc)	FINAL DTW	17.85 ft (loc)
SCREENED INTERVAL	45.50 ft (bas)	DEPTH OF INTAKE	47.5 ft (loc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

27. gal.

[illegible]

**SIGNATURE:**

# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 11/8/18

WELL / SAMPLE NUMBER MW-20A ACTIVITY TIME Start 09:15 End 11:00 TIME 11:00

QC SAMPLES COLLECTED NA ASSOCIATED TRIP BLANK TB-32

## WATER LEVEL / PUMP DATA

INITIAL DTW 17.75 ft (toc)

FINAL DTW 18.05 ft (toc)

SCREENED INTERVAL 60-65 ft (bgs)

DEPTH OF INTAKE 62.5 ft (toc)

## PUMP TYPE

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

## AMOUNT PURGED

~2 gal.

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
09:30	18.05	0.2	15.71	0.097	7.02	3.83	9.74	83.8	0.00 w/out R
09:35	18.00	0.2	16.15	0.101	7.08	1.70	8.59	72.4	
09:40	17.85	0.2	16.39	0.104	7.09	1.29	7.65	62.4	
09:45	17.95	0.2	16.41	0.108	7.13	1.11	6.98	56.8	
09:50	17.90	0.2	16.38	0.109	7.15	1.11	7.15	55.0	Battery to peri-pump died, rehooked to car
10:15	17.82	0.4	16.57	0.112	7.16	1.03	8.18	55.3	Battery recharged at 10:15
10:20	18.20	0.2	16.54	0.113	7.16	1.00	7.05	49.2	2.67 w/out R / slow flow rate
10:25	18.20	0.2	16.67	0.111	7.11	0.89	6.59	50.5	
10:30	18.12	0.2	16.68	0.110	7.09	0.91	6.44	52.8	1.81 w/out R
10:35	18.15	0.2	16.76	0.111	7.08	0.82	5.35	62.7	
10:40	18.11	0.2	16.60	0.110	7.04	0.69	5.19	246.5	1.93 w/out R
10:45	18.08	0.2	16.62	0.110	7.03	0.70	4.88	280.7	
10:50	18.05	0.2	16.62	0.109	7.01	0.68	4.59	331.7	
10:55	18.05	0.2	16.56	0.109	7.00	0.68	4.37	349.0	2.34 w/out R / 3.20 w/R

ANALYSES: TCE according to EPA Method 8260

NOTES:

SIGNATURE: 

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/2/18
WELL / SAMPLE NUMBER	MW-21	ACTIVITY TIME	Start 08:20 End 09:30	TIME	09:20
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	T13-32		

INITIAL  
DTW

18.63	ft (loc)
-------	----------

FINAL  
DTW

18.82 ft (toc)
----------------

SCREENED  
INTERVAL 40-45 ft (bgs)

DEPTH OF INTAKE ~ 42.5 ft (toc)

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

~ 1.3 gal.

[illegible]

**SIGNATURE:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/6/18
WELL / SAMPLE NUMBER	MW-21A	ACTIVITY TIME	Start 16:00 End 16:55	TIME	16:55
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-32		

INITIAL  
DTW 18.33 ft (loc)

FINAL  
DTW

18.90	ft (toc)
-------	----------

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

~ 2 gal.

SCREENED  
INTERVAL 60-55 ft (bags)

DEPTH OF INTAKE ~57.5 ft (toc)

[illegible]

**NOTES:**

**SIGNATURE:**



# FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT CTS of Asheville, Inc. Superfund Site JOB NUMBER 6252-16-2012 DATE 11/7/18

WELL / SAMPLE NUMBER MW-22 ACTIVITY TIME Start 09:20 End 10:30 TIME 10:30

QC SAMPLES COLLECTED NA ASSOCIATED TRIP BLANK TB-32

## WATER LEVEL / PUMP DATA

INITIAL DTW 19.85 ft (toc)

FINAL DTW 20.05 ft (toc)

## PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

☐ Bladder

## AMOUNT PURGED

1.0 gal.

SCREENED INTERVAL 50-55 ft (bgs)

DEPTH OF INTAKE 52.5 ft (toc)

## PURGE DATA

TIME	DTW (ft)	PURGE RATE (L/min)	TEMP (C°)	SPECIFIC CONDUCTIVITY (mS/cm)	pH	DO (mg/L)	TURBIDITY (NTU)	ORP (mV)	COMMENTS
0940	19.90	0.15	16.96	2.503	11.66	4.90	38.3	240.8	2.76 w/out R
0945	19.93	0.15	17.22	2.544	11.71	2.08	26.9	189.5	
0950	19.95	0.15	17.32	2.523	11.73	1.39	19.1	165.5	2.02 w/out R
0955	19.98	0.15	17.40	2.417	11.73	1.14	17.5	147.7	
1000	20.02	0.15	17.35	2.073	11.64	0.95	7.31	138.4	0.92 w/out R
1005	20.04	0.15	17.37	1.884	11.61	0.80	4.95	132.1	
1010	20.05	0.15	17.43	1.799	11.57	0.81	4.20	130.3	0.59 w/out R
1015	20.05	0.15	17.48	1.631	11.53	0.79	4.19	128.7	
1020	20.05	0.15	17.50	1.468	11.47	0.78	3.85	124.5	
1025	20.05	0.15	17.38	1.257	11.37	0.88	3.99	108.0	1.72 w/out R / 2.92 w/R
1030	END 11/7/18								

ANALYSES: TCE according to EPA Method 8260

NOTES:

SIGNATURE: 

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	11/7/18
WELL / SAMPLE NUMBER	MW-22A	ACTIVITY TIME	Start 10:20 End 11:30	TIME	11:30
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-32		

INITIAL DTW 19.85 ft (toc)

FINAL  
DTW

20.21	ft (toc)
-------	----------

☒ Peristaltic

~ 2.5 gal.

SCREENED  
INTERVAL 65-70ft (bgs)

DEPTH OF INTAKE 67.5 ft (toc)

☐ Variable-speed submersible

☐ Bladder[illegible]

**NOTES:**

**SIGNATURE:**

## FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 3/11/19

Project Number: 6252-16-2012

Name: RODNEY M. CLARK

### Water Quality Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: <u>YSI</u>	pH: <u>4</u> SU (low)	pH: <u>4.00</u> SU	+/- 10% of standard
Model No.: <u>556 MPS</u>	pH: <u>7</u> SU (med)	pH: <u>6.96</u> SU	+/- 10% of standard
Unit ID: <u>PINE 18930</u>	pH: <u>10</u> SU (high)	pH: <u>10.00</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.412</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>240.0</u> mV	+/- 10% of standard

### Turbidity Meter Calibration

	Standard Value	Meter Value	Acceptance Criteria
Manufacturer: _____	_____ NTU (low)	_____ NTU	+/- 10% of standard
Model No.: _____	_____ NTU (med)	_____ NTU	+/- 10% of standard
Unit ID: _____	_____ NTU (high)	_____ NTU	+/- 10% of standard
	_____ NTU (high)	_____ NTU	+/- 10% of standard

### Photoionization Detector

			Acceptance Criteria
Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

### Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>PINE</u>	<u>4</u> SU	<u>8G1846</u>	<u>Sept. 20</u>
pH (med)	<u>PINE</u>	<u>7</u> SU	<u>8G1527</u>	<u>Sept. 20</u>
pH (high)	<u>PINE</u>	<u>10</u> SU	<u>8G165</u>	<u>Sept 20</u>
Conductivity	<u>PINE</u>	<u>1.413</u> mS/cm	<u>8G140</u>	<u>Dec. 20</u>
ORP:	<u>PINE</u>	<u>240</u> mV	<u>3336</u>	<u>Sept. 23</u>
Turbidity (low)	_____	_____ NTU	_____	_____
Turbidity (med):	_____	_____ NTU	_____	_____
Turbidity (high):	_____	_____ NTU	_____	_____
Turbidity (high):	_____	_____ NTU	_____	_____
PID gas:	_____	_____ ppmv	_____	_____

### NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

# FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 3/12/19

Project Number: 6252-16-2012

Name: Rodney Clark

## Water Quality Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: <u>RMC 550 MPS H198129</u>	pH: <u>4</u> SU (low)	pH: <u>4.02</u> SU	+/- 10% of standard
Model No.: <u>3/12/19</u>	pH: <u>7</u> SU (med)	pH: <u>6.99</u> SU	+/- 10% of standard
Unit ID: <u>024201C7994</u>	pH: <u>10</u> SU (high)	pH: <u>NA</u> SU	+/- 10% of standard
	Conductivity: <u>1.413</u> mS/cm	Conductivity: <u>1.414</u> mS/cm	+/- 10% of standard
	ORP: <u>240</u> mV	ORP: <u>NA</u> mV	+/- 10% of standard

## Turbidity Meter Calibration

### Standard Value

### Meter Value

### Acceptance Criteria

Manufacturer: _____	_____ NTU (low)	_____ NTU	+/- 10% of standard
Model No.: _____	_____ NTU (med)	_____ NTU	+/- 10% of standard
Unit ID: _____	_____ NTU (high)	_____ NTU	+/- 10% of standard
	_____ NTU (high)	_____ NTU	+/- 10% of standard

## Photoionization Detector

### Acceptance Criteria

Manufacturer: _____	Background: _____ ppmv	Meter: _____ ppmv	within 5 ppmv of Zero
Model No.: _____	Span Gas: _____ ppmv	Meter: _____ ppmv	+/- 10% of standard
Unit ID: _____			

## Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH (low)	<u>PINE/AQUAPHENIX</u>	<u>4</u> SU	<u>7GI006</u>	<u>09/19</u>
pH (med)	<u>PINE/AQUAPHENIX</u>	<u>7</u> SU	<u>8GAG87</u>	<u>Jan 2020</u>
pH (high)		<u>10</u> SU		
Conductivity	<u>PINE</u>	<u>1.413</u> mS/cm	<u>8GF659</u>	<u>JUNE 2019</u> RMC 3/12/19
ORP:		<u>240</u> mV		
Turbidity (low)		_____ NTU		
Turbidity (med):		_____ NTU		
Turbidity (high):		_____ NTU		
Turbidity (high):		_____ NTU		
PID gas:		_____ ppmv		

## NOTES:

If a meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

## FIELD DATA RECORD - GROUNDWATER SAMPLING

CTS of Asheville, Inc. Superfund Site

6252-16-2012

DATE \_\_\_\_\_

3/11/19

MW-21

## ACTIVITY TIME

Sta

10:30

End

11.15

TIME

11/15

FD-37

ASSOCIATED TRIP BLANK

TB-34

## WATER LEVEL / PUMP DATA

INITIAL  
DTW

12.96 ft (top)

FINAL  
DTW

13 10 ft (top)

**PUMP TYPE**

☒ Peristaltic☐ Variable-speed submersible☐ Bladder

AMOUNT PURGED

2 1/2 gal

**SCREENED  
INTERVAL**

40-45 ft (bags)

### DEPTH OF INTAKE

47.5 ft (top)

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

NOTES: Add ascorbic acid to unpreserved VOA containers

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	3/11/19
WELL / SAMPLE NUMBER	GW-132-48	ACTIVITY TIME	Start 13:40 End 14:10	TIME	14:10
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-34		

INITIAL DTW	16.06 ft (loc)	FINAL DTW	23.45 ft (loc)	<input checked="" type="checkbox"/> Peristaltic	~ 1/2 gal.
SCREENED INTERVAL	45-50 ft (bgs)	DEPTH OF INTAKE	48 ft (loc)	<input type="checkbox"/> Variable-speed submersible	
				<input type="checkbox"/> Bladder	

[illegible]

**NOTES:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

CTS of Asheville, Inc. Superfund Site

**JOB NUMBER**

6252-16-2012

DATE \_\_\_\_\_

3/11/19

GW-132-58

## ACTIVITY TIME

Start 14:30

End 15:30

TIME

15:30

NA

ASSOCIATED TRIP BLANK

TB-324

### WATER LEVEL / PUMP DATA

20.21 ft (loc)

FINAL DTW	24.30 ft (toc)
--------------	----------------

**PUMP TYPE**

☒ Peristaltic

AMOUNT PURGED

✓ 1/2 gal

SS-60 ft (bags)

DEPTH OF INTAKE 58 ft (log)

☐ Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

**NOTES:**

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	3/11/19
WELL / SAMPLE NUMBER	GW-131-59	ACTIVITY TIME	Start 16:00 End 17:20	TIME	17:20
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	713-34		

INITIAL DTW 12/16/19 3/11/19 FINAL DTW 16:00 ft (toc)

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

✓ 1/2 gal

SCREENED  
INTERVAL

58-61 ft (bgs)
----------------

DEPTH OF INTAKE 59 ft (loc)

[illegible]

**NOTES:**



PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	3/2/19
WELL / SAMPLE NUMBER	GW-121-45	ACTIVITY TIME	Start 01:45 End 12:10	TIME	12:10
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TJB-34		

INITIAL  
DTW

FINAL  
DTW

14.23 ft (toc)
----------------

☒ Peristaltic  
☐ Variable-speed submersible  
☐ Bladder

$\approx 1/2$ gal.
--------------------

~~SCREENED  
INTERVAL~~ 42-47 ft (bgs)

DEPTH OF INTAKE 45 ft (toc)

[illegible]

**NOTES:**

## FIELD DATA RECORD - GROUNDWATER SAMPLING

CTS of Asheville, Inc. Superfund Site

6252-16-2012

3/12/19

GW-122-46

Start 14:00

End 14:40

14:40

NA

TB-34

PUMP TYPE

**AMOUNT PURGED**

14.13 ft (loc)

14.51 ft (toc)

✓

### Peristaltic

 $\frac{1}{2}$ 

gal.

43-48 ft (bags)

46 ft (loc)

1

7

## Bladder

## PURGE DATA

[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

Need 7 pinches of ascorbic acid to neutralize K-permanganate

## FIELD DATA RECORD - GROUNDWATER SAMPLING

PROJECT	CTS of Asheville, Inc. Superfund Site	JOB NUMBER	6252-16-2012	DATE	3/12/19
WELL / SAMPLE NUMBER	MW-21A	ACTIVITY TIME	Start 16:00 End 16:40	TIME	16:40
QC SAMPLES COLLECTED	NA	ASSOCIATED TRIP BLANK	TB-34		

## WATER LEVEL / PUMP DATA

INITIAL  
DTW

13.08 ft (toc)
----------------

FINAL  
DTW

13.26	ft (toc)
-------	----------

PUMP TYPE

☒ Peristaltic

☐ Variable-speed submersible

**AMOUNT PURGED**

~ 10 gal.

SCREENED  
INTERVAL

55-60 ft (bgs)

DEPTH OF INTAKE 57.5 ft (toc)

☐ Bladder

## PURGE DATA

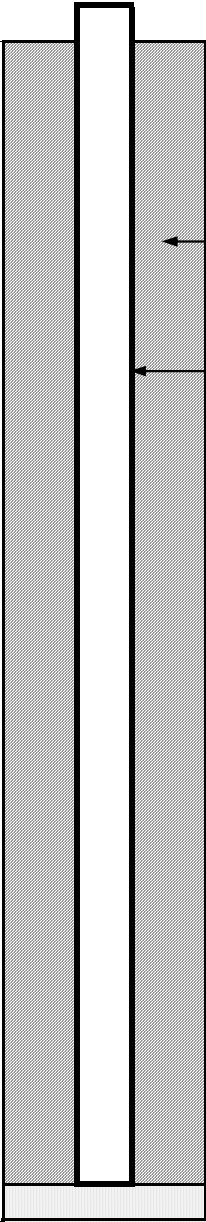
[illegible]

**ANALYSES:** EPA 8260 (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride)

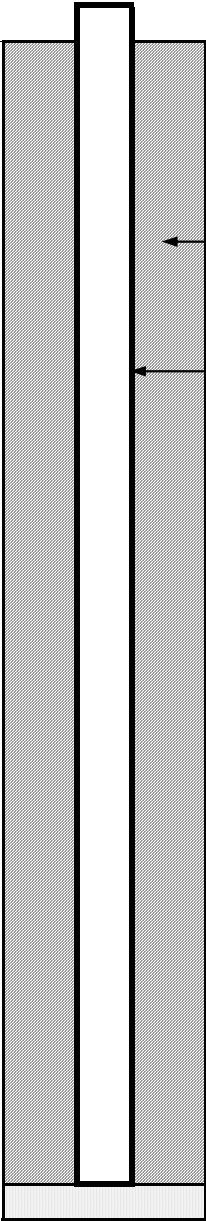
**NOTES:**

**APPENDIX B**  
**MONITORING AND EMPLACEMENT WELL CONSTRUCTION RECORDS**

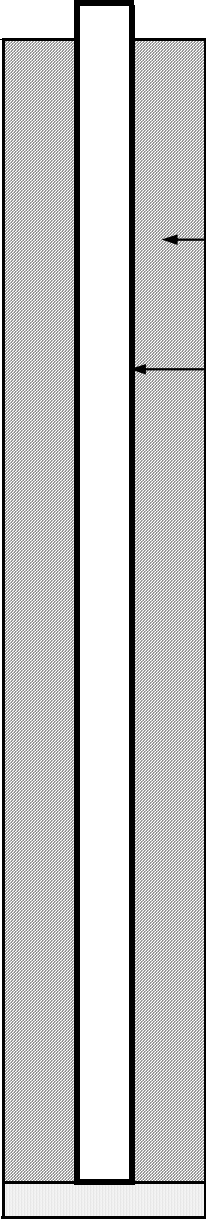
<b>EPW CASING CONSTRUCTION DETAIL</b> <b>CTS of Asheville, Inc. Superfund Site</b> <b>Wood Project 6252-16-2012.06</b>		<b>EPW ID</b>  <b>EPW-1</b>
<b>Date of Installation:</b> 1/10/18	<b>Depth to Water:</b> N/A	<b>Completed By:</b> Susan Avritt, PE, LG
<b>Drilling Method:</b> 8" diameter sonic		<b>Measuring Point (MP)</b>
<b>Contractor:</b> Geologic Exploration	<b>Northing:</b> not surveyed	<b>Type:</b> ground surface
<b>Driller:</b> Andrew Gloege (NC #4314)	<b>Easting:</b> not surveyed	<b>Elevation:</b> approx. 2,142 feet msl

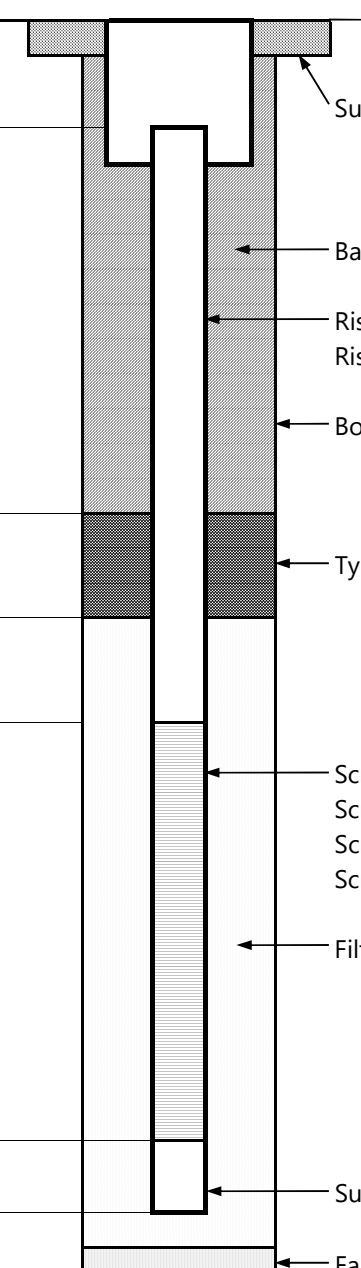
Item	Depth below MP (feet)	Description
Riser Pipe:	-0.5 feet	
		Ground Surface
		Backfill/Grout Type: <u>Portland cement/ bentonite</u>
		Riser Pipe Type: <u>Sch. 40 PVC</u> Riser Pipe ID: <u>4 inch</u>
		Borehole Diameter: <u>8 inch</u>
Drilled Depth:	<u>75.0</u>	Fallback: <u>~0.5 feet</u>
Notes: <u>Drill rig: Geoprobe 8150 LS</u> <u>Centralizers installed at 10, 25, 40, 55, and 70 feet below ground surface.</u>		

<b>EPW CASING CONSTRUCTION DETAIL</b> <b>CTS of Asheville, Inc. Superfund Site</b> <b>Wood Project 6252-16-2012.06</b>		<b>EPW ID</b>  <b>EPW-2</b>
<b>Date of Installation:</b> 1/11/18	<b>Depth to Water:</b> N/A	<b>Completed By:</b> Susan Avritt, PE, LG
<b>Drilling Method:</b> 8" diameter sonic		<b>Measuring Point</b>
<b>Contractor:</b> Geologic Exploration	<b>Northing:</b> not surveyed	<b>Type:</b> ground surface
<b>Driller:</b> Andrew Gloege (NC #4314)	<b>Easting:</b> not surveyed	<b>Elevation:</b> approx. 2,143 feet msl

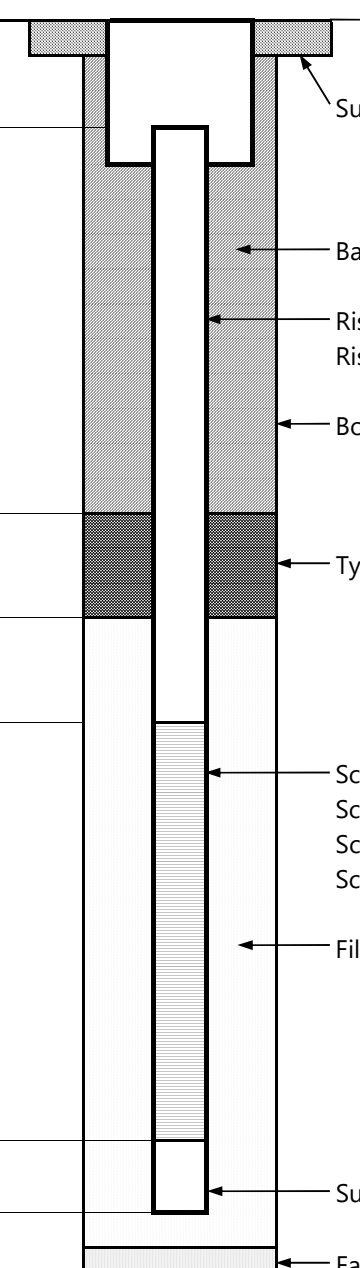
Item	Depth below MP (feet)	Description
Riser Pipe:	-0.5 feet	
		Backfill/Grout Type: <u>Portland cement/ bentonite</u>
		Riser Pipe Type: <u>Sch. 40 PVC</u>
		Riser Pipe ID: <u>4 inch</u>
		Borehole Diameter: <u>8 inch</u>
Drilled Depth:	<u>75.0</u>	Fallback: <u>~0.5 feet</u>
Notes: <u>Drill rig: Geoprobe 8150 LS</u>		
<u>Centralizers installed at 15, 30, 42, 55, and 70 feet below ground surface.</u>		

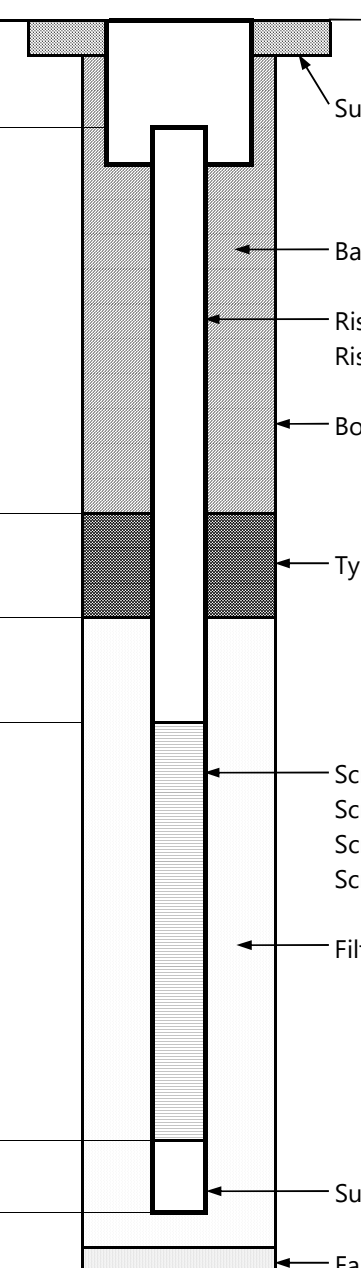
<b>EPW CASING CONSTRUCTION DETAIL</b> <b>CTS of Asheville, Inc. Superfund Site</b> <b>Wood Project 6252-16-2012.06</b>		<b>EPW ID</b>  <b>EPW-3</b>
<b>Date of Installation:</b> 1/11/18	<b>Depth to Water:</b> N/A	<b>Completed By:</b> Susan Avritt, PE, LG
<b>Drilling Method:</b> 8" diameter sonic		<b>Measuring Point</b>
<b>Contractor:</b> Geologic Exploration	<b>Northing:</b> not surveyed	<b>Type:</b> ground surface
<b>Driller:</b> Andrew Gloege (NC #4314)	<b>Easting:</b> not surveyed	<b>Elevation:</b> approx. 2,143 feet msl

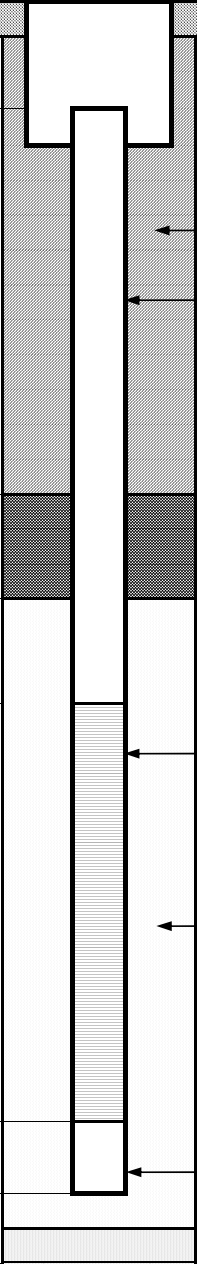
Item	Depth below MP (feet)	Description
Riser Pipe:	-0.5	
		Ground surface
		Backfill/Grout Type: <u>Portland cement/ bentonite</u>
		Riser Pipe Type: <u>Sch. 40 PVC</u>
		Riser Pipe ID: <u>4 inch</u>
		Borehole Diameter: <u>8 inch</u>
Drilled Depth:	<u>75.0</u>	Fallback: <u>~0.5 feet</u>
Notes: <u>Drill rig: Geoprobe 8150 LS</u>		
<u>Centralizers installed at 10, 25, 40, 55, and 70 feet below ground surface.</u>		

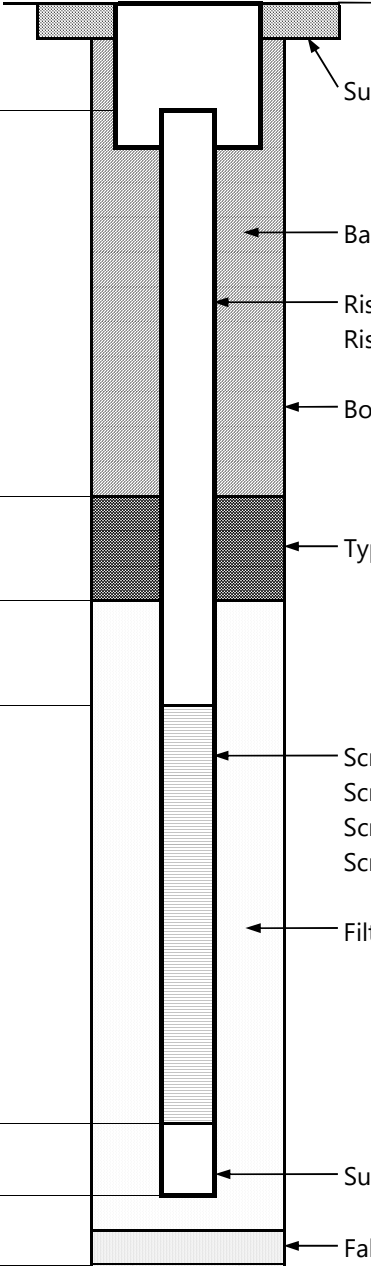
MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site			MW-19
Wood Project 6252-16-2012.06			
Date of Installation: 11/30/17  Drilling Method: 4.25" ID auger  Contractor: Geologic Exploration  Driller: Jacob Messick (NC #4252)	Depth to Water: 21.72 feet bgs (12/1/17)	Completed By: Rodney Clark, LG	
	Northing: not surveyed	Measuring Point (MP)	
	Easting: not surveyed	Type: ground surface  Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.3	 <div>Surface Seal Type: 2' x 2' concrete</div>	
Top of Seal:	35.0	Backfill/Grout Type: Portland cement/bentonite	
Top of Filter Pack:	38.0	Riser Pipe Type: Schedule 40 PVC Riser Pipe ID: 2 inch	
Top of Screen:	40.0	Borehole Diameter: 8 inch	
Bottom of Screen:	44.8	Type of Seal: 3/8" bentonite chips	
End Cap:	45.2	Screen Type: Schedule 40 PVC Screen ID: 2 inch Screen Slot Size: 0.010 inch Screen Length: 4.8 feet	
Drilled Depth:	45.2	Filter Pack Type: #2 silica sand	
		Sump: 0.4 feet	
		Fallback/Backfill: None	
Notes: Drill rig: Diedrich D50			

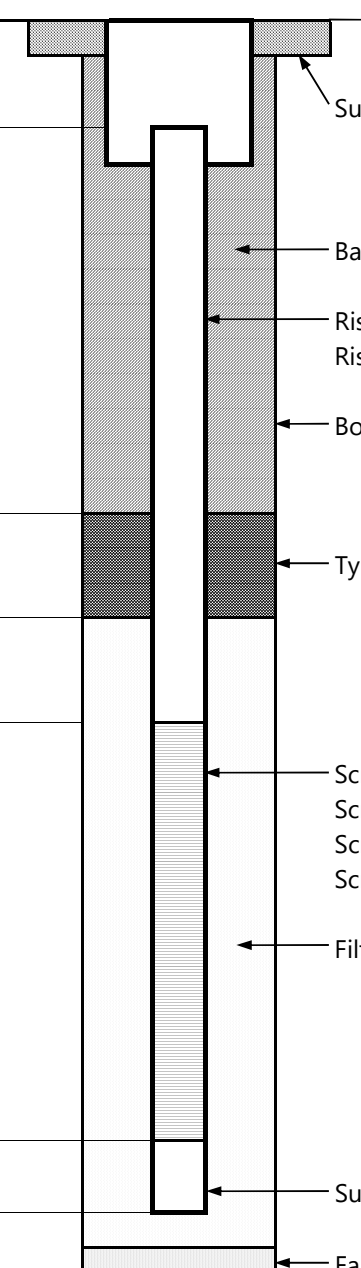


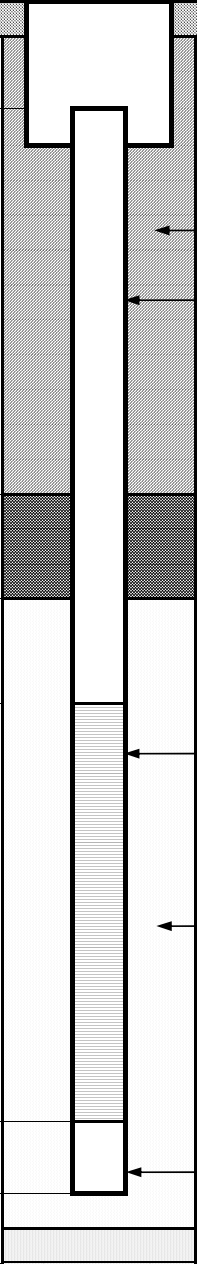
MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site			MW-19A
Wood Project 6252-16-2012.06			
Date of Installation: 11/30/17	Depth to Water: 21.05 feet bgs (12/1/17)	Completed By: Rodney Clark, LG	
Drilling Method: 4.25" ID auger		Measuring Point (MP)	
Contractor: Geologic Exploration	Northing: not surveyed	Type: ground surface	
Driller: Jacob Messick (NC #4252)	Easting: not surveyed	Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.2	 <div>Surface Seal Type: 2' x 2' concrete</div>	
		Backfill/Grout Type: Portland cement/ bentonite	
		Riser Pipe Type: Schedule 40 PVC Riser Pipe ID: 2 inch	
		Borehole Diameter: 8 inch	
Top of Seal:	54.0		
Top of Filter Pack:	57.5	Type of Seal: 3/8" bentonite chips	
Top of Screen:	59.7		
		Screen Type: Schedule 40 PVC Screen ID: 2 inch Screen Slot Size: 0.010 inch Screen Length: 4.8 feet	
		Filter Pack Type: #2 silica sand	
Bottom of Screen:	64.5		
End Cap:	64.9	Sump: 0.4 feet	
Drilled Depth:	65.0	Fallback/Backfill: 0.1 feet	
Notes: Drill rig: Diedrich D50			

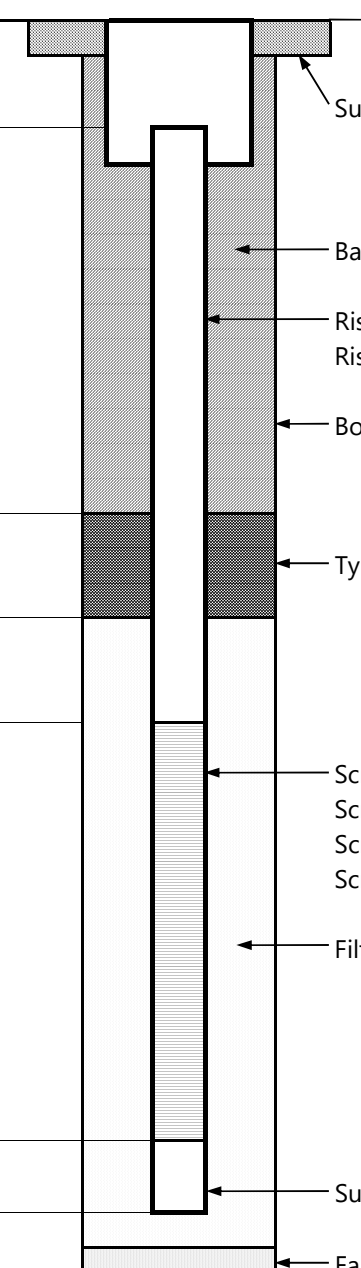
MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site			MW-20
Wood Project 6252-16-2012.06			
Date of Installation: 12/5/17  Drilling Method: 4.25" ID auger  Contractor: Geologic Exploration  Driller: Jacob Messick (NC #4252)	Depth to Water: 19.35 feet bgs (12/6/17)	Completed By: Rodney Clark, LG	
	Northing: not surveyed	Measuring Point (MP)	
	Easting: not surveyed	Type: ground surface	
		Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.3	 <div>Surface Seal Type: 2' x 2' concrete</div>	
Top of Seal:	41.0	Backfill/Grout Type: Portland cement/bentonite	
Top of Filter Pack:	43.0	Riser Pipe Type: Schedule 40 PVC Riser Pipe ID: 2 inch	
Top of Screen:	45.3	Borehole Diameter: 8 inch	
		Type of Seal: 3/8" bentonite chips	
		Screen Type: Schedule 40 PVC Screen ID: 2 inch Screen Slot Size: 0.010 inch Screen Length: 4.8 feet	
		Filter Pack Type: #2 silica sand	
Bottom of Screen:	50.1	Sump: 0.4 feet	
End Cap:	50.5	Fallback/Backfill: None	
Drilled Depth:	50.5		
Notes: Drill rig: Diedrich D50			

<b>MONITORING WELL CONSTRUCTION DETAIL</b> <b>CTS of Asheville, Inc. Superfund Site</b> <b>Wood Project 6252-16-2012.06</b>			<b>WELL ID</b>  <b>MW-20A</b>
<b>Date of Installation:</b> 12/6/17  <b>Drilling Method:</b> 4.25" ID auger  <b>Contractor:</b> Geologic Exploration  <b>Driller:</b> Jacob Messick (NC #4252)	<b>Depth to Water:</b> 20.43 feet bgs (12/6/17)		<b>Completed By:</b> Rodney Clark, LG
	<b>Measuring Point (MP)</b>  <b>Type:</b> ground surface		
	<b>Northing:</b> not surveyed  <b>Easting:</b> not surveyed		<b>Elevation (ft msl):</b> TBD
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.3		
		Surface Seal Type:	2' x 2' concrete
		Backfill/Grout Type:	Portland cement/bentonite
		Riser Pipe Type:	Schedule 40 PVC
		Riser Pipe ID:	2 inch
		Borehole Diameter:	8 inch
Top of Seal:	55.5		
Top of Filter Pack:	57.5	Type of Seal:	3/8" bentonite chips
Top of Screen:	59.5		
		Screen Type:	Schedule 40 PVC
		Screen ID:	2 inch
		Screen Slot Size:	0.010 inch
		Screen Length:	4.8 feet
		Filter Pack Type:	#2 silica sand
Bottom of Screen:	64.3		
End Cap:	64.7	Sump:	0.4 feet
Drilled Depth:	65.0	Fallback/Backfill:	0.3 feet
Notes: Drill rig: Diedrich D50			

MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site Wood Project 6252-16-2012.06			MW-21
Date of Installation: 12/4/17  Drilling Method: 4.25" ID auger  Contractor: Geologic Exploration  Driller: Jacob Messick (NC #4252)	Depth to Water: 20.73 feet bgs (12/28/17)	Completed By: Rodney Clark, LG	
	Northing: not surveyed	Measuring Point (MP)	
	Easting: not surveyed	Type: ground surface  Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.2	 <div>Surface Seal Type: 2' x 2' concrete</div>	
Top of Seal:	36.0	Backfill/Grout Type: Portland cement/bentonite	
Top of Filter Pack:	38.0	Riser Pipe Type: Schedule 40 PVC Riser Pipe ID: 2 inch	
Top of Screen:	39.7	Borehole Diameter: 8 inch	
		Type of Seal: 3/8" bentonite chips	
		Screen Type: Schedule 40 PVC Screen ID: 2 inch Screen Slot Size: 0.010 inch Screen Length: 4.8 feet	
		Filter Pack Type: #2 silica sand	
Bottom of Screen:	44.5		
End Cap:	44.9	Sump: 0.4 feet	
Drilled Depth:	45.0	Fallback/Backfill: 0.1 feet	
Notes: Drill rig: Diedrich D50			

MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site			MW-21A
Wood Project 6252-16-2012.06			
Date of Installation: 12/5/17  Drilling Method: 4.25" ID auger  Contractor: Geologic Exploration  Driller: Jacob Messick (NC #4252)	Depth to Water: 20.20 feet bgs (12/28/17)	Completed By: Rodney Clark, LG	
	Northing: not surveyed	Measuring Point (MP)	
	Easting: not surveyed	Type: ground surface  Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.5	 <div>Surface Seal Type: 2' x 2' concrete</div>	
		Backfill/Grout Type: Portland cement/bentonite	
		Riser Pipe Type: Schedule 40 PVC Riser Pipe ID: 2 inch	
		Borehole Diameter: 8 inch	
Top of Seal:	51.0		
Top of Filter Pack:	53.0	Type of Seal: 3/8" bentonite chips	
Top of Screen:	55.5		
		Screen Type: Schedule 40 PVC Screen ID: 2 inch Screen Slot Size: 0.010 inch Screen Length: 4.8 feet	
		Filter Pack Type: #2 silica sand	
Bottom of Screen:	60.3		
End Cap:	60.7	Sump: 0.4 feet	
Drilled Depth:	60.7	Fallback/Backfill: None	
Notes: Drill rig: Diedrich D50			

<b>MONITORING WELL CONSTRUCTION DETAIL</b> <b>CTS of Asheville, Inc. Superfund Site</b> <b>Wood Project 6252-16-2012.06</b>			<b>WELL ID</b>  <b>MW-22</b>
<b>Date of Installation:</b> 12/4/17	<b>Depth to Water:</b> 21.07 feet bgs (12/5/17)	<b>Completed By:</b> Rodney Clark, LG	
<b>Drilling Method:</b> 4.25" ID auger		<b>Measuring Point (MP)</b>	
<b>Contractor:</b> Geologic Exploration	<b>Northing:</b> not surveyed	<b>Type:</b> ground surface	
<b>Driller:</b> Jacob Messick (NC #4252)	<b>Easting:</b> not surveyed	<b>Elevation (ft msl):</b> TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.4		
		Surface Seal Type:	2' x 2' concrete
		Backfill/Grout Type:	Portland cement/bentonite
		Riser Pipe Type:	Schedule 40 PVC
		Riser Pipe ID:	2 inch
		Borehole Diameter:	8 inch
Top of Seal:	46.0		
Top of Filter Pack:	48.0	Type of Seal:	3/8" bentonite chips
Top of Screen:	50.5		
		Screen Type:	Schedule 40 PVC
		Screen ID:	2 inch
		Screen Slot Size:	0.010 inch
		Screen Length:	4.8 feet
		Filter Pack Type:	#2 silica sand
Bottom of Screen:	55.3		
End Cap:	55.7	Sump:	0.4 feet
Drilled Depth:	55.7	Fallback/Backfill:	None
Notes: Drill rig: Diedrich D50			

MONITORING WELL CONSTRUCTION DETAIL			WELL ID
CTS of Asheville, Inc. Superfund Site			MW-22A
Wood Project 6252-16-2012.06			
Date of Installation: 12/1/17	Depth to Water: 21.61 feet bgs (12/5/17)	Completed By: Rodney Clark, LG	
Drilling Method: 4.25" ID auger		Measuring Point (MP)	
Contractor: Geologic Exploration	Northing: not surveyed	Type: ground surface	
Driller: Jacob Messick (NC #4252)	Easting: not surveyed	Elevation (ft msl): TBD	
Item	Depth below MP (feet)	Description	
Riser Pipe:	- 0.3	 Surface Seal Type: 2' x 2' concrete	
		Backfill/Grout Type: Portland cement/bentonite	
		Riser Pipe Type: Schedule 40 PVC	
		Riser Pipe ID: 2 inch	
		Borehole Diameter: 8 inch	
Top of Seal:	60.5		
Top of Filter Pack:	63.0	Type of Seal: 3/8" bentonite chips	
Top of Screen:	65.3		
		Screen Type: Schedule 40 PVC	
		Screen ID: 2 inch	
		Screen Slot Size: 0.010 inch	
		Screen Length: 4.8 feet	
		Filter Pack Type: #2 silica sand	
Bottom of Screen:	70.1		
End Cap:	70.5	Sump: 0.4 feet	
Drilled Depth:	70.5	Fallback/Backfill: None	
Notes: Drill rig: Diedrich D50			

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-18

### 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:  
(if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 45.0 (ft.)

For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)

If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER

(i.e. auger, rotary, cable, direct push, etc.)

### FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

### 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

### 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

### 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	40.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

### 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
40.0 ft.	45.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

### 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	35.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

### 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
38.0 ft.	45.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

### 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	45.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

### 21. REMARKS

BENTONITE SEAL FROM 35.0 TO 38.0 FEET

### 22. Certification:

Signature of Certified Well Contractor

12/08/17

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

### 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

### SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.



# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-19A

### 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:  
(if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 65.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+ "

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

### FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

### 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

### 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

### 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	60.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

### 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
60.0 ft.	65.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

### 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	54.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

### 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
57.0 ft.	65.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

### 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	65.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

### 21. REMARKS

BENTONITE SEAL FROM 54.0 TO 57.0 FEET

### 22. Certification:

*Jacob Messick*

12/08/17

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

### 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

### SUBMITTAL INSTRUCTIONS

24a. **For All Wells:** Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. **For Injection Wells:** In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. **For Water Supply & Injection Wells:** In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/07/17 Well ID# MW-20

## 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

## 5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 50.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

## FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

## 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

## 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

## 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	45.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

## 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
45.0 ft.	50.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

## 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	40.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

## 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
43.0 ft.	50.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

## 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	50.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

## 21. REMARKS

BENTONITE SEAL FROM 40.0 TO 43.0 FEET

## 22. Certification:

Signature of Certified Well Contractor

12/08/17

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

## 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

## SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/07/17 Well ID# MW-20A

### 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

### 5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 65.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

### FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

### 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

### 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

### 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	60.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

### 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
60.0 ft.	65.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

### 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	55.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

### 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
58.0 ft.	65.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

### 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	65.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

### 21. REMARKS

BENTONITE SEAL FROM 55.0 TO 58.0 FEET

### 22. Certification:

Jacob Messick

12/08/17

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

### 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

### SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-21

## 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

## 5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 45.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

## FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY

## 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

## 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

## 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	40.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

## 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
40.0 ft.	45.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

## 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	35.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

## 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
38.0 ft.	45.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

## 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	45.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

## 21. REMARKS

BENTONITE SEAL FROM 35.0 TO 38.0 FEET

## 22. Certification:

Signature of Certified Well Contractor: Jacob Messick Date: 12/08/17

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

## 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

## SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

<b>Water Supply Well:</b>	
<input type="checkbox"/> Agricultural	<input type="checkbox"/> Municipal/Public
<input type="checkbox"/> Geothermal (Heating/Cooling Supply)	<input type="checkbox"/> Residential Water Supply (single)
<input type="checkbox"/> Industrial/Commercial	<input type="checkbox"/> Residential Water Supply (shared)
<input type="checkbox"/> Irrigation	
<b>Non-Water Supply Well:</b>	
<input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Recovery	
<b>Injection Well:</b>	
<input type="checkbox"/> Aquifer Recharge	<input type="checkbox"/> Groundwater Remediation
<input type="checkbox"/> Aquifer Storage and Recovery	<input type="checkbox"/> Salinity Barrier
<input type="checkbox"/> Aquifer Test	<input type="checkbox"/> Stormwater Drainage
<input type="checkbox"/> Experimental Technology	<input type="checkbox"/> Subsidence Control
<input type="checkbox"/> Geothermal (Closed Loop)	<input type="checkbox"/> Tracer
<input type="checkbox"/> Geothermal (Heating/Cooling Return)	<input type="checkbox"/> Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-21A

## 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:  
(if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 60.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

## FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

## 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

## 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

## 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	55.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

## 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
55.0 ft.	60.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

## 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	50.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

## 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
53.0 ft.	60.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

## 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	60.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

## 21. REMARKS

BENTONITE SEAL FROM 50.0 TO 53.0 FEET

## 22. Certification:

Signature of Certified Well Contractor: Jacob Messick Date: 12/08/17

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

## 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

## SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-22

### 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:  
(if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 55.0 (ft.)  
For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER

(i.e. auger, rotary, cable, direct push, etc.)

### FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

### 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

### 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

### 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	50.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

### 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
50.0 ft.	55.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

### 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	45.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

### 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
48.0 ft.	55.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

### 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	55.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

### 21. REMARKS

BENTONITE SEAL FROM 45.0 TO 48.0 FEET

### 22. Certification

Jacob Messick

12/08/17

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

### 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

### SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed

# WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

## 1. Well Contractor Information:

JACOB MESSICK

Well Contractor Name

A - 4252

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION, INC

Company Name

## 2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

## 3. Well Use (check well use):

### Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public  
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)  
☐ Industrial/Commercial ☐ Residential Water Supply (shared)  
☐ Irrigation

### Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

### Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation  
☐ Aquifer Storage and Recovery ☐ Salinity Barrier  
☐ Aquifer Test ☐ Stormwater Drainage  
☐ Experimental Technology ☐ Subsidence Control  
☐ Geothermal (Closed Loop) ☐ Tracer  
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 12/05/17 Well ID# MW-22A

### 5a. Well Location:

CTS FACILITY

Facility/Owner Name

Facility ID# (if applicable)

235 MILLS GAP ROAD ASHEVILLE 28803

Physical Address, City, and Zip

BUNCOMBE

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:  
(if well field, one lat/long is sufficient)

35° 29' 36.69" N 82° 30' 34.46" W

6. Is (are) the well(s): ☒ Permanent or ☐ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 70.0 (ft.)  
For multiple wells list all depths if different (example: 3@200' and 2@100')

10. Static water level below top of casing: 20.0 (ft.)  
If water level is above casing, use "+"

11. Borehole diameter: 8.0 (in.)

12. Well construction method: AUGER  
(i.e. auger, rotary, cable, direct push, etc.)

### FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY

### 14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

### 15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

### 16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
0.0 ft.	65.0 ft.	2.0 in.	SCH 40	PVC
ft.	ft.	in.		

### 17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
65.0 ft.	70.0 ft.	2.0 in.	.010	SCH 40	PVC
ft.	ft.	in.			

### 18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
0.0 ft.	60.0 ft.	PORTLAND BENTONITE	SLURRY
ft.	ft.		
ft.	ft.		

### 19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
63.0 ft.	70.0 ft.	20-40	FINE SILICA SAND
ft.	ft.		

### 20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	35.0 ft.	RED/TAN SILTY CLAY
35.0 ft.	70.0 ft.	BROWN/TAN SILT
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

### 21. REMARKS

BENTONITE SEAL FROM 60.0 TO 63.0 FEET

### 22. Certification:

*Jacob Messick*

12/08/17

Signature of Certified Well Contractor

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

### 23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

### SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following

Division of Water Quality, Information Processing Unit,  
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,  
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

**APPENDIX C**  
**GROUNDWATER ANALYTICAL REPORTS**



January 10, 2018

Susan Avritt  
Amec Foster Wheeler  
1308 Patton Avenue  
Asheville, NC 28806

RE: Project: ISCO Pilot Study 6252-16-2012-Revised Report  
Pace Project No.: 92368500

Dear Susan Avritt:

Enclosed are the analytical results for sample(s) received by the laboratory on December 29, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
taylor.ezell@pacelabs.com  
(704)875-9092  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

---

### Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078

Louisiana/NELAP Certification # LA170028

North Carolina Drinking Water Certification #: 37706

North Carolina Field Services Certification #: 5342

North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627

Kentucky UST Certification #: 84

Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92368500001	MW-7A	Water	12/27/17 16:45	12/29/17 12:40
92368500002	MW-7	Water	12/28/17 10:00	12/29/17 12:40
92368500003	MW-19	Water	12/28/17 10:50	12/29/17 12:40
92368500004	MW-19A	Water	12/28/17 12:00	12/29/17 12:40
92368500005	MW-22	Water	12/28/17 13:50	12/29/17 12:40
92368500006	MW-22A	Water	12/28/17 14:45	12/29/17 12:40
92368500007	MW-21A	Water	12/28/17 15:45	12/29/17 12:40
92368500008	MW-21	Water	12/28/17 16:18	12/29/17 12:40
92368500009	MW-20A	Water	12/29/17 10:03	12/29/17 12:40
92368500010	MW-20	Water	12/29/17 11:12	12/29/17 12:40
92368500011	FD-13	Water	12/27/17 00:00	12/29/17 12:40
92368500012	TB-11	Water	12/27/17 00:00	12/29/17 12:40

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92368500001	MW-7A	EPA 8260	GAW	7	PASI-C
92368500002	MW-7	EPA 8260	GAW	7	PASI-C
92368500003	MW-19	EPA 8260	GAW	7	PASI-C
92368500004	MW-19A	EPA 8260	GAW	7	PASI-C
92368500005	MW-22	EPA 8260	GAW	7	PASI-C
92368500006	MW-22A	EPA 8260	GAW	7	PASI-C
92368500007	MW-21A	EPA 8260	GAW	7	PASI-C
92368500008	MW-21	EPA 8260	GAW	7	PASI-C
92368500009	MW-20A	EPA 8260	GAW	7	PASI-C
92368500010	MW-20	EPA 8260	GAW	7	PASI-C
92368500011	FD-13	EPA 8260	GAW	7	PASI-C
92368500012	TB-11	EPA 8260	GAW	7	PASI-C

## REPORT OF LABORATORY ANALYSIS

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## SUMMARY OF DETECTION

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92368500001</b>	<b>MW-7A</b>					
EPA 8260	Trichloroethene	25000	ug/L	250	01/04/18 12:10	
<b>92368500002</b>	<b>MW-7</b>					
EPA 8260	Trichloroethene	55.9	ug/L	1.0	01/04/18 11:18	
<b>92368500003</b>	<b>MW-19</b>					
EPA 8260	Trichloroethene	2770	ug/L	40.0	01/04/18 12:27	
<b>92368500004</b>	<b>MW-19A</b>					
EPA 8260	Trichloroethene	15800	ug/L	125	01/04/18 12:44	
<b>92368500005</b>	<b>MW-22</b>					
EPA 8260	Trichloroethene	28800	ug/L	250	01/04/18 13:19	
<b>92368500006</b>	<b>MW-22A</b>					
EPA 8260	Trichloroethene	13200	ug/L	100	01/04/18 13:37	
<b>92368500007</b>	<b>MW-21A</b>					
EPA 8260	Trichloroethene	19300	ug/L	125	01/04/18 14:11	M1
<b>92368500008</b>	<b>MW-21</b>					
EPA 8260	Trichloroethene	33100	ug/L	200	01/04/18 14:45	
<b>92368500009</b>	<b>MW-20A</b>					
EPA 8260	Trichloroethene	18800	ug/L	100	01/04/18 15:20	
<b>92368500010</b>	<b>MW-20</b>					
EPA 8260	Trichloroethene	36600	ug/L	400	01/04/18 16:12	
<b>92368500011</b>	<b>FD-13</b>					
EPA 8260	Trichloroethene	16700	ug/L	125	01/04/18 16:29	

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: ISCO Pilot Study 6252-16-2012-Revised Report  
Pace Project No.: 92368500

---

**Method:** EPA 8260  
**Description:** 8260 MSV Low Level  
**Client:** Amec Foster Wheeler, Asheville  
**Date:** January 10, 2018

### General Information:

12 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 393112

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92368500007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2180043)
  - Trichloroethene
- MSD (Lab ID: 2180044)
  - Vinyl chloride

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-7A		Lab ID: 92368500001		Collected: 12/27/17 16:45		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	250	47.5	250		01/04/18 12:10	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		01/04/18 12:10	156-60-5	
Trichloroethene	<b>25000</b>	ug/L	250	118	250		01/04/18 12:10	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		01/04/18 12:10	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		250		01/04/18 12:10	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	70-130		250		01/04/18 12:10	17060-07-0	
Toluene-d8 (S)	107	%	70-130		250		01/04/18 12:10	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-7		Lab ID: 92368500002		Collected: 12/28/17 10:00		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		01/04/18 11:18	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		01/04/18 11:18	156-60-5	
Trichloroethene	<b>55.9</b>	ug/L	1.0	0.47	1		01/04/18 11:18	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		01/04/18 11:18	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		1		01/04/18 11:18	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	70-130		1		01/04/18 11:18	17060-07-0	
Toluene-d8 (S)	109	%	70-130		1		01/04/18 11:18	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-19		Lab ID: 92368500003		Collected: 12/28/17 10:50		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	40.0	7.6	40		01/04/18 12:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	40.0	19.6	40		01/04/18 12:27	156-60-5	
Trichloroethene	<b>2770</b>	ug/L	40.0	18.8	40		01/04/18 12:27	79-01-6	
Vinyl chloride	ND	ug/L	40.0	24.8	40		01/04/18 12:27	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		40		01/04/18 12:27	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		40		01/04/18 12:27	17060-07-0	
Toluene-d8 (S)	110	%	70-130		40		01/04/18 12:27	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-19A		Lab ID: 92368500004		Collected: 12/28/17 12:00		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	125	23.8	125		01/04/18 12:44	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	125	61.2	125		01/04/18 12:44	156-60-5	
Trichloroethene	<b>15800</b>	ug/L	125	58.8	125		01/04/18 12:44	79-01-6	
Vinyl chloride	ND	ug/L	125	77.5	125		01/04/18 12:44	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		125		01/04/18 12:44	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	70-130		125		01/04/18 12:44	17060-07-0	
Toluene-d8 (S)	110	%	70-130		125		01/04/18 12:44	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-22		Lab ID: 92368500005		Collected: 12/28/17 13:50		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	250	47.5	250		01/04/18 13:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		01/04/18 13:19	156-60-5	
Trichloroethene	<b>28800</b>	ug/L	250	118	250		01/04/18 13:19	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		01/04/18 13:19	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	98	%	70-130		250		01/04/18 13:19	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		250		01/04/18 13:19	17060-07-0	
Toluene-d8 (S)	108	%	70-130		250		01/04/18 13:19	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-22A		Lab ID: 92368500006		Collected: 12/28/17 14:45		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		01/04/18 13:37	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		01/04/18 13:37	156-60-5	
Trichloroethene	<b>13200</b>	ug/L	100	47.0	100		01/04/18 13:37	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		01/04/18 13:37	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		01/04/18 13:37	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		100		01/04/18 13:37	17060-07-0	
Toluene-d8 (S)	108	%	70-130		100		01/04/18 13:37	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-21A		Lab ID: 92368500007		Collected: 12/28/17 15:45		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	125	23.8	125		01/04/18 14:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	125	61.2	125		01/04/18 14:11	156-60-5	
Trichloroethene	<b>19300</b>	ug/L	125	58.8	125		01/04/18 14:11	79-01-6	M1
Vinyl chloride	ND	ug/L	125	77.5	125		01/04/18 14:11	75-01-4	M1
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		125		01/04/18 14:11	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		125		01/04/18 14:11	17060-07-0	
Toluene-d8 (S)	106	%	70-130		125		01/04/18 14:11	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-21		Lab ID: 92368500008		Collected: 12/28/17 16:18		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	200	38.0	200		01/04/18 14:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		01/04/18 14:45	156-60-5	
Trichloroethene	<b>33100</b>	ug/L	200	94.0	200		01/04/18 14:45	79-01-6	
Vinyl chloride	ND	ug/L	200	124	200		01/04/18 14:45	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	98	%	70-130		200		01/04/18 14:45	460-00-4	
1,2-Dichloroethane-d4 (S)	104	%	70-130		200		01/04/18 14:45	17060-07-0	
Toluene-d8 (S)	110	%	70-130		200		01/04/18 14:45	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-20A		Lab ID: 92368500009		Collected: 12/29/17 10:03		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		01/04/18 15:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		01/04/18 15:20	156-60-5	
Trichloroethene	<b>18800</b>	ug/L	100	47.0	100		01/04/18 15:20	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		01/04/18 15:20	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		01/04/18 15:20	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		100		01/04/18 15:20	17060-07-0	
Toluene-d8 (S)	109	%	70-130		100		01/04/18 15:20	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: MW-20		Lab ID: 92368500010		Collected: 12/29/17 11:12		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	400	76.0	400		01/04/18 16:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	400	196	400		01/04/18 16:12	156-60-5	
Trichloroethene	<b>36600</b>	ug/L	400	188	400		01/04/18 16:12	79-01-6	
Vinyl chloride	ND	ug/L	400	248	400		01/04/18 16:12	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		400		01/04/18 16:12	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		400		01/04/18 16:12	17060-07-0	
Toluene-d8 (S)	112	%	70-130		400		01/04/18 16:12	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: FD-13		Lab ID: 92368500011		Collected: 12/27/17 00:00		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	125	23.8	125		01/04/18 16:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	125	61.2	125		01/04/18 16:29	156-60-5	
Trichloroethene	<b>16700</b>	ug/L	125	58.8	125		01/04/18 16:29	79-01-6	
Vinyl chloride	ND	ug/L	125	77.5	125		01/04/18 16:29	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	100	%	70-130		125		01/04/18 16:29	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		125		01/04/18 16:29	17060-07-0	
Toluene-d8 (S)	111	%	70-130		125		01/04/18 16:29	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Sample: TB-11		Lab ID: 92368500012		Collected: 12/27/17 00:00		Received: 12/29/17 12:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		01/04/18 10:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		01/04/18 10:26	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		01/04/18 10:26	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		01/04/18 10:26	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		1		01/04/18 10:26	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	70-130		1		01/04/18 10:26	17060-07-0	
Toluene-d8 (S)	111	%	70-130		1		01/04/18 10:26	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

QC Batch:	393112	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92368500001, 92368500002, 92368500003, 92368500004, 92368500005, 92368500006, 92368500007, 92368500008, 92368500009, 92368500010, 92368500011, 92368500012		

METHOD BLANK: 2180041

Matrix: Water

Associated Lab Samples: 92368500001, 92368500002, 92368500003, 92368500004, 92368500005, 92368500006, 92368500007, 92368500008, 92368500009, 92368500010, 92368500011, 92368500012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	01/04/18 10:09	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	01/04/18 10:09	
Trichloroethene	ug/L	ND	1.0	0.47	01/04/18 10:09	
Vinyl chloride	ug/L	ND	1.0	0.62	01/04/18 10:09	
1,2-Dichloroethane-d4 (S)	%	93	70-130		01/04/18 10:09	
4-Bromofluorobenzene (S)	%	94	70-130		01/04/18 10:09	
Toluene-d8 (S)	%	108	70-130		01/04/18 10:09	

LABORATORY CONTROL SAMPLE: 2180042

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	53.5	107	70-131	
trans-1,2-Dichloroethene	ug/L	50	52.7	105	70-130	
Trichloroethene	ug/L	50	54.7	109	70-130	
Vinyl chloride	ug/L	50	55.6	111	50-150	
1,2-Dichloroethane-d4 (S)	%			97	70-130	
4-Bromofluorobenzene (S)	%			97	70-130	
Toluene-d8 (S)	%			96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2180043 2180044

Parameter	Units	92368500007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	5000	5000	5810	6180	116	124	70-130	6	30	
trans-1,2-Dichloroethene	ug/L	ND	5000	5000	5870	6270	117	125	70-130	6	30	
Trichloroethene	ug/L	19300	5000	5000	27100	25700	158	129	69-151	5	30	M1
Vinyl chloride	ug/L	ND	5000	5000	6480	7030	130	141	70-130	8	30	M1
1,2-Dichloroethane-d4 (S)	%						98	102	70-130			
4-Bromofluorobenzene (S)	%						99	98	70-130			
Toluene-d8 (S)	%						100	103	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: ISCO Pilot Study 6252-16-2012-Revised Report  
Pace Project No.: 92368500

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: ISCO Pilot Study 6252-16-2012-Revised Report

Pace Project No.: 92368500

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92368500001	MW-7A	EPA 8260	393112		
92368500002	MW-7	EPA 8260	393112		
92368500003	MW-19	EPA 8260	393112		
92368500004	MW-19A	EPA 8260	393112		
92368500005	MW-22	EPA 8260	393112		
92368500006	MW-22A	EPA 8260	393112		
92368500007	MW-21A	EPA 8260	393112		
92368500008	MW-21	EPA 8260	393112		
92368500009	MW-20A	EPA 8260	393112		
92368500010	MW-20	EPA 8260	393112		
92368500011	FD-13	EPA 8260	393112		
92368500012	TB-11	EPA 8260	393112		

## REPORT OF LABORATORY ANALYSIS

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	Document Name: <b>Sample Condition Upon Receipt(SCUR)</b>	Document Revised: July 25, 2017 Page 1 of 2
	Document No.: <b>F-CAR-CS-033-Rev.03</b>	Issuing Authority: Pace Quality Office

**Laboratory receiving samples:**

Asheville ☒ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐

Sample Condition  
Upon Receipt

Client Name:

**AMEC Foster**

Project #

**WO#: 92368500**



**92368500**

Courier:

☐ Commercial

☐ Fed Ex

☐ UPS

☐ USPS

☐ Other: \_\_\_\_\_

☒ Client

☐ Pace

Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Date/Initials Person Examining Contents: **12/29/17** *[Signature]*

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other

Biological Tissue Frozen?

☐ Yes

☐ No

☒ N/A

Thermometer:

☐ IR Gun ID:

**1027**

Type of Ice:

☒ Wet

☐ Blue

☐ None

Correction Factor:

Cooler Temp Corrected (°C):

**0.4**

Temp should be above freezing to 6°C

☒ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (Internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Dissolved analysis: Samples Field Filtered?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <b>W/L</b>			
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Trip Blank Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Trip Blank Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Comments/Sample Discrepancy: \_\_\_\_\_


Project Manager SCURF Review: \_\_\_\_\_

Date: \_\_\_\_\_

Project Manager SRF Review: \_\_\_\_\_

Date: \_\_\_\_\_

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

	Document Name:	Document Revised: July 25, 2017
	Sample Condition Upon Receipt(SCUR)	Page 2 of 2
	Document No.: F-CAR-CS-033-Rev.03	Issuing Authority: Pace Quality Office

\*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

\*\*Bottom half of box is to list number of bottles

Project #

**WO# : 92368500**

PM: PTE

Due Date: 01/08/18

CLIENT: 92-AMEC A

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP3Z-250 mL Plastic ZN Acetate & NaOH (>9)	BP3C-250 mL Plastic NaOH (pH > 12) (Cl-)	WGJU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	Cubitainer	VSGU-20 mL Scintillation vials (N/A)	GN	
1																3													
2																3													
3																3													
4																3													
5																3													
6																3													
7																9													
8																3													
9																3													
10																3													
11																3													
12																2													

### pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company: Amec Foster Wheeler, Asheville	Report To: <b>SUSAN RIVITT</b>	Report To: <b>SUSAN RIVITT</b>	Attention: <b>SUSAN RIVITT</b>	Company Name: <b>AMEC FOSTER WHEELER</b>	
Address: 1308 Patton Avenue	Copy To:	Copy To:		Address: 1308 Patton Ave., Asheville, NC 28801	Regulatory Agency: <b>USEPA</b>
Asheville, NC 28806				Pace Quote:	State/Location: <b>NC</b>
Email: <b>susan.rivitt@cw.com</b>	Purchase Order #:			Pace Project Manager: <b>taylor.zeel@pace.com</b>	
Phone: <b>728-252-8130</b>	Project Name: <b>Groundwater 1500 P-H Study</b>				
Requested Due Date: <b>Standard</b>	Project #: <b>6252-16-2012</b>				

ITEM #	MATRIX CODED Chloro Wtred W
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ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	
LEVEL II DATA Package		<i>[Signature]</i>	12/29/12	14:10	A. Wilson / PAU	12/29/12	12:40	4	4
TEMPERATURE TAKEN WITH A									
DOWNWARD TREND PRESENT - ALL									
*CE, CE-12 DCE, Ions-12 DCE, and VC									
TEMPERATURE TAKEN WITH A									
DOWNWARD TREND PRESENT - ALL									
TEMP IN C									
Received on									
Cooler (Y/N)									
Sealed (Y/N)									
Custody (Y/N)									
Samples Intact (Y/N)									

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	RODNEY M. BLANK + GUY L. HUTCHINSON
SIGNATURE of SAMPLER:	<i>[Signature]</i>
DATE Signed:	12/29/12



May 09, 2018

Susan Avritt  
Amec Foster Wheeler  
1308 Patton Avenue  
Asheville, NC 28806

RE: Project: CTS of Asheville 6252-16-2012  
Pace Project No.: 92383412

Dear Susan Avritt:

Enclosed are the analytical results for sample(s) received by the laboratory on May 03, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
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(704)875-9092  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

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### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078

Louisiana/NELAP Certification # LA170028

North Carolina Drinking Water Certification #: 37706

North Carolina Field Services Certification #: 5342

North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627

Kentucky UST Certification #: 84

Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92383412001	MW-19A	Water	05/03/18 10:40	05/03/18 15:19
92383412002	MW-7	Water	05/03/18 12:00	05/03/18 15:19
92383412003	MW-19	Water	05/03/18 09:35	05/03/18 15:19
92383412004	MW-20	Water	05/02/18 16:10	05/03/18 15:19
92383412005	MW-20A	Water	05/02/18 15:20	05/03/18 15:19
92383412006	MW-22A	Water	05/02/18 14:20	05/03/18 15:19
92383412007	MW-22	Water	05/02/18 13:22	05/03/18 15:19
92383412008	MW-21A	Water	05/02/18 12:15	05/03/18 15:19
92383412009	MW-21	Water	05/02/18 11:30	05/03/18 15:19
92383412010	MW-7A	Water	05/03/18 14:28	05/03/18 15:19
92383412011	FD-21	Water	05/02/18 00:00	05/03/18 15:19
92383412012	TB-18	Water	05/02/18 00:00	05/03/18 15:19

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92383412001	MW-19A	EPA 8260	GAW	7	PASI-C
92383412002	MW-7	EPA 8260	GAW	7	PASI-C
92383412003	MW-19	EPA 8260	GAW	7	PASI-C
92383412004	MW-20	EPA 8260	GAW	7	PASI-C
92383412005	MW-20A	EPA 8260	GAW	7	PASI-C
92383412006	MW-22A	EPA 8260	GAW	7	PASI-C
92383412007	MW-22	EPA 8260	GAW	7	PASI-C
92383412008	MW-21A	EPA 8260	GAW	7	PASI-C
92383412009	MW-21	EPA 8260	GAW	7	PASI-C
92383412010	MW-7A	EPA 8260	GAW	7	PASI-C
92383412011	FD-21	EPA 8260	GAW	7	PASI-C
92383412012	TB-18	EPA 8260	GAW	7	PASI-C

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## SUMMARY OF DETECTION

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92383412001</b>	<b>MW-19A</b>					
EPA 8260	cis-1,2-Dichloroethene	2610	ug/L	100	05/08/18 20:07	
EPA 8260	Trichloroethene	10600	ug/L	100	05/08/18 20:07	
<b>92383412002</b>	<b>MW-7</b>					
EPA 8260	Trichloroethene	1250	ug/L	12.5	05/08/18 20:24	
<b>92383412003</b>	<b>MW-19</b>					
EPA 8260	Trichloroethene	3730	ug/L	50.0	05/08/18 20:41	
<b>92383412004</b>	<b>MW-20</b>					
EPA 8260	Trichloroethene	29300	ug/L	250	05/08/18 20:58	M1
<b>92383412005</b>	<b>MW-20A</b>					
EPA 8260	Trichloroethene	13300	ug/L	100	05/08/18 21:15	
<b>92383412006</b>	<b>MW-22A</b>					
EPA 8260	cis-1,2-Dichloroethene	550	ug/L	100	05/08/18 21:32	
EPA 8260	Trichloroethene	13900	ug/L	100	05/08/18 21:32	
<b>92383412007</b>	<b>MW-22</b>					
EPA 8260	Trichloroethene	21500	ug/L	250	05/08/18 21:49	
<b>92383412008</b>	<b>MW-21A</b>					
EPA 8260	Trichloroethene	15800	ug/L	100	05/08/18 22:06	
<b>92383412009</b>	<b>MW-21</b>					
EPA 8260	cis-1,2-Dichloroethene	530	ug/L	250	05/08/18 22:22	
EPA 8260	Trichloroethene	28800	ug/L	250	05/08/18 22:22	
<b>92383412010</b>	<b>MW-7A</b>					
EPA 8260	Trichloroethene	20300	ug/L	200	05/08/18 22:39	
<b>92383412011</b>	<b>FD-21</b>					
EPA 8260	cis-1,2-Dichloroethene	515	ug/L	100	05/08/18 22:56	
EPA 8260	Trichloroethene	12300	ug/L	100	05/08/18 22:56	

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## PROJECT NARRATIVE

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

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**Method:** EPA 8260

**Description:** 8260 MSV Low Level

**Client:** Amec Foster Wheeler, Asheville

**Date:** May 09, 2018

**General Information:**

12 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Internal Standards:**

All internal standards were within QC limits with any exceptions noted below.

**Surrogates:**

All surrogates were within QC limits with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 409840

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92383412004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2273735)
  - Trichloroethene
- MSD (Lab ID: 2273736)
  - Trichloroethene

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-19A		Lab ID: 92383412001		Collected: 05/03/18 10:40		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	<b>2610</b>	ug/L	100	19.0	100		05/08/18 20:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		05/08/18 20:07	156-60-5	
Trichloroethene	<b>10600</b>	ug/L	100	47.0	100		05/08/18 20:07	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		05/08/18 20:07	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	105	%	70-130		100		05/08/18 20:07	460-00-4	
1,2-Dichloroethane-d4 (S)	81	%	70-130		100		05/08/18 20:07	17060-07-0	
Toluene-d8 (S)	120	%	70-130		100		05/08/18 20:07	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-7		Lab ID: 92383412002		Collected: 05/03/18 12:00		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	12.5	2.4	12.5		05/08/18 20:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	12.5	6.1	12.5		05/08/18 20:24	156-60-5	
Trichloroethene	<b>1250</b>	ug/L	12.5	5.9	12.5		05/08/18 20:24	79-01-6	
Vinyl chloride	ND	ug/L	12.5	7.8	12.5		05/08/18 20:24	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		12.5		05/08/18 20:24	460-00-4	
1,2-Dichloroethane-d4 (S)	77	%	70-130		12.5		05/08/18 20:24	17060-07-0	
Toluene-d8 (S)	121	%	70-130		12.5		05/08/18 20:24	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-19		Lab ID: 92383412003		Collected: 05/03/18 09:35		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	50.0	9.5	50		05/08/18 20:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	50.0	24.5	50		05/08/18 20:41	156-60-5	
Trichloroethene	<b>3730</b>	ug/L	50.0	23.5	50		05/08/18 20:41	79-01-6	
Vinyl chloride	ND	ug/L	50.0	31.0	50		05/08/18 20:41	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		50		05/08/18 20:41	460-00-4	
1,2-Dichloroethane-d4 (S)	83	%	70-130		50		05/08/18 20:41	17060-07-0	
Toluene-d8 (S)	118	%	70-130		50		05/08/18 20:41	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-20		Lab ID: 92383412004		Collected: 05/02/18 16:10		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	250	47.5	250		05/08/18 20:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		05/08/18 20:58	156-60-5	
Trichloroethene	<b>29300</b>	ug/L	250	118	250		05/08/18 20:58	79-01-6	M1
Vinyl chloride	ND	ug/L	250	155	250		05/08/18 20:58	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	100	%	70-130		250		05/08/18 20:58	460-00-4	
1,2-Dichloroethane-d4 (S)	77	%	70-130		250		05/08/18 20:58	17060-07-0	
Toluene-d8 (S)	122	%	70-130		250		05/08/18 20:58	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-20A		Lab ID: 92383412005		Collected: 05/02/18 15:20		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		05/08/18 21:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		05/08/18 21:15	156-60-5	
Trichloroethene	<b>13300</b>	ug/L	100	47.0	100		05/08/18 21:15	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		05/08/18 21:15	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		100		05/08/18 21:15	460-00-4	
1,2-Dichloroethane-d4 (S)	80	%	70-130		100		05/08/18 21:15	17060-07-0	
Toluene-d8 (S)	121	%	70-130		100		05/08/18 21:15	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-22A		Lab ID: 92383412006		Collected: 05/02/18 14:20		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	550	ug/L	100	19.0	100		05/08/18 21:32	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		05/08/18 21:32	156-60-5	
Trichloroethene	13900	ug/L	100	47.0	100		05/08/18 21:32	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		05/08/18 21:32	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	100	%	70-130		100		05/08/18 21:32	460-00-4	
1,2-Dichloroethane-d4 (S)	78	%	70-130		100		05/08/18 21:32	17060-07-0	
Toluene-d8 (S)	121	%	70-130		100		05/08/18 21:32	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-22		Lab ID: 92383412007		Collected: 05/02/18 13:22		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	250	47.5	250		05/08/18 21:49	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		05/08/18 21:49	156-60-5	
Trichloroethene	<b>21500</b>	ug/L	250	118	250		05/08/18 21:49	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		05/08/18 21:49	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		250		05/08/18 21:49	460-00-4	
1,2-Dichloroethane-d4 (S)	75	%	70-130		250		05/08/18 21:49	17060-07-0	
Toluene-d8 (S)	122	%	70-130		250		05/08/18 21:49	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-21A		Lab ID: 92383412008		Collected: 05/02/18 12:15		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		05/08/18 22:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		05/08/18 22:06	156-60-5	
Trichloroethene	<b>15800</b>	ug/L	100	47.0	100		05/08/18 22:06	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		05/08/18 22:06	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		100		05/08/18 22:06	460-00-4	
1,2-Dichloroethane-d4 (S)	79	%	70-130		100		05/08/18 22:06	17060-07-0	
Toluene-d8 (S)	122	%	70-130		100		05/08/18 22:06	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-21		Lab ID: 92383412009		Collected: 05/02/18 11:30		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	<b>530</b>	ug/L	250	47.5	250		05/08/18 22:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		05/08/18 22:22	156-60-5	
Trichloroethene	<b>28800</b>	ug/L	250	118	250		05/08/18 22:22	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		05/08/18 22:22	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		250		05/08/18 22:22	460-00-4	
1,2-Dichloroethane-d4 (S)	73	%	70-130		250		05/08/18 22:22	17060-07-0	
Toluene-d8 (S)	128	%	70-130		250		05/08/18 22:22	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: MW-7A		Lab ID: 92383412010		Collected: 05/03/18 14:28		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	200	38.0	200		05/08/18 22:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		05/08/18 22:39	156-60-5	
Trichloroethene	<b>20300</b>	ug/L	200	94.0	200		05/08/18 22:39	79-01-6	
Vinyl chloride	ND	ug/L	200	124	200		05/08/18 22:39	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		200		05/08/18 22:39	460-00-4	
1,2-Dichloroethane-d4 (S)	77	%	70-130		200		05/08/18 22:39	17060-07-0	
Toluene-d8 (S)	123	%	70-130		200		05/08/18 22:39	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: FD-21		Lab ID: 92383412011		Collected: 05/02/18 00:00		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	515	ug/L	100	19.0	100		05/08/18 22:56	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		05/08/18 22:56	156-60-5	
Trichloroethene	12300	ug/L	100	47.0	100		05/08/18 22:56	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		05/08/18 22:56	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		05/08/18 22:56	460-00-4	
1,2-Dichloroethane-d4 (S)	79	%	70-130		100		05/08/18 22:56	17060-07-0	
Toluene-d8 (S)	121	%	70-130		100		05/08/18 22:56	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Sample: TB-18		Lab ID: 92383412012		Collected: 05/02/18 00:00		Received: 05/03/18 15:19		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		05/07/18 19:32	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		05/07/18 19:32	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		05/07/18 19:32	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		05/07/18 19:32	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	95	%	70-130		1		05/07/18 19:32	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	70-130		1		05/07/18 19:32	17060-07-0	
Toluene-d8 (S)	102	%	70-130		1		05/07/18 19:32	2037-26-5	

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: CTS of Asheville 6252-16-2012  
Pace Project No.: 92383412

QC Batch:	409667	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92383412012		

METHOD BLANK: 2272725 Matrix: Water  
Associated Lab Samples: 92383412012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	05/07/18 18:11	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	05/07/18 18:11	
Trichloroethene	ug/L	ND	1.0	0.47	05/07/18 18:11	
Vinyl chloride	ug/L	ND	1.0	0.62	05/07/18 18:11	
1,2-Dichloroethane-d4 (S)	%	94	70-130		05/07/18 18:11	
4-Bromofluorobenzene (S)	%	94	70-130		05/07/18 18:11	
Toluene-d8 (S)	%	102	70-130		05/07/18 18:11	

LABORATORY CONTROL SAMPLE: 2272726

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	49.4	99	74-124	
trans-1,2-Dichloroethene	ug/L	50	49.1	98	71-127	
Trichloroethene	ug/L	50	52.7	105	78-122	
Vinyl chloride	ug/L	50	48.9	98	50-150	
1,2-Dichloroethane-d4 (S)	%			91	70-130	
4-Bromofluorobenzene (S)	%			96	70-130	
Toluene-d8 (S)	%			99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2272727 2272728

Parameter	Units	92383119001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	20	20	21.7	22.5	108	113	70-130	4	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	21.4	23.2	107	116	70-130	8	30	
Trichloroethene	ug/L	ND	20	20	23.1	25.2	116	126	69-151	9	30	
Vinyl chloride	ug/L	ND	20	20	21.0	22.8	105	114	70-130	8	30	
1,2-Dichloroethane-d4 (S)	%						92	95	70-130			
4-Bromofluorobenzene (S)	%						96	97	70-130			
Toluene-d8 (S)	%						100	103	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

QC Batch:	409840	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92383412001, 92383412002, 92383412003, 92383412004, 92383412005, 92383412006, 92383412007, 92383412008, 92383412009, 92383412010, 92383412011		

METHOD BLANK: 2273733

Matrix: Water

Associated Lab Samples: 92383412001, 92383412002, 92383412003, 92383412004, 92383412005, 92383412006, 92383412007, 92383412008, 92383412009, 92383412010, 92383412011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	05/08/18 18:08	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	05/08/18 18:08	
Trichloroethene	ug/L	ND	1.0	0.47	05/08/18 18:08	
Vinyl chloride	ug/L	ND	1.0	0.62	05/08/18 18:08	
1,2-Dichloroethane-d4 (S)	%	77	70-130		05/08/18 18:08	
4-Bromofluorobenzene (S)	%	104	70-130		05/08/18 18:08	
Toluene-d8 (S)	%	118	70-130		05/08/18 18:08	

LABORATORY CONTROL SAMPLE: 2273734

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	49.2	98	74-124	
trans-1,2-Dichloroethene	ug/L	50	51.4	103	71-127	
Trichloroethene	ug/L	50	55.6	111	78-122	
Vinyl chloride	ug/L	50	45.5	91	50-150	
1,2-Dichloroethane-d4 (S)	%			106	70-130	
4-Bromofluorobenzene (S)	%			101	70-130	
Toluene-d8 (S)	%			91	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2273735 2273736

Parameter	Units	92383412004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	5000	5000	5300	5380	106	108	70-130	2	30	
trans-1,2-Dichloroethene	ug/L	ND	5000	5000	5110	5570	102	111	70-130	9	30	
Trichloroethene	ug/L	29300	5000	5000	39900	40100	212	215	69-151	0	30	M1
Vinyl chloride	ug/L	ND	5000	5000	5430	5520	109	110	70-130	2	30	
1,2-Dichloroethane-d4 (S)	%						95	100	70-130			
4-Bromofluorobenzene (S)	%						100	101	70-130			
Toluene-d8 (S)	%						102	98	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALIFIERS

Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: CTS of Asheville 6252-16-2012

Pace Project No.: 92383412

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92383412001	MW-19A	EPA 8260	409840		
92383412002	MW-7	EPA 8260	409840		
92383412003	MW-19	EPA 8260	409840		
92383412004	MW-20	EPA 8260	409840		
92383412005	MW-20A	EPA 8260	409840		
92383412006	MW-22A	EPA 8260	409840		
92383412007	MW-22	EPA 8260	409840		
92383412008	MW-21A	EPA 8260	409840		
92383412009	MW-21	EPA 8260	409840		
92383412010	MW-7A	EPA 8260	409840		
92383412011	FD-21	EPA 8260	409840		
92383412012	TB-18	EPA 8260	409667		

## REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

# Laboratory receiving samples:

Asheville ☒ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐

## Sample Condition Upon Receipt

Client Name:

Amec

Project

WO# : 92383412



Courier:

☐ Commercial

☐ Fed Ex

☐ Pace

☐ UPS

☐ USPS

☐ Other:

☒ Client

Custody Seal Present?

☐ Yes

☒ No

Seals Intact?

☐ Yes

☐ No

Date/Initials Person Examining Contents:

LOT 5/3/18

Packing Material:

☐ Bubble Wrap

☐ Bubble Bags

☒ None

☐ Other

Thermometer:

☐ IR Gun ID: 7051

Type of Ice:

☒ Wet

☐ Blue

☐ None

Biological Tissue Frozen?

☐ Yes

☐ No

☒ N/A

Cooler Temp (°C):

3.8

Correction Factor: Add/Subtract (°C)

0.0

Cooler Temp Corrected (°C):

3.8

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

		Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.
Dissolved analysis: Samples Field Filtered?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Includes Date/Time/ID/Analysis Matrix:	WT	
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10.
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	11.
Trip Blank Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

Samples say FD-20/chain say's FD-21

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No


Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted:

Date/Time:

Project Manager SCURF Review:




Date:

5/7

Project Manager SRF Review:

Date:

5/7

	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

\*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

\*\*Bottom half of box is to list number of bottle

Project #

**WO# : 92383412**

PM: PTE

Due Date: 05/10/18

CLIENT: 92-AMEC A

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)	
1																3													
2																3													
3																3													
4																9													
5																3													
6																3													
7																3													
8																3													
9																3													
10																3													
11																3													
12																2													

### pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.



**CHAIN-OF-CUSTODY / Analytical Request Document**  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed.

## Section A


## Section B

## Section C

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately

<b>Required Client Information:</b>		<b>Required Project Information:</b>		<b>Section C</b>		<b>Invoice Information:</b>	
Company:	Amec Foster Wheeler, Asheville	Report To:	Susan Avritt	Attention:		Page :	1 Of 1
Address:	1308 Patton Avenue	Copy To:		Company Name:			
Asheville, NC	28806			Address:			
Email:	susan.avritt@amecwf.com	Purchase Order #:		Pace Quote:			
Phone:	NONE	Fax:		Pace Project Manager:	taylor.ezell@paceilabs.com,		
Requested Due Date:		Project #:	6252-16-2012	Pace Profile #:	3900-3		
						<b>Regulatory Agency</b>	
						<b>State / Location</b>	
						NC	

[illegible]

SAMPLE NAME AND SIGNATURE			
PRINT Name of SAMPLER: Rodney M. Clark			
SIGNATURE of SAMPLER: 		DATE Signed: 5/13/18	
TEMP in C		Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)
		Samples Intact (Y/N)	

August 15, 2018

Susan Avritt  
Wood E&S  
1308 Patton Avenue  
Asheville, NC 28806

RE: Project: CTS OF ASHEVILLE  
Pace Project No.: 92395073

Dear Susan Avritt:

Enclosed are the analytical results for sample(s) received by the laboratory on August 08, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
taylor.ezell@pacelabs.com  
(704)875-9092  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

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### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078

Louisiana/NELAP Certification # LA170028

North Carolina Drinking Water Certification #: 37706

North Carolina Field Services Certification #: 5342

North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627

Kentucky UST Certification #: 84

Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92395073001	TB-20	Water	08/07/18 00:00	08/08/18 16:55
92395073002	FD-24	Water	08/07/18 00:00	08/08/18 16:55
92395073003	MW-21A	Water	08/07/18 13:05	08/08/18 16:55
92395073004	MW-21	Water	08/07/18 14:05	08/08/18 16:55
92395073005	MW-20A	Water	08/08/18 09:20	08/08/18 16:55
92395073006	MW-20	Water	08/08/18 10:10	08/08/18 16:55
92395073007	MW-19A	Water	08/08/18 11:15	08/08/18 16:55
92395073008	MW-7A	Water	08/08/18 14:15	08/08/18 16:55
92395073009	MW-19	Water	08/08/18 12:10	08/08/18 16:55
92395073010	MW-22A	Water	08/07/18 15:45	08/08/18 16:55
92395073011	MW-22	Water	08/07/18 16:30	08/08/18 16:55
92395073012	MW-7	Water	08/08/18 15:15	08/08/18 16:55

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92395073001	TB-20	EPA 8260B	CAH	7	PASI-C
92395073002	FD-24	EPA 8260B	GAW	7	PASI-C
92395073003	MW-21A	EPA 8260B	GAW	7	PASI-C
92395073004	MW-21	EPA 8260B	CAH	7	PASI-C
92395073005	MW-20A	EPA 8260B	CAH	7	PASI-C
92395073006	MW-20	EPA 8260B	CAH	7	PASI-C
92395073007	MW-19A	EPA 8260B	CAH	7	PASI-C
92395073008	MW-7A	EPA 8260B	CAH	7	PASI-C
92395073009	MW-19	EPA 8260B	CAH	7	PASI-C
92395073010	MW-22A	EPA 8260B	GAW	7	PASI-C
92395073011	MW-22	EPA 8260B	CAH	7	PASI-C
92395073012	MW-7	EPA 8260B	GAW	7	PASI-C

## REPORT OF LABORATORY ANALYSIS

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## SUMMARY OF DETECTION

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92395073002</b>	<b>FD-24</b>					
EPA 8260B	Trichloroethene	652	ug/L	5.0	08/14/18 19:06	
<b>92395073003</b>	<b>MW-21A</b>					
EPA 8260B	Trichloroethene	424	ug/L	2.5	08/15/18 11:28	
<b>92395073004</b>	<b>MW-21</b>					
EPA 8260B	cis-1,2-Dichloroethene	452	ug/L	250	08/11/18 09:34	
EPA 8260B	Trichloroethene	33900	ug/L	250	08/11/18 09:34	
<b>92395073005</b>	<b>MW-20A</b>					
EPA 8260B	Trichloroethene	17500	ug/L	100	08/11/18 06:52	
<b>92395073006</b>	<b>MW-20</b>					
EPA 8260B	Trichloroethene	33900	ug/L	250	08/11/18 09:17	
<b>92395073007</b>	<b>MW-19A</b>					
EPA 8260B	cis-1,2-Dichloroethene	3300	ug/L	100	08/11/18 07:08	
EPA 8260B	Trichloroethene	13200	ug/L	100	08/11/18 07:08	
<b>92395073008</b>	<b>MW-7A</b>					
EPA 8260B	Trichloroethene	23500	ug/L	200	08/11/18 08:45	
<b>92395073009</b>	<b>MW-19</b>					
EPA 8260B	Trichloroethene	6380	ug/L	40.0	08/11/18 05:47	
<b>92395073010</b>	<b>MW-22A</b>					
EPA 8260B	cis-1,2-Dichloroethene	206	ug/L	100	08/14/18 19:39	
EPA 8260B	Trichloroethene	18400	ug/L	100	08/14/18 19:39	
<b>92395073011</b>	<b>MW-22</b>					
EPA 8260B	cis-1,2-Dichloroethene	325	ug/L	250	08/11/18 09:01	
EPA 8260B	Trichloroethene	29600	ug/L	250	08/11/18 09:01	
<b>92395073012</b>	<b>MW-7</b>					
EPA 8260B	Trichloroethene	177	ug/L	2.0	08/15/18 13:42	

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

**Method:** EPA 8260B

**Description:** 8260 MSV Low Level

**Client:** Wood E&I - Asheville

**Date:** August 15, 2018

### General Information:

12 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 424918

S0: Surrogate recovery outside laboratory control limits.

- MS (Lab ID: 2350486)
  - 1,2-Dichloroethane-d4 (S)
- MSD (Lab ID: 2350487)
  - 1,2-Dichloroethane-d4 (S)

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 424918

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92395116013

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2350486)
  - trans-1,2-Dichloroethene

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## PROJECT NARRATIVE

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

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**Method:** EPA 8260B

**Description:** 8260 MSV Low Level

**Client:** Wood E&I - Asheville

**Date:** August 15, 2018

QC Batch: 425030

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92394805002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 2350503)
  - cis-1,2-Dichloroethene
  - trans-1,2-Dichloroethene

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: TB-20		Lab ID: 92395073001		Collected: 08/07/18 00:00		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		08/11/18 01:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		08/11/18 01:28	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		08/11/18 01:28	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		08/11/18 01:28	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	96	%	70-130		1		08/11/18 01:28	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	70-130		1		08/11/18 01:28	17060-07-0	
Toluene-d8 (S)	100	%	70-130		1		08/11/18 01:28	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: FD-24		Lab ID: 92395073002		Collected: 08/07/18 00:00		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	5.0	0.95	5		08/14/18 19:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	5.0	2.4	5		08/14/18 19:06	156-60-5	
Trichloroethene	<b>652</b>	ug/L	5.0	2.4	5		08/14/18 19:06	79-01-6	
Vinyl chloride	ND	ug/L	5.0	3.1	5		08/14/18 19:06	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		5		08/14/18 19:06	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%	70-130		5		08/14/18 19:06	17060-07-0	
Toluene-d8 (S)	106	%	70-130		5		08/14/18 19:06	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-21A		Lab ID: 92395073003		Collected: 08/07/18 13:05		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	2.5	0.48	2.5		08/15/18 11:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	2.5	1.2	2.5		08/15/18 11:28	156-60-5	
Trichloroethene	<b>424</b>	ug/L	2.5	1.2	2.5		08/15/18 11:28	79-01-6	
Vinyl chloride	ND	ug/L	2.5	1.6	2.5		08/15/18 11:28	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		2.5		08/15/18 11:28	460-00-4	
1,2-Dichloroethane-d4 (S)	109	%	70-130		2.5		08/15/18 11:28	17060-07-0	
Toluene-d8 (S)	110	%	70-130		2.5		08/15/18 11:28	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-21		Lab ID: 92395073004		Collected: 08/07/18 14:05		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	452	ug/L	250	47.5	250		08/11/18 09:34	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		08/11/18 09:34	156-60-5	
Trichloroethene	33900	ug/L	250	118	250		08/11/18 09:34	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		08/11/18 09:34	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	97	%	70-130		250		08/11/18 09:34	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		250		08/11/18 09:34	17060-07-0	
Toluene-d8 (S)	100	%	70-130		250		08/11/18 09:34	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-20A		Lab ID: 92395073005		Collected: 08/08/18 09:20		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		08/11/18 06:52	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		08/11/18 06:52	156-60-5	
Trichloroethene	<b>17500</b>	ug/L	100	47.0	100		08/11/18 06:52	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		08/11/18 06:52	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		100		08/11/18 06:52	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	70-130		100		08/11/18 06:52	17060-07-0	
Toluene-d8 (S)	100	%	70-130		100		08/11/18 06:52	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-20		Lab ID: 92395073006		Collected: 08/08/18 10:10		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	250	47.5	250		08/11/18 09:17	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		08/11/18 09:17	156-60-5	
Trichloroethene	<b>33900</b>	ug/L	250	118	250		08/11/18 09:17	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		08/11/18 09:17	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	96	%	70-130		250		08/11/18 09:17	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	70-130		250		08/11/18 09:17	17060-07-0	
Toluene-d8 (S)	98	%	70-130		250		08/11/18 09:17	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-19A		Lab ID: 92395073007		Collected: 08/08/18 11:15		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>3300</b>	ug/L	100	19.0	100		08/11/18 07:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		08/11/18 07:08	156-60-5	
Trichloroethene	<b>13200</b>	ug/L	100	47.0	100		08/11/18 07:08	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		08/11/18 07:08	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		100		08/11/18 07:08	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		100		08/11/18 07:08	17060-07-0	
Toluene-d8 (S)	97	%	70-130		100		08/11/18 07:08	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-7A		Lab ID: 92395073008		Collected: 08/08/18 14:15		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	200	38.0	200		08/11/18 08:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		08/11/18 08:45	156-60-5	
Trichloroethene	<b>23500</b>	ug/L	200	94.0	200		08/11/18 08:45	79-01-6	
Vinyl chloride	ND	ug/L	200	124	200		08/11/18 08:45	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	97	%	70-130		200		08/11/18 08:45	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		200		08/11/18 08:45	17060-07-0	
Toluene-d8 (S)	100	%	70-130		200		08/11/18 08:45	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-19		Lab ID: 92395073009		Collected: 08/08/18 12:10		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	40.0	7.6	40		08/11/18 05:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	40.0	19.6	40		08/11/18 05:47	156-60-5	
Trichloroethene	<b>6380</b>	ug/L	40.0	18.8	40		08/11/18 05:47	79-01-6	
Vinyl chloride	ND	ug/L	40.0	24.8	40		08/11/18 05:47	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		40		08/11/18 05:47	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	70-130		40		08/11/18 05:47	17060-07-0	
Toluene-d8 (S)	99	%	70-130		40		08/11/18 05:47	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-22A		Lab ID: 92395073010		Collected: 08/07/18 15:45		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>206</b>	ug/L	100	19.0	100		08/14/18 19:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		08/14/18 19:39	156-60-5	
Trichloroethene	<b>18400</b>	ug/L	100	47.0	100		08/14/18 19:39	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		08/14/18 19:39	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	108	%	70-130		100		08/14/18 19:39	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%	70-130		100		08/14/18 19:39	17060-07-0	
Toluene-d8 (S)	108	%	70-130		100		08/14/18 19:39	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-22		Lab ID: 92395073011		Collected: 08/07/18 16:30		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	325	ug/L	250	47.5	250		08/11/18 09:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	250	122	250		08/11/18 09:01	156-60-5	
Trichloroethene	29600	ug/L	250	118	250		08/11/18 09:01	79-01-6	
Vinyl chloride	ND	ug/L	250	155	250		08/11/18 09:01	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	97	%	70-130		250		08/11/18 09:01	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		250		08/11/18 09:01	17060-07-0	
Toluene-d8 (S)	99	%	70-130		250		08/11/18 09:01	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Sample: MW-7		Lab ID: 92395073012		Collected: 08/08/18 15:15		Received: 08/08/18 16:55		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	2.0	0.38	2		08/15/18 13:42	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	2.0	0.98	2		08/15/18 13:42	156-60-5	
Trichloroethene	<b>177</b>	ug/L	2.0	0.94	2		08/15/18 13:42	79-01-6	
Vinyl chloride	ND	ug/L	2.0	1.2	2		08/15/18 13:42	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		2		08/15/18 13:42	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%	70-130		2		08/15/18 13:42	17060-07-0	
Toluene-d8 (S)	111	%	70-130		2		08/15/18 13:42	2037-26-5	

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

QC Batch: 424390 Analysis Method: EPA 8260B  
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Low Level  
Associated Lab Samples: 92395073001, 92395073005, 92395073007, 92395073009

METHOD BLANK: 2347687 Matrix: Water  
Associated Lab Samples: 92395073001, 92395073005, 92395073007, 92395073009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	08/11/18 00:55	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	08/11/18 00:55	
Trichloroethene	ug/L	ND	1.0	0.47	08/11/18 00:55	
Vinyl chloride	ug/L	ND	1.0	0.62	08/11/18 00:55	
1,2-Dichloroethane-d4 (S)	%	100	70-130		08/11/18 00:55	
4-Bromofluorobenzene (S)	%	97	70-130		08/11/18 00:55	
Toluene-d8 (S)	%	101	70-130		08/11/18 00:55	

LABORATORY CONTROL SAMPLE: 2347688

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	51.0	102	74-124	
trans-1,2-Dichloroethene	ug/L	50	52.2	104	71-127	
Trichloroethene	ug/L	50	52.6	105	78-122	
Vinyl chloride	ug/L	50	52.8	106	58-137	
1,2-Dichloroethane-d4 (S)	%			94	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2347689 2347690

Parameter	Units	92394925009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	2000	2000	1550	1570	77	78	70-130	1	30	
trans-1,2-Dichloroethene	ug/L	ND	2000	2000	1610	1640	80	82	70-130	2	30	
Trichloroethene	ug/L	ND	2000	2000	1570	1660	79	83	69-151	6	30	
Vinyl chloride	ug/L	ND	2000	2000	1620	1710	81	85	70-130	5	30	
1,2-Dichloroethane-d4 (S)	%						98	97	70-130			
4-Bromofluorobenzene (S)	%						99	98	70-130			
Toluene-d8 (S)	%						99	98	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

QC Batch: 424394 Analysis Method: EPA 8260B  
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Low Level  
Associated Lab Samples: 92395073004, 92395073006, 92395073008, 92395073011

METHOD BLANK: 2347703 Matrix: Water  
Associated Lab Samples: 92395073004, 92395073006, 92395073008, 92395073011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	08/11/18 01:12	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	08/11/18 01:12	
Trichloroethene	ug/L	ND	1.0	0.47	08/11/18 01:12	
Vinyl chloride	ug/L	ND	1.0	0.62	08/11/18 01:12	
1,2-Dichloroethane-d4 (S)	%	96	70-130		08/11/18 01:12	
4-Bromofluorobenzene (S)	%	99	70-130		08/11/18 01:12	
Toluene-d8 (S)	%	100	70-130		08/11/18 01:12	

LABORATORY CONTROL SAMPLE: 2347704

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	50.7	101	74-124	
trans-1,2-Dichloroethene	ug/L	50	51.5	103	71-127	
Trichloroethene	ug/L	50	53.6	107	78-122	
Vinyl chloride	ug/L	50	53.3	107	58-137	
1,2-Dichloroethane-d4 (S)	%			100	70-130	
4-Bromofluorobenzene (S)	%			96	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2348098 2348099

Parameter	Units	92395116001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	20	20	22.4	22.4	112	112	70-130	0	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	23.0	23.3	115	116	70-130	1	30	
Trichloroethene	ug/L	ND	20	20	23.0	22.7	115	113	69-151	1	30	
Vinyl chloride	ug/L	ND	20	20	23.6	23.8	118	119	70-130	1	30	
1,2-Dichloroethane-d4 (S)	%						98	99	70-130			
4-Bromofluorobenzene (S)	%						98	99	70-130			
Toluene-d8 (S)	%						97	98	70-130			

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

QC Batch: 424918

Analysis Method: EPA 8260B

QC Batch Method: EPA 8260B

Analysis Description: 8260 MSV Low Level

Associated Lab Samples: 92395073002, 92395073010

METHOD BLANK: 2350158

Matrix: Water

Associated Lab Samples: 92395073002, 92395073010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	08/14/18 18:16	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	08/14/18 18:16	
Trichloroethene	ug/L	ND	1.0	0.47	08/14/18 18:16	
Vinyl chloride	ug/L	ND	1.0	0.62	08/14/18 18:16	
1,2-Dichloroethane-d4 (S)	%	99	70-130		08/14/18 18:16	
4-Bromofluorobenzene (S)	%	106	70-130		08/14/18 18:16	
Toluene-d8 (S)	%	108	70-130		08/14/18 18:16	

LABORATORY CONTROL SAMPLE: 2350159

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	53.8	108	74-124	
trans-1,2-Dichloroethene	ug/L	50	56.4	113	71-127	
Trichloroethene	ug/L	50	56.9	114	78-122	
Vinyl chloride	ug/L	50	52.4	105	58-137	
1,2-Dichloroethane-d4 (S)	%			117	70-130	
4-Bromofluorobenzene (S)	%			96	70-130	
Toluene-d8 (S)	%			96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2350486 2350487

Parameter	Units	92395116013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	500	500	636	622	127	124	70-130	2	30	
trans-1,2-Dichloroethene	ug/L	ND	500	500	661	647	132	129	70-130	2	30	M1
Trichloroethene	ug/L	ND	500	500	648	626	130	125	69-151	4	30	
Vinyl chloride	ug/L	ND	500	500	605	609	121	122	70-130	1	30	
1,2-Dichloroethane-d4 (S)	%						106	110	70-130			S0
4-Bromofluorobenzene (S)	%						94	94	70-130			
Toluene-d8 (S)	%						101	98	70-130			

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

QC Batch:	425030	Analysis Method:	EPA 8260B
QC Batch Method:	EPA 8260B	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92395073003, 92395073012		

METHOD BLANK: 2350500 Matrix: Water

Associated Lab Samples: 92395073003, 92395073012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	08/15/18 10:55	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	08/15/18 10:55	
Trichloroethene	ug/L	ND	1.0	0.47	08/15/18 10:55	
Vinyl chloride	ug/L	ND	1.0	0.62	08/15/18 10:55	
1,2-Dichloroethane-d4 (S)	%	96	70-130		08/15/18 10:55	
4-Bromofluorobenzene (S)	%	108	70-130		08/15/18 10:55	
Toluene-d8 (S)	%	115	70-130		08/15/18 10:55	

LABORATORY CONTROL SAMPLE: 2350501

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	51.2	102	74-124	
trans-1,2-Dichloroethene	ug/L	50	50.9	102	71-127	
Trichloroethene	ug/L	50	55.9	112	78-122	
Vinyl chloride	ug/L	50	47.8	96	58-137	
1,2-Dichloroethane-d4 (S)	%			97	70-130	
4-Bromofluorobenzene (S)	%			97	70-130	
Toluene-d8 (S)	%			95	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2350502 2350503

Parameter	Units	92394805002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	21.1	400	400	488	558	117	134	70-130	14	30 M1
trans-1,2-Dichloroethene	ug/L	ND	400	400	473	581	118	145	70-130	21	30 M1
Trichloroethene	ug/L	58.2	400	400	553	613	124	139	69-151	10	30
Vinyl chloride	ug/L	ND	400	400	453	515	113	129	70-130	13	30
1,2-Dichloroethane-d4 (S)	%						108	117	70-130		
4-Bromofluorobenzene (S)	%						101	100	70-130		
Toluene-d8 (S)	%						99	98	70-130		

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## REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

S0 Surrogate recovery outside laboratory control limits.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: CTS OF ASHEVILLE

Pace Project No.: 92395073

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92395073001	TB-20	EPA 8260B	424390		
92395073002	FD-24	EPA 8260B	424918		
92395073003	MW-21A	EPA 8260B	425030		
92395073004	MW-21	EPA 8260B	424394		
92395073005	MW-20A	EPA 8260B	424390		
92395073006	MW-20	EPA 8260B	424394		
92395073007	MW-19A	EPA 8260B	424390		
92395073008	MW-7A	EPA 8260B	424394		
92395073009	MW-19	EPA 8260B	424390		
92395073010	MW-22A	EPA 8260B	424918		
92395073011	MW-22	EPA 8260B	424394		
92395073012	MW-7	EPA 8260B	425030		

## REPORT OF LABORATORY ANALYSIS

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	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: February 7, 2018 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

Laboratory receiving samples:

Asheville ☒ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐

Sample Condition  
Upon Receipt

Client Name:

Wood

Project

WO# : 92395073

Courier:

☐ Commercial

☐ Fed Ex

☐ Pace

☐ UPS

☐ USPS

☐ Other:

☒ Client



Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Date/Initials Person Examining Contents: 8/9/18

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other

Thermometer:

☐ IR Gun ID: 937046

Type of Ice:

☒ Wet

☐ Blue

☐ None

Biological Tissue Frozen?

☐ Yes

☐ No

☒ N/A

Cooler Temp (°C): 4.2

Correction Factor: Add/Subtract (°C) 0

Cooler Temp Corrected (°C): 4.2

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil: ☐ N/A, water sample

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes

☐ No

Did samples originate from a foreign source (Internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Dissolved analysis: Samples Field Filtered?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <i>wt</i>			
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Trip Blank Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Trip Blank Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted:

Date/Time:

Project Manager SCURF Review:

*TD*


Date:

8/9

Project Manager SRF Review:

Date:

8/9

	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt (SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

\*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

\*\*Bottom half of box is to list number of bottle

Proje **WO# : 92395073**

PM: PTE

Due Date: 08/15/18

CLIENT: 92-AMEC A

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGJU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A/DG3A-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AGOU-100 mL Amber Unpreserved vials (N/A)	VG9U-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)
1																2												
2																3												
3																3												
4																3												
5																3												
6																3												
7																3												
8																3												
9																3												
10																3												
11																3												
12																3												

pH Adjustment Log for Preserved Samples						
Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.





November 15, 2018

Susan Avritt  
Wood E&S  
1308 Patton Avenue  
Asheville, NC 28806

RE: Project: CTS OF ASHEVILLE  
Pace Project No.: 92406645

Dear Susan Avritt:

Enclosed are the analytical results for sample(s) received by the laboratory on November 08, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
taylor.ezell@pacelabs.com  
(704)875-9092  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

---

### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078

Louisiana/NELAP Certification # LA170028

North Carolina Drinking Water Certification #: 37706

North Carolina Field Services Certification #: 5342

North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627

Kentucky UST Certification #: 84

Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92406645001	FD-35	Water	11/07/18 00:00	11/08/18 13:13
92406645002	TB-32	Water	11/07/18 00:00	11/08/18 13:13
92406645003	MW-7A	Water	11/06/18 13:50	11/08/18 13:13
92406645004	MW-7	Water	11/06/18 15:25	11/08/18 13:13
92406645005	MW-21A	Water	11/06/18 16:55	11/08/18 13:13
92406645006	MW-21	Water	11/07/18 09:20	11/08/18 13:13
92406645007	MW-22	Water	11/07/18 10:30	11/08/18 13:13
92406645008	MW-22A	Water	11/07/18 11:30	11/08/18 13:13
92406645009	MW-19A	Water	11/07/18 13:30	11/08/18 13:13
92406645010	MW-19	Water	11/07/18 14:30	11/08/18 13:13
92406645011	MW-20	Water	11/07/18 15:30	11/08/18 13:13
92406645012	MW-20A	Water	11/07/18 11:00	11/08/18 13:13

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## SAMPLE ANALYTE COUNT

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92406645001	FD-35	EPA 8260B	SAS	7	PASI-C
92406645002	TB-32	EPA 8260B	GAW	7	PASI-C
92406645003	MW-7A	EPA 8260B	GAW	7	PASI-C
92406645004	MW-7	EPA 8260B	GAW	7	PASI-C
92406645005	MW-21A	EPA 8260B	GAW	7	PASI-C
92406645006	MW-21	EPA 8260B	GAW	7	PASI-C
92406645007	MW-22	EPA 8260B	GAW	7	PASI-C
92406645008	MW-22A	EPA 8260B	GAW	7	PASI-C
92406645009	MW-19A	EPA 8260B	GAW	7	PASI-C
92406645010	MW-19	EPA 8260B	GAW	7	PASI-C
92406645011	MW-20	EPA 8260B	GAW	7	PASI-C
92406645012	MW-20A	EPA 8260B	GAW	7	PASI-C

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## SUMMARY OF DETECTION

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92406645001</b>	<b>FD-35</b>					
EPA 8260B	cis-1,2-Dichloroethene	3550	ug/L	100	11/13/18 19:15	
EPA 8260B	Trichloroethene	14800	ug/L	100	11/13/18 19:15	M1
<b>92406645003</b>	<b>MW-7A</b>					
EPA 8260B	cis-1,2-Dichloroethene	57.2J	ug/L	200	11/13/18 20:21	
EPA 8260B	Trichloroethene	28600	ug/L	200	11/13/18 20:21	M1
<b>92406645004</b>	<b>MW-7</b>					
EPA 8260B	Trichloroethene	86.5	ug/L	1.0	11/14/18 16:57	
<b>92406645005</b>	<b>MW-21A</b>					
EPA 8260B	Trichloroethene	7130	ug/L	50.0	11/14/18 20:23	
<b>92406645006</b>	<b>MW-21</b>					
EPA 8260B	Trichloroethene	12400	ug/L	100	11/14/18 21:14	
<b>92406645007</b>	<b>MW-22</b>					
EPA 8260B	Trichloroethene	24300	ug/L	200	11/14/18 21:31	
<b>92406645008</b>	<b>MW-22A</b>					
EPA 8260B	cis-1,2-Dichloroethene	73.2J	ug/L	100	11/13/18 19:47	
EPA 8260B	Trichloroethene	17300	ug/L	100	11/13/18 19:47	
<b>92406645009</b>	<b>MW-19A</b>					
EPA 8260B	cis-1,2-Dichloroethene	3090	ug/L	100	11/13/18 19:30	
EPA 8260B	Trichloroethene	12400	ug/L	100	11/13/18 19:30	
<b>92406645010</b>	<b>MW-19</b>					
EPA 8260B	cis-1,2-Dichloroethene	15.6J	ug/L	40.0	11/13/18 19:13	
EPA 8260B	Trichloroethene	4590	ug/L	40.0	11/13/18 19:13	
<b>92406645011</b>	<b>MW-20</b>					
EPA 8260B	Trichloroethene	22600	ug/L	200	11/14/18 21:48	
<b>92406645012</b>	<b>MW-20A</b>					
EPA 8260B	Trichloroethene	16800	ug/L	100	11/13/18 20:04	

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

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**Method:** EPA 8260B

**Description:** 8260 MSV Low Level

**Client:** Wood E&I - Asheville

**Date:** November 15, 2018

### General Information:

12 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 441803

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92406645003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2425883)
  - Trichloroethene
- MSD (Lab ID: 2425884)
  - Trichloroethene

QC Batch: 442054

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92406645001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 2426863)
  - Trichloroethene

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

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**Method:** EPA 8260B

**Description:** 8260 MSV Low Level

**Client:** Wood E&I - Asheville

**Date:** November 15, 2018

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: FD-35		Lab ID: 92406645001		Collected: 11/07/18 00:00		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>3550</b>	ug/L	100	19.0	100		11/13/18 19:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		11/13/18 19:15	156-60-5	
Trichloroethene	<b>14800</b>	ug/L	100	47.0	100		11/13/18 19:15	79-01-6	M1
Vinyl chloride	ND	ug/L	100	62.0	100		11/13/18 19:15	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	106	%	70-130		100		11/13/18 19:15	460-00-4	
1,2-Dichloroethane-d4 (S)	97	%	70-130		100		11/13/18 19:15	17060-07-0	
Toluene-d8 (S)	106	%	70-130		100		11/13/18 19:15	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: TB-32		Lab ID: 92406645002		Collected: 11/07/18 00:00		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		11/12/18 17:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		11/12/18 17:41	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.47	1		11/12/18 17:41	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		11/12/18 17:41	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		1		11/12/18 17:41	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		1		11/12/18 17:41	17060-07-0	
Toluene-d8 (S)	107	%	70-130		1		11/12/18 17:41	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-7A		Lab ID: 92406645003		Collected: 11/06/18 13:50		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>57.2J</b>	ug/L	200	38.0	200		11/13/18 20:21	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		11/13/18 20:21	156-60-5	
Trichloroethene	<b>28600</b>	ug/L	200	94.0	200		11/13/18 20:21	79-01-6	M1
Vinyl chloride	ND	ug/L	200	124	200		11/13/18 20:21	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	103	%	70-130		200		11/13/18 20:21	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		200		11/13/18 20:21	17060-07-0	
Toluene-d8 (S)	103	%	70-130		200		11/13/18 20:21	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-7		Lab ID: 92406645004		Collected: 11/06/18 15:25		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.19	1		11/14/18 16:57	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.49	1		11/14/18 16:57	156-60-5	
Trichloroethene	<b>86.5</b>	ug/L	1.0	0.47	1		11/14/18 16:57	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.62	1		11/14/18 16:57	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	102	%	70-130		1		11/14/18 16:57	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		1		11/14/18 16:57	17060-07-0	
Toluene-d8 (S)	106	%	70-130		1		11/14/18 16:57	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-21A		Lab ID: 92406645005		Collected: 11/06/18 16:55		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	50.0	9.5	50		11/14/18 20:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	50.0	24.5	50		11/14/18 20:23	156-60-5	
Trichloroethene	<b>7130</b>	ug/L	50.0	23.5	50		11/14/18 20:23	79-01-6	
Vinyl chloride	ND	ug/L	50.0	31.0	50		11/14/18 20:23	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		50		11/14/18 20:23	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	70-130		50		11/14/18 20:23	17060-07-0	
Toluene-d8 (S)	105	%	70-130		50		11/14/18 20:23	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-21		Lab ID: 92406645006		Collected: 11/07/18 09:20		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		11/14/18 21:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		11/14/18 21:14	156-60-5	
Trichloroethene	<b>12400</b>	ug/L	100	47.0	100		11/14/18 21:14	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		11/14/18 21:14	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		11/14/18 21:14	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130		100		11/14/18 21:14	17060-07-0	
Toluene-d8 (S)	106	%	70-130		100		11/14/18 21:14	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-22		Lab ID: 92406645007		Collected: 11/07/18 10:30		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	200	38.0	200		11/14/18 21:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		11/14/18 21:31	156-60-5	
Trichloroethene	<b>24300</b>	ug/L	200	94.0	200		11/14/18 21:31	79-01-6	
Vinyl chloride	ND	ug/L	200	124	200		11/14/18 21:31	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		200		11/14/18 21:31	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	70-130		200		11/14/18 21:31	17060-07-0	
Toluene-d8 (S)	105	%	70-130		200		11/14/18 21:31	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-22A		Lab ID: 92406645008		Collected: 11/07/18 11:30		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>73.2J</b>	ug/L	100	19.0	100		11/13/18 19:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		11/13/18 19:47	156-60-5	
Trichloroethene	<b>17300</b>	ug/L	100	47.0	100		11/13/18 19:47	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		11/13/18 19:47	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		11/13/18 19:47	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		100		11/13/18 19:47	17060-07-0	
Toluene-d8 (S)	107	%	70-130		100		11/13/18 19:47	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-19A		Lab ID: 92406645009		Collected: 11/07/18 13:30		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>3090</b>	ug/L	100	19.0	100		11/13/18 19:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		11/13/18 19:30	156-60-5	
Trichloroethene	<b>12400</b>	ug/L	100	47.0	100		11/13/18 19:30	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		11/13/18 19:30	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		100		11/13/18 19:30	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	70-130		100		11/13/18 19:30	17060-07-0	
Toluene-d8 (S)	107	%	70-130		100		11/13/18 19:30	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-19		Lab ID: 92406645010		Collected: 11/07/18 14:30		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	<b>15.6J</b>	ug/L	40.0	7.6	40		11/13/18 19:13	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	40.0	19.6	40		11/13/18 19:13	156-60-5	
Trichloroethene	<b>4590</b>	ug/L	40.0	18.8	40		11/13/18 19:13	79-01-6	
Vinyl chloride	ND	ug/L	40.0	24.8	40		11/13/18 19:13	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	102	%	70-130		40		11/13/18 19:13	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		40		11/13/18 19:13	17060-07-0	
Toluene-d8 (S)	106	%	70-130		40		11/13/18 19:13	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-20		Lab ID: 92406645011		Collected: 11/07/18 15:30		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	200	38.0	200		11/14/18 21:48	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	200	98.0	200		11/14/18 21:48	156-60-5	
Trichloroethene	<b>22600</b>	ug/L	200	94.0	200		11/14/18 21:48	79-01-6	
Vinyl chloride	ND	ug/L	200	124	200		11/14/18 21:48	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		200		11/14/18 21:48	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	70-130		200		11/14/18 21:48	17060-07-0	
Toluene-d8 (S)	106	%	70-130		200		11/14/18 21:48	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Sample: MW-20A		Lab ID: 92406645012		Collected: 11/07/18 11:00		Received: 11/08/18 13:13		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Low Level</b>		Analytical Method: EPA 8260B							
cis-1,2-Dichloroethene	ND	ug/L	100	19.0	100		11/13/18 20:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	100	49.0	100		11/13/18 20:04	156-60-5	
Trichloroethene	<b>16800</b>	ug/L	100	47.0	100		11/13/18 20:04	79-01-6	
Vinyl chloride	ND	ug/L	100	62.0	100		11/13/18 20:04	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		100		11/13/18 20:04	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	70-130		100		11/13/18 20:04	17060-07-0	
Toluene-d8 (S)	105	%	70-130		100		11/13/18 20:04	2037-26-5	

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE  
Pace Project No.: 92406645

QC Batch:	441793	Analysis Method:	EPA 8260B
QC Batch Method:	EPA 8260B	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92406645002		

METHOD BLANK: 2425825 Matrix: Water  
Associated Lab Samples: 92406645002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	11/12/18 10:49	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	11/12/18 10:49	
Trichloroethene	ug/L	ND	1.0	0.47	11/12/18 10:49	
Vinyl chloride	ug/L	ND	1.0	0.62	11/12/18 10:49	
1,2-Dichloroethane-d4 (S)	%	98	70-130		11/12/18 10:49	
4-Bromofluorobenzene (S)	%	102	70-130		11/12/18 10:49	
Toluene-d8 (S)	%	109	70-130		11/12/18 10:49	

LABORATORY CONTROL SAMPLE: 2425826

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	50.7	101	70-130	
trans-1,2-Dichloroethene	ug/L	50	53.9	108	70-130	
Trichloroethene	ug/L	50	51.9	104	70-130	
Vinyl chloride	ug/L	50	52.2	104	70-131	
1,2-Dichloroethane-d4 (S)	%			102	70-130	
4-Bromofluorobenzene (S)	%			98	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE SAMPLE: 2426693

Parameter	Units	92406738002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	20	20.2	101	77-141	
trans-1,2-Dichloroethene	ug/L	ND	20	20.5	102	76-146	
Trichloroethene	ug/L	ND	20	21.0	105	77-147	
Vinyl chloride	ug/L	ND	20	19.3	96	70-156	
1,2-Dichloroethane-d4 (S)	%				91	70-130	
4-Bromofluorobenzene (S)	%				100	70-130	
Toluene-d8 (S)	%				99	70-130	

SAMPLE DUPLICATE: 2426692

Parameter	Units	92406738003 Result	Dup Result	RPD	Max RPD	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	ND		30	
trans-1,2-Dichloroethene	ug/L	ND	ND		30	
Trichloroethene	ug/L	ND	ND		30	
Vinyl chloride	ug/L	ND	ND		30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

SAMPLE DUPLICATE: 2426692

Parameter	Units	92406738003 Result	Dup Result	RPD	Max RPD	Qualifiers
1,2-Dichloroethane-d4 (S)	%	95	88	8		
4-Bromofluorobenzene (S)	%	104	104	0		
Toluene-d8 (S)	%	108	111	2		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

QC Batch: 441803 Analysis Method: EPA 8260B  
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Low Level  
Associated Lab Samples: 92406645003, 92406645008, 92406645009, 92406645010, 92406645012

METHOD BLANK: 2425881 Matrix: Water  
Associated Lab Samples: 92406645003, 92406645008, 92406645009, 92406645010, 92406645012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	11/13/18 11:53	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	11/13/18 11:53	
Trichloroethene	ug/L	ND	1.0	0.47	11/13/18 11:53	
Vinyl chloride	ug/L	ND	1.0	0.62	11/13/18 11:53	
1,2-Dichloroethane-d4 (S)	%	98	70-130		11/13/18 11:53	
4-Bromofluorobenzene (S)	%	103	70-130		11/13/18 11:53	
Toluene-d8 (S)	%	108	70-130		11/13/18 11:53	

LABORATORY CONTROL SAMPLE: 2425882

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	49.9	100	70-130	
trans-1,2-Dichloroethene	ug/L	50	53.1	106	70-130	
Trichloroethene	ug/L	50	51.6	103	70-130	
Vinyl chloride	ug/L	50	50.7	101	70-131	
1,2-Dichloroethane-d4 (S)	%			96	70-130	
4-Bromofluorobenzene (S)	%			96	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2425883 2425884

Parameter	Units	92406645003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	57.2J	4000	4000	4050	3950	100	97	77-141	2	30	
trans-1,2-Dichloroethene	ug/L	ND	4000	4000	4220	4130	105	103	76-146	2	30	
Trichloroethene	ug/L	28600	4000	4000	35400	36600	170	200	77-147	3	30	M1
Vinyl chloride	ug/L	ND	4000	4000	3690	3530	92	88	70-156	4	30	
1,2-Dichloroethane-d4 (S)	%						86	89	70-130			
4-Bromofluorobenzene (S)	%						98	101	70-130			
Toluene-d8 (S)	%						96	98	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE  
Pace Project No.: 92406645

QC Batch:	442054	Analysis Method:	EPA 8260B
QC Batch Method:	EPA 8260B	Analysis Description:	8260 MSV Low Level
Associated Lab Samples:	92406645001		

METHOD BLANK: 2426860 Matrix: Water  
Associated Lab Samples: 92406645001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	11/13/18 17:02	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	11/13/18 17:02	
Trichloroethene	ug/L	ND	1.0	0.47	11/13/18 17:02	
Vinyl chloride	ug/L	ND	1.0	0.62	11/13/18 17:02	
1,2-Dichloroethane-d4 (S)	%	87	70-130		11/13/18 17:02	
4-Bromofluorobenzene (S)	%	102	70-130		11/13/18 17:02	
Toluene-d8 (S)	%	108	70-130		11/13/18 17:02	

LABORATORY CONTROL SAMPLE: 2426861

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	49.8	100	70-130	
trans-1,2-Dichloroethene	ug/L	50	48.9	98	70-130	
Trichloroethene	ug/L	50	53.6	107	70-130	
Vinyl chloride	ug/L	50	47.5	95	70-131	
1,2-Dichloroethane-d4 (S)	%			94	70-130	
4-Bromofluorobenzene (S)	%			100	70-130	
Toluene-d8 (S)	%			94	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2426862 2426863

Parameter	Units	92406645001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	3550	2000	2000	5210	5650	83	105	77-141	8	30	
trans-1,2-Dichloroethene	ug/L	ND	2000	2000	1920	2220	96	111	76-146	14	30	
Trichloroethene	ug/L	14800	2000	2000	17500	18800	137	197	77-147	7	30	M1
Vinyl chloride	ug/L	ND	2000	2000	1630	1910	82	96	70-156	16	30	
1,2-Dichloroethane-d4 (S)	%						88	87	70-130			
4-Bromofluorobenzene (S)	%						99	100	70-130			
Toluene-d8 (S)	%						97	99	70-130			

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## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

QC Batch: 442323 Analysis Method: EPA 8260B  
QC Batch Method: EPA 8260B Analysis Description: 8260 MSV Low Level  
Associated Lab Samples: 92406645004, 92406645005, 92406645006, 92406645007, 92406645011

METHOD BLANK: 2427966 Matrix: Water  
Associated Lab Samples: 92406645004, 92406645005, 92406645006, 92406645007, 92406645011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.19	11/14/18 13:49	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.49	11/14/18 13:49	
Trichloroethene	ug/L	ND	1.0	0.47	11/14/18 13:49	
Vinyl chloride	ug/L	ND	1.0	0.62	11/14/18 13:49	
1,2-Dichloroethane-d4 (S)	%	93	70-130		11/14/18 13:49	
4-Bromofluorobenzene (S)	%	104	70-130		11/14/18 13:49	
Toluene-d8 (S)	%	108	70-130		11/14/18 13:49	

LABORATORY CONTROL SAMPLE: 2427967

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	49.6	99	70-130	
trans-1,2-Dichloroethene	ug/L	50	51.7	103	70-130	
Trichloroethene	ug/L	50	52.9	106	70-130	
Vinyl chloride	ug/L	50	43.3	87	70-131	
1,2-Dichloroethane-d4 (S)	%			94	70-130	
4-Bromofluorobenzene (S)	%			95	70-130	
Toluene-d8 (S)	%			98	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2427968 2427969

Parameter	Units	92406701015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	100	100	106	109	103	106	77-141	3	30	
trans-1,2-Dichloroethene	ug/L	ND	100	100	110	113	110	113	76-146	3	30	
Trichloroethene	ug/L	ND	100	100	113	120	113	120	77-147	6	30	
Vinyl chloride	ug/L	ND	100	100	94.6	99.6	95	100	70-156	5	30	
1,2-Dichloroethane-d4 (S)	%						97	96	70-130			
4-Bromofluorobenzene (S)	%						98	99	70-130			
Toluene-d8 (S)	%						99	100	70-130			

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## QUALIFIERS

Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: CTS OF ASHEVILLE

Pace Project No.: 92406645

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92406645001	FD-35	EPA 8260B	442054		
92406645002	TB-32	EPA 8260B	441793		
92406645003	MW-7A	EPA 8260B	441803		
92406645004	MW-7	EPA 8260B	442323		
92406645005	MW-21A	EPA 8260B	442323		
92406645006	MW-21	EPA 8260B	442323		
92406645007	MW-22	EPA 8260B	442323		
92406645008	MW-22A	EPA 8260B	441803		
92406645009	MW-19A	EPA 8260B	441803		
92406645010	MW-19	EPA 8260B	441803		
92406645011	MW-20	EPA 8260B	442323		
92406645012	MW-20A	EPA 8260B	441803		

## REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt (SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

**Laboratory receiving samples:**

Asheville ☒ Eden ☐ Greenwood ☐ Huntersville ☐ Raleigh ☐ Mechanicsville ☐

Sample Condition  
Upon Receipt

Client Name:

Wood

Project #

**WO# : 92406645**



Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client  
☐ Commercial ☐ Pace ☐ Other: \_\_\_\_\_

Custody Seal Present? ☒ Yes ☐ No Seals Intact? ☒ Yes ☐ No

Date/Initials Person Examining Contents: TD 11/8/19

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Biological Tissue Frozen?

☐ Yes ☐ No ☒ N/A

Thermometer: ☐ IR Gun ID: 937046 Type of Ice: ☒ Wet ☐ Blue ☐ None

Cooler Temp (°C): 5.8 Correction Factor: Add/Subtract (°C) 0

Temp should be above freezing to 6°C

Cooler Temp Corrected (°C): 5.8

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil ☒ N/A, water sample

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Dissolved analysis: Samples Field Filtered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	8.	
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>			
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Trip Blank Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Trip Blank Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		

COMMENTS/SAMPLE DISCREPANCY

Field Data Required? ☐ Yes ☐ No

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Project Manager SCURF Review:

TD  
FD

Date:


11/9

Project Manager SRF Review:

Date:

11/9



	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.05	Issuing Authority: Pace Carolinas Quality Office

\*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DR0/8015 (water) DOC, LLHg

\*\*Bottom half of box is to list number of bottle

Project # **WO# : 92406645**

PM: PTE

Due Date: 11/15/18

CLIENT: 92-AMEC A

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)	
1																3													
2																2													
3																9													
4																3													
5																3													
6																3													
7																3													
8																3													
9																3													
10																3													
11																3													
12																3													

pH Adjustment Log for Preserved Samples						
Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, Incorrect preservative, out of temp, Incorrect containers.

**CHAIN-OF-CUSTODY / Analytical Request Document**  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Wood E&IS	Report To:	Susan Avritt	Attention:	
Address:	1308 Patton Avenue	Copy To:		Company Name:	
Email To:	susan.avritt@woodplc.com	Purchase Order No.:		Address:	
Phone:	828-252-8130	Project Name:	CTS of Asheville	Place Quote Reference:	
Requested Due Date/TAT:	standard TAT	Project Number:	6252-16-2012.06	Place Project Manager:	taylor.ezell@pacelabs.com
				Place Profile #:	3900-3

Section D Required Client Information		Section E Valid Matrix Codes		Section F Requested Analysis Filtered (Y/N)	
<div style="text-align: center;"> <b>SAMPLE ID</b>  <small>(A-Z, 0-9 / -)</small>            Sample IDs MUST BE UNIQUE         </div>		Valid Matrix Codes MATRIX CODE DRINKING WATER WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIFE AIR SLURRY TISSUE		Preservatives H <sub>2</sub> SO <sub>4</sub> <input type="checkbox"/> HNO <sub>3</sub> <input type="checkbox"/> HCl <input type="checkbox"/> NaOH <input type="checkbox"/> Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> <input type="checkbox"/> Methanol <input type="checkbox"/> Other <input type="checkbox"/>	
				# OF CONTAINERS VOCs by 8260* <input type="checkbox"/> Analysis Test <input type="checkbox"/>	
ITEM #		MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G-GRAB C-COMP)	COLLECTED	Requested Analysis Filtered (Y/N)
				COMPOSITE START DATE TIME	
				COMPOSITE END/GRAB DATE TIME	
				SAMPLE TEMP AT COLLECTION	
1	FD-35	G	G	11/2/18 0:00	
2	TB-32	G	G	lab prep	
3	MW-7A	G	G	11/6/18 13:50	
4	MW-7	G	G	11/6/18 15:25	
5	MW-21A	G	G	11/6/18 16:55	
6	MW-21	G	G	11/7/18 09:20	
7	MW-22	G	G	11/2/18 10:30	
8	MW-22A	G	G	11/2/18 11:30	
9	MW-19A	G	G	11/2/18 13:30	
10	MW-19	G	G	11/2/18 14:30	
11	MW-20	G	G	11/2/18 15:30	
12	MW-20A	G	G	11/8/18 11:00	

Section G Additional Comments		Section H Relinquished By / Affiliation		Section I Accepted By / Affiliation		Section J Sample Conditions	
Level II data package TCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride		[Signature] 11/8/18		[Signature] 11/8/18		DATE 11/8/18	
						TIME 13:13	
						Received on <input type="checkbox"/> Custody <input type="checkbox"/> Sealed Cooler <input type="checkbox"/> (Y/N) Temp in °C <input type="checkbox"/>	

Section K Regulatory Agency	
<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input checked="" type="checkbox"/> OTHER	State Location NC

Section L Sampler Name and Signature	
PRINT Name of SAMPLER: Rodney M. Clark	DATE Signed (MM/DD/YY): 11/08/18

March 19, 2019

Susan Avritt  
Wood E&S  
1308 Patton Avenue  
Asheville, NC 28806

RE: Project: CTS of Asheville  
Pace Project No.: 92421040

Dear Susan Avritt:

Enclosed are the analytical results for sample(s) received by the laboratory on March 13, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
taylor.ezell@pacelabs.com  
(704)875-9092  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: CTS of Asheville

Pace Project No.: 92421040

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### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078

Louisiana/NELAP Certification # LA170028

North Carolina Drinking Water Certification #: 37706

North Carolina Field Services Certification #: 5342

North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627

Kentucky UST Certification #: 84

Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE SUMMARY

Project: CTS of Asheville

Pace Project No.: 92421040

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92421040001	MW-21	Water	03/11/19 11:15	03/13/19 09:40
92421040002	GW-132-48	Water	03/11/19 14:10	03/13/19 09:40
92421040003	GW-132-58	Water	03/11/19 15:30	03/13/19 09:40
92421040004	GW-131-59	Water	03/11/19 17:20	03/13/19 09:40
92421040005	FD-37	Water	03/11/19 00:00	03/13/19 09:40
92421040006	GW-121-45	Water	03/12/19 12:10	03/13/19 09:40
92421040007	GW-122-46	Water	03/12/19 14:40	03/13/19 09:40
92421040008	MW-21A	Water	03/12/19 16:40	03/13/19 09:40
92421040009	TB-34	Water	03/12/19 00:00	03/13/19 09:40

## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: CTS of Asheville

Pace Project No.: 92421040

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92421040001	MW-21	EPA 8260D	NSCQ	7	PASI-C
92421040002	GW-132-48	EPA 8260D	NSCQ	7	PASI-C
92421040003	GW-132-58	EPA 8260D	NSCQ	7	PASI-C
92421040004	GW-131-59	EPA 8260D	NSCQ	7	PASI-C
92421040005	FD-37	EPA 8260D	NSCQ	7	PASI-C
92421040006	GW-121-45	EPA 8260D	NSCQ	7	PASI-C
92421040007	GW-122-46	EPA 8260D	NSCQ	7	PASI-C
92421040008	MW-21A	EPA 8260D	NSCQ	7	PASI-C
92421040009	TB-34	EPA 8260D	SAS	7	PASI-C

## REPORT OF LABORATORY ANALYSIS

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## SUMMARY OF DETECTION

Project: CTS of Asheville

Pace Project No.: 92421040

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92421040001</b>	<b>MW-21</b>					
EPA 8260D	Trichloroethene	4.1	ug/L	1.0	03/15/19 18:09	
<b>92421040002</b>	<b>GW-132-48</b>					
EPA 8260D	Trichloroethene	1610	ug/L	12.5	03/15/19 19:59	M1
<b>92421040003</b>	<b>GW-132-58</b>					
EPA 8260D	Trichloroethene	160	ug/L	1.0	03/15/19 18:27	
<b>92421040005</b>	<b>FD-37</b>					
EPA 8260D	Trichloroethene	12.7	ug/L	1.0	03/15/19 19:04	
<b>92421040008</b>	<b>MW-21A</b>					
EPA 8260D	Trichloroethene	44900	ug/L	400	03/15/19 20:17	

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: CTS of Asheville

Pace Project No.: 92421040

---

**Method:** EPA 8260D

**Description:** 8260D MSV Low Level

**Client:** Wood E&I - Asheville

**Date:** March 19, 2019

### General Information:

9 samples were analyzed for EPA 8260D. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

### Surrogates:

All surrogates were within QC limits with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 463621

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92421040002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2522217)
  - Trichloroethene
- MSD (Lab ID: 2522218)
  - Trichloroethene

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: MW-21		Lab ID: 92421040001		Collected: 03/11/19 11:15		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 18:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 18:09	156-60-5	
Trichloroethene	4.1	ug/L	1.0	0.22	1		03/15/19 18:09	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 18:09	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	102	%	70-130		1		03/15/19 18:09	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		1		03/15/19 18:09	17060-07-0	
Toluene-d8 (S)	105	%	70-130		1		03/15/19 18:09	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: <b>GW-132-48</b>		Lab ID: <b>92421040002</b>		Collected: 03/11/19 14:10		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	12.5	3.6	12.5		03/15/19 19:59	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	12.5	3.2	12.5		03/15/19 19:59	156-60-5	
Trichloroethene	<b>1610</b>	ug/L	12.5	2.8	12.5		03/15/19 19:59	79-01-6	M1
Vinyl chloride	ND	ug/L	12.5	3.0	12.5		03/15/19 19:59	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		12.5		03/15/19 19:59	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	70-130		12.5		03/15/19 19:59	17060-07-0	
Toluene-d8 (S)	105	%	70-130		12.5		03/15/19 19:59	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: <b>GW-132-58</b>		Lab ID: <b>92421040003</b>		Collected: 03/11/19 15:30		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 18:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 18:27	156-60-5	
Trichloroethene	<b>160</b>	ug/L	1.0	0.22	1		03/15/19 18:27	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 18:27	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		1		03/15/19 18:27	460-00-4	
1,2-Dichloroethane-d4 (S)	97	%	70-130		1		03/15/19 18:27	17060-07-0	
Toluene-d8 (S)	106	%	70-130		1		03/15/19 18:27	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: GW-131-59		Lab ID: 92421040004		Collected: 03/11/19 17:20		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 18:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 18:46	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.22	1		03/15/19 18:46	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 18:46	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	102	%	70-130		1		03/15/19 18:46	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		1		03/15/19 18:46	17060-07-0	
Toluene-d8 (S)	106	%	70-130		1		03/15/19 18:46	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: FD-37		Lab ID: 92421040005		Collected: 03/11/19 00:00		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 19:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 19:04	156-60-5	
Trichloroethene	<b>12.7</b>	ug/L	1.0	0.22	1		03/15/19 19:04	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 19:04	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	102	%	70-130		1		03/15/19 19:04	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	70-130		1		03/15/19 19:04	17060-07-0	
Toluene-d8 (S)	105	%	70-130		1		03/15/19 19:04	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: <b>GW-121-45</b>		Lab ID: <b>92421040006</b>		Collected: 03/12/19 12:10		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 19:22	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 19:22	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.22	1		03/15/19 19:22	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 19:22	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	100	%	70-130		1		03/15/19 19:22	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		1		03/15/19 19:22	17060-07-0	
Toluene-d8 (S)	105	%	70-130		1		03/15/19 19:22	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: <b>GW-122-46</b>		Lab ID: <b>92421040007</b>		Collected: 03/12/19 14:40		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/15/19 19:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/15/19 19:41	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.22	1		03/15/19 19:41	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/15/19 19:41	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		1		03/15/19 19:41	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	70-130		1		03/15/19 19:41	17060-07-0	
Toluene-d8 (S)	105	%	70-130		1		03/15/19 19:41	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: MW-21A		Lab ID: 92421040008		Collected: 03/12/19 16:40		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	400	116	400		03/15/19 20:17	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	400	102	400		03/15/19 20:17	156-60-5	
Trichloroethene	<b>44900</b>	ug/L	400	88.0	400		03/15/19 20:17	79-01-6	
Vinyl chloride	ND	ug/L	400	96.8	400		03/15/19 20:17	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	104	%	70-130		400		03/15/19 20:17	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	70-130		400		03/15/19 20:17	17060-07-0	
Toluene-d8 (S)	105	%	70-130		400		03/15/19 20:17	2037-26-5	

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## ANALYTICAL RESULTS

Project: CTS of Asheville

Pace Project No.: 92421040

Sample: TB-34		Lab ID: 92421040009		Collected: 03/12/19 00:00		Received: 03/13/19 09:40		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260D MSV Low Level</b>		Analytical Method: EPA 8260D							
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.29	1		03/14/19 19:18	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		03/14/19 19:18	156-60-5	
Trichloroethene	ND	ug/L	1.0	0.22	1		03/14/19 19:18	79-01-6	
Vinyl chloride	ND	ug/L	1.0	0.24	1		03/14/19 19:18	75-01-4	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	101	%	70-130		1		03/14/19 19:18	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	70-130		1		03/14/19 19:18	17060-07-0	
Toluene-d8 (S)	104	%	70-130		1		03/14/19 19:18	2037-26-5	

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## QUALITY CONTROL DATA

Project: CTS of Asheville

Pace Project No.: 92421040

QC Batch: 463391

Analysis Method: EPA 8260D

QC Batch Method: EPA 8260D

Analysis Description: 8260D MSV Low Level

Associated Lab Samples: 92421040009

METHOD BLANK: 2521278

Matrix: Water

Associated Lab Samples: 92421040009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.29	03/14/19 16:45	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.25	03/14/19 16:45	
Trichloroethene	ug/L	ND	1.0	0.22	03/14/19 16:45	
Vinyl chloride	ug/L	ND	1.0	0.24	03/14/19 16:45	
1,2-Dichloroethane-d4 (S)	%	100	70-130		03/14/19 16:45	
4-Bromofluorobenzene (S)	%	100	70-130		03/14/19 16:45	
Toluene-d8 (S)	%	106	70-130		03/14/19 16:45	

LABORATORY CONTROL SAMPLE: 2521279

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	51.6	103	70-130	
trans-1,2-Dichloroethene	ug/L	50	51.2	102	70-130	
Trichloroethene	ug/L	50	53.0	106	70-130	
Vinyl chloride	ug/L	50	57.2	114	70-131	
1,2-Dichloroethane-d4 (S)	%			99	70-130	
4-Bromofluorobenzene (S)	%			101	70-130	
Toluene-d8 (S)	%			96	70-130	

MATRIX SPIKE SAMPLE: 2521281

Parameter	Units	92421097002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	20	21.2	106	70-141	
trans-1,2-Dichloroethene	ug/L	ND	20	21.6	108	70-146	
Trichloroethene	ug/L	ND	20	21.8	109	70-147	
Vinyl chloride	ug/L	ND	20	25.5	128	70-156	
1,2-Dichloroethane-d4 (S)	%				91	70-130	
4-Bromofluorobenzene (S)	%				96	70-130	
Toluene-d8 (S)	%				99	70-130	

SAMPLE DUPLICATE: 2521280

Parameter	Units	92421097001 Result	Dup Result	RPD	Max RPD	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	ND		30	
trans-1,2-Dichloroethene	ug/L	ND	ND		30	
Trichloroethene	ug/L	ND	ND		30	
Vinyl chloride	ug/L	ND	ND		30	

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## QUALITY CONTROL DATA

Project: CTS of Asheville

Pace Project No.: 92421040

SAMPLE DUPLICATE: 2521280

Parameter	Units	92421097001 Result	Dup Result	RPD	Max RPD	Qualifiers
1,2-Dichloroethane-d4 (S)	%	101	99	2		
4-Bromofluorobenzene (S)	%	98	99	1		
Toluene-d8 (S)	%	104	103	1		

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## QUALITY CONTROL DATA

Project: CTS of Asheville

Pace Project No.: 92421040

QC Batch:	463621	Analysis Method:	EPA 8260D
QC Batch Method:	EPA 8260D	Analysis Description:	8260D MSV Low Level
Associated Lab Samples:	92421040001, 92421040002, 92421040003, 92421040004, 92421040005, 92421040006, 92421040007, 92421040008		

METHOD BLANK:	2522215	Matrix:	Water
Associated Lab Samples:	92421040001, 92421040002, 92421040003, 92421040004, 92421040005, 92421040006, 92421040007, 92421040008		

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.29	03/15/19 14:47	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.25	03/15/19 14:47	
Trichloroethene	ug/L	ND	1.0	0.22	03/15/19 14:47	
Vinyl chloride	ug/L	ND	1.0	0.24	03/15/19 14:47	
1,2-Dichloroethane-d4 (S)	%	93	70-130		03/15/19 14:47	
4-Bromofluorobenzene (S)	%	101	70-130		03/15/19 14:47	
Toluene-d8 (S)	%	107	70-130		03/15/19 14:47	

LABORATORY CONTROL SAMPLE: 2522216

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
cis-1,2-Dichloroethene	ug/L	50	54.9	110	70-130	
trans-1,2-Dichloroethene	ug/L	50	58.9	118	70-130	
Trichloroethene	ug/L	50	59.9	120	70-130	
Vinyl chloride	ug/L	50	60.5	121	70-131	
1,2-Dichloroethane-d4 (S)	%			103	70-130	
4-Bromofluorobenzene (S)	%			98	70-130	
Toluene-d8 (S)	%			95	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2522217 2522218

Parameter	Units	92421040002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
cis-1,2-Dichloroethene	ug/L	ND	250	250	302	297	121	119	70-141	1	30	
trans-1,2-Dichloroethene	ug/L	ND	250	250	321	318	128	127	70-146	1	30	
Trichloroethene	ug/L	1610	250	250	2070	2110	186	202	70-147	2	30	M1
Vinyl chloride	ug/L	ND	250	250	334	331	133	132	70-156	1	30	
1,2-Dichloroethane-d4 (S)	%						108	107	70-130			
4-Bromofluorobenzene (S)	%						98	100	70-130			
Toluene-d8 (S)	%						99	99	70-130			

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## QUALIFIERS

Project: CTS of Asheville  
Pace Project No.: 92421040

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: CTS of Asheville

Pace Project No.: 92421040

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92421040001	MW-21	EPA 8260D	463621		
92421040002	GW-132-48	EPA 8260D	463621		
92421040003	GW-132-58	EPA 8260D	463621		
92421040004	GW-131-59	EPA 8260D	463621		
92421040005	FD-37	EPA 8260D	463621		
92421040006	GW-121-45	EPA 8260D	463621		
92421040007	GW-122-46	EPA 8260D	463621		
92421040008	MW-21A	EPA 8260D	463621		
92421040009	TB-34	EPA 8260D	463391		

## REPORT OF LABORATORY ANALYSIS

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Document Name:  
Sample Condition Upon Receipt(SCUR)  
Document No.:  
F-CAR-CS-033-Rev.06

Document Revised: February 7, 2018  
Page 1 of 2  
Issuing Authority:  
Pace Carolinas Quality Office

Laboratory receiving samples:

Asheville ☒

Eden ☐

Greenwood ☐

Huntersville ☐

Raleigh ☐

Mechanicsville ☐

Sample Condition  
Upon Receipt

Client Name:

Wood E+I - Asheville

Project #

WO#: 92421040



Courier:

☐ Commercial

☐ Fed Ex

☐ UPS

☐ USPS

☒ Client

☐ Pace

☐ Other:

Custody Seal Present?

☒ Yes

☐ No

Seals Intact?

☒ Yes

☐ No

Date/Initials Person Examining Contents:

JD  
3/13/19

Packing Material:

☐ Bubble Wrap

☒ Bubble Bags

☐ None

☐ Other

Thermometer:

☒ IR Gun ID:

93T046

Type of Ice:

☒ Wet

☐ Blue

☐ None

Biological Tissue Frozen?

☐ Yes

☐ No

☒ N/A

Cooler Temp (°C):

3.9

Correction Factor: Add/Subtract (°C)

0.0

Cooler Temp Corrected (°C):

3.9

Temp should be above freezing to 6°C

☐ Samples out of temp criteria. Samples on ice, cooling process has begun

USDA Regulated Soil ☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes

☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

Comments/Discrepancy:

Chain of Custody Present?

☒ Yes

☐ No

☐ N/A

1.

Samples Arrived within Hold Time?

☒ Yes

☐ No

☐ N/A

2.

Short Hold Time Analysis (<72 hr.)?

☐ Yes

☒ No

☐ N/A

3.

Rush Turn Around Time Requested?

☐ Yes

☒ No

☐ N/A

4.

Sufficient Volume?

☒ Yes

☐ No

☐ N/A

5.

Correct Containers Used?

☒ Yes

☐ No

☐ N/A

6.

-Pace Containers Used?

☒ Yes

☐ No

☐ N/A

Containers Intact?

☒ Yes

☐ No

☐ N/A

7.

Dissolved analysis: Samples Field Filtered?

☐ Yes

☒ No

☐ N/A

8.

Sample Labels Match COC?

☒ Yes

☐ No

☐ N/A

9.

-Includes Date/Time/ID/Analysis Matrix:

WT

Headspace in VOA Vials (>5-6mm)?

☐ Yes

☒ No

☐ N/A

10.

Trip Blank Present?

☒ Yes

☐ No

☐ N/A

11.

Trip Blank Custody Seals Present?

☒ Yes

☐ No

☐ N/A

Field Data Required? ☐ Yes ☒ No

COMMENTS/SAMPLE DISCREPANCY

Lot ID of split containers:

CLIENT NOTIFICATION/RESOLUTION

Person contacted:

Date/Time:

Project Manager SCURF Review:

(P)  
(P)


Date:

3/14

Project Manager SRF Review:

Date:

3/14

	Document Name:	Document Revised: February 7, 2018
	Sample Condition Upon Receipt(SCUR)	Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.06	Issuing Authority: Pace Carolinas Quality Office

\*Check mark top half of box if pH and/or dechlorination is verified and within the acceptance range for preservation samples.

Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC, LLHg

\*\*Bottom half of box is to list number of bottle

Project #

**WO# : 92421040**

PM: PTE

Due Date: 03/20/19

CLIENT: 92-AMEC A

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic ZN Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A - lab)	SP2T-250 mL Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	AG0U-100 mL Amber Unpreserved vials (N/A)	VSGU-20 mL Scintillation vials (N/A)	DG9U-40 mL Amber Unpreserved vials (N/A)	
1																		3											
2																		3											
3																		3											
4																		3											
5																		3											
6																		3											
7																		3											
8																		3											
9																2													
10																													
11																													
12																													

### pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers.



# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

## Section A

### Required Client Information:

Company: Wood E&I - Asheville  
 Address: 1308 Patton Avenue  
 Asheville, NC 28806  
 Email: susan.avitt@woodpic.com  
 Phone: NONE  
 Requested Due Date: 3 DAY HOLD TIME

## Section B

### Required Project Information:

Report To: Susan Avitt  
 Copy To:  
 Purchase Order #:  
 Project Name: CTS of Asheville  
 Project #: 6252-16-2012.08

## Section C

### Invoice Information:

Attention:  
 Company Name:  
 Address:  
 Pace Order:  
 Pace Project Manager: taylor.azell@pacelabs.com  
 Pace Profile #: 3900-3

Regulatory Agency: USEPA  
 State / Location: NC

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -) Sample IDs must be unique	MATRIX Drinking Water Waste Water Process Water Soil/Solid Oil Wipe Air Other Tissue	CODE DW WW PW SL OK WP AR OT TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test	Y/N	VOC (Unpreserved)	VOC (Preserved)	Trip BLANK	Residual Chlorine (Y/N)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
						START	END			Unpreserved	H2SO4	HN03	HCl	NaOH	Na2S2O3	Methanol								Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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PRINT Name of SAMPLER: Rodney M. Clark  
 SIGNATURE of SAMPLER: [Signature]  
 DATE Signed: 3/12

TEMP In C: 3.9  
 Received on Ice (Y/N): Y  
 Custody Sealed Cooler (Y/N): Y  
 Samples Intact (Y/N): Y

## **APPENDIX D**

### **SOIL BORING LOGS**

Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-121**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Checked By: R. Clark
Equipment: Geoprobe 7822DT	
Approximate Ground Surface Elevation (feet): 2415 ft.	Boring Date: 12/17/2018

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
			0-5 70%			Reddish Brown to Brown, Sandy SILT, Trace Mica and Coarse Sand (Possible Fill)
5						Red, Silty SAND, Moist
			5-10 80%			Red to Reddish Brown, Fine to Medium SAND, Moist, Little/Some Silt (Relict Structure/Foliation Apparent at 8 feet)
10						
			10-15 95%			Brown, Micaceous, Fine to Medium Sandy SILT, Slightly Moist, Little/Some Silt
15						
			15-20 95%			Reddish Brown, Slightly Micaceous, Fine to Medium SAND, Moist, Little/Some Silt
20						
			20-25 100%			Brown, Micaceous, Fine to Medium SAND, Moist, Foliated, Trace Coarse Sand and Gravel (Weathered Rock)
25						
			25-30 95%			Brown, Fine to Medium SAND, Moist, Little/Some Silt, Little Mica, Mostly Massive Appearance
30						
			30-35 75%			
35						
			35-40 100%			
40						38.2'-38.7': Potassium Permanganate Staining
			40-45 50%			
45						43.3'-46.6': Potassium Permanganate Staining 44.2': Potassium Permanganate Emplacement (0.8' Thick)
			45-50 100%			
50						Geoprobe refusal at 50 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-122**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/17/2018
Approximate Ground Surface Elevation (feet): 2415 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			75%		Gravel Red, Silty Clayey SAND, Moist, Trace Coarse Sand (Possible Fill)
5-10			85%		Red to Reddish Brown, Fine to Medium SAND, Slightly Moist, Little/Some Sand, Little Mica, Slight Relict Structure
10-15			85%		
15-20			80%		
20-25			95%		Reddish Brown to Brown, Micaceous, Silty Fine to Medium SAND, Moist, Little/Some Silt, Foliated
25-30			100%		Reddish Brown, Fine to Medium SAND, Moist, Little/Some Silt, Little Mica, Massive Appearance with Some Dark Mineral Weathering
30-35			100%		Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Slight Foliation
35-40			90%		29.7 to 29.9 feet - Quartz Vein (Coarse Sand to Gravel), Wet Brown to Dark Brown, Highly Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Zones of Coarse Sandy Gravel (Weathered Rock from 34 to 35 feet)
40-45			100%		Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Massive Appearance with Some Dark Mineral Weathering
45-48			100%		43.7'-47.8': Potassium Permanganate Staining 44.2': Potassium Permanganate Emplacement (0.01' Thick)
Geoprobe refusal at 48 feet					

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-123**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/17/2018
Approximate Ground Surface Elevation (feet): 2415 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			50%	Gravel	Red, Clayey Sandy SILT, Moist, Trace Mica
5-10			90%		Red, Silty SAND, Slightly Moist, Trace Mica
10-15			90%		Reddish Brown, Micaceous, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Mostly Massive Appearance with Zones of Relict Structure Apparent
15-20			80%		
20-25			80%		Brown to Dark Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Layered with Zones of Kaolin and Quartz from 33 to 35 feet
25-30			90%		
30-35			80%		
35-40			100%		Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Massive Appearance
40-45			90%		Dark Brown, Micaceous, Fine to Medium SAND, Moist, Some Silt, Foliated
45-48			100%		Brown, Fine to Medium SAND, Moist (Wet at top of Liner), Little Silt, Little Mica
					44-44.3 Quartz/Kaolin Layer (Quartz up to 1 inch Diameter)
					46.8-48 Quartz/Kaolin Layer, Wet (Quartz up to 1 inch Diameter)
					Geoprobe refusal at 48 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-124**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Checked By: R. Clark
Equipment: Geoprobe 7822DT	
Approximate Ground Surface Elevation (feet): 2414 ft.	Boring Date: 12/17/2018

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
			0-5 50%		Gravel	Red, Clayey Sandy SILT, Moist, Trace Mica and Gravel (Possible Fill)
5			5-10 70%			Red, Silty SAND, Slightly Moist, Some Mica, Trace Relict Structure
10			10-15 75%			Red to Reddish Brown, Micaceous, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Massive Appearance, Trace Relict Structure and Dark Mineral Weathering
15			15-20 90%			
20			20-25 90%			
25			25-30 90%			Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Massive Appearance with Dark Mineral Weathering
30			30-35 90%			
35			35-40 90%			34.8'-38.0': Potassium Permanganate Staining 36.5': Potassium Permanganate Emplacement (0.03' Thick)
40			40-44 100%			

Geoprobe refusal at 44 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-125**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/17/2018
Approximate Ground Surface Elevation (feet): 2414 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
			0-5 50%			Gravel Brown to Red, Clayey Sandy SILT, Moist, Trace Gravel (Possible Fill)
5			5-10 80%			Red, Silty SAND, Slightly Moist, Little Mica, Massive with Trace Dark Mineral Weathering
10			10-15 85%			Red to Reddish Brown, Micaceous, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Massive Appearance
15			15-20 100%			
20			20-25 95%			
25			25-30 100%			Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Mostly Massive with Zones of Slight Foliation
30			30-35 80%			30.0'-37.0': Potassium Permanganate Staining 32.3': Potassium Permanganate Emplacement (0.08' Thick)
35			35-40 80%			
40			40-45 90%			
45			45-48 100%			Orangish Brown to Dark Brown, Fine to Medium SAND, Little/Some Silt, Moist, Quartz/Kaolin Rich Dark Brown, Micaceous, Fine to Medium SAND, Moist, Little Silt, Massive Appearance with Dark Mineral Weathering
Geoprobe refusal at 48 feet						

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-126**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Checked By: R. Clark
Equipment: Geoprobe 7822DT	
Approximate Ground Surface Elevation (feet): 2415 ft.	Boring Date: 12/17/2018

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
0-5			50%		Gravel	Gravel
5-10			50%			Reddish Brown, Clayey Sandy SILT, Moist, Trace Gravel (Possible Fill)
10-15			90%			Reddish Brown to Brown, Silty SAND, Moist
15-20			95%			Reddish Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Some Mica, Massive with Dark Mineral Weathering
20-25			95%			Brown, Micaceous, Fine to Medium SAND, Moist, Little/Some Silt, Mostly Massive Appearance with Dark Mineral Weathering
25-30			100%			
30-35			70%			
35-40			90%			
40-45			90%			
45-48			100%			

Geoprobe refusal at 48 feet

Remarks:



Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-127**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/17/2018
Approximate Ground Surface Elevation (feet): 2414 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			50%	Asphalt/Gravel	Asphalt/Gravel
5-10			85%	Reddish Brown, Sandy SILT, Moist, Trace Mica	Reddish Brown, Sandy SILT, Moist, Trace Mica
10-15			90%	0.8-1.1 Asphalt	0.8-1.1 Asphalt
15-20			90%	Reddish Brown to Brown, Clayey Sandy SILT, Moist, Little Gravel Zones (Possible Fill)	Reddish Brown to Brown, Clayey Sandy SILT, Moist, Little Gravel Zones (Possible Fill)
20-25			95%	Reddish Brown to Brown, Silty Fine to Medium SAND, Slightly Moist, Massive Appearance with Dark Mineral Weathering	Reddish Brown to Brown, Silty Fine to Medium SAND, Slightly Moist, Massive Appearance with Dark Mineral Weathering
25-30			95%	Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Little/Some Mica, Mostly Massive Appearance with Some Slight Layering	Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Little/Some Mica, Mostly Massive Appearance with Some Slight Layering
30-35			95%		
35-40			100%	33.6'-39.0': Potassium Permanganate Staining	33.6'-39.0': Potassium Permanganate Staining
40-45			100%		
45				Geoprobe refusal at 45 feet	Geoprobe refusal at 45 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-128**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: R. Clark	Equipment: Geoprobe 7822DT
Checked By: S. Avritt	Boring Date: 12/18/2018
Approximate Ground Surface Elevation (feet): 2413 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
0-5			30%			Asphalt
5-10			80%			Grayish Brown, Silty SAND, Some Gravel
						Red, Fine Sandy SILT, Moist, Trace Gravel, Possible Fill
10-15			80%			Light Yellowish Brown, Silty Fine to Medium SAND, Moist, Trace Mica, Mostly Massive with Trace Black Mineral Weathering
15-20			90%			
20-25			100%			
25-30			100%			
30-35			100%			29.2'-30.8': Potassium Permanganate Staining
35-40			100%			
40-45			70%			42.6'-43.4': Potassium Permanganate Staining
45						Geoprobe refusal at 45 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-129**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: R. Clark	Equipment: Geoprobe 7822DT
Checked By: S. Avritt	Boring Date: 12/18/2018
Approximate Ground Surface Elevation (feet): 2414 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
			0-5 65%			Asphalt
						Red, Fine Sandy SILT, Some Gravel/Quartz, Possible Fill
5			5-10 85%			Reddish Brown to Light Brown, Silty Fine to Medium SAND, Moist, Massive
10			10-15 95%			Light Reddish Brown, Silty Fine to Medium SAND, Moist, Massive
15			15-20 85%			Light Yellowish Brown to Light Reddish Brown, Silty Fine to Medium SAND, Moist, Massive
20			20-25 100%			
25			25-30 100%			
30			30-35 80%			28.6'-28.7': Potassium Permanganate Staining
35			35-40 100%			33.9'-34.4': Potassium Permanganate Staining
40			40-45 85%			38.7'-39.2': Potassium Permanganate Staining
45			45-50 85%			42.8'-43.3': Potassium Permanganate Staining 44.2'-46.4': Potassium Permanganate Staining
50			50-55 35%			Light Yellowish Brown, Silty Fine to Medium SAND, Moist, Trace Dark Mineral Weathering
55						Geoprobe refusal at 55 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-130**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: R. Clark	Equipment: Geoprobe 7822DT
Checked By: S. Avritt	Boring Date: 12/18/2018
Approximate Ground Surface Elevation (feet): 2414 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)		Lithology	Lithologic Description
			0-5 25%			Asphalt
						Red, Fine Sandy SILT, Some Gravel, Possible Fill
5			5-10 80%			Red to Reddish Brown, Silty Fine to Medium SAND, Moist, Massive, Trace Structure
10			10-15 90%			
15			15-20 75%			
20			20-25 60%			Light Yellowish Brown, Silty Fine to Medium SAND, Moist, Massive, Trace Structure
25			25-30 100%			
30			30-35 100%			
35			35-40 60%			
40			40-45 100%			
45			45-50 90%			
50						Geoprobe refusal at 50 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-131**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: R. Clark	Equipment: Geoprobe 7822DT
Checked By: S. Avritt	Boring Date: 12/18/2018
Approximate Ground Surface Elevation (feet): 2414 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			60%		Asphalt
5					Red, Silty Fine SAND, Some Gravel, Possible Fill
					1.5-1.8 Quartz Seam
5-10			80%		Red, Fine Sandy SILT, Moist, Some Gravel, Possible Fill
					Red, Silty Fine to Medium SAND, Moist, Massive, Trace Structure
10-15			85%		
15-20			85%		
20-25			100%		Light Yellowish Brown to Light Reddish Brown, Silty Fine to Medium SAND, Moist, Massive, Trace Structure, Trace Dark Mineral Weathering
25-30			90%		
30-35			80%		
35-40			90%		
40-45			90%		39.8'-44.6': Potassium Permanganate Staining
45-50			100%		45.8'-46.3': Potassium Permanganate Staining
					45.9'-46.1' Kaolin Rich Zone
50-55			85%		52.0'-52.3' Quartz/Kaolin Zone
55-60			100%		54.4'-62.5': Potassium Permanganate Staining
60-62			100%		
Geoprobe refusal at 62.5 feet					
Remarks:					

Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-132**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/19/2018
Approximate Ground Surface Elevation (feet): 2415 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			50%	Gravel	Gravel
5-10			70%	Red, Sandy SILT, Moist, Trace Mica, Slightly Moist, Massive Appearance	Reddish Brown to Brown, Clayey Sandy SILT, Moist (Possible Fill)
10-15			80%	Reddish Brown, Micaceous, Silty SAND, Slightly Moist, Foliated	
15-20			80%	Reddish Brown to Brown, Fine to Medium SAND, Slightly Moist to Moist, Trace Mica, Massive Appearance with Dark Mineral Weathering	
20-25			85%		
25-30			100%		
30-35			90%	Brown, Micaceous, Fine to Medium SAND, Moist, Mostly Massive Appearance with Some Slight Layering, Dark Mineral Weathering	
35-40			80%		
40-45			90%	39.3'-39.8': Potassium Permanganate Staining 40.0'-52.8': Potassium Permanganate Staining	
45-50			100%	43.7': Potassium Permanganate Emplacement (0.13' Thick)	
50-55			75%		
55-60			10%	55.0'-60.0': No Recovery from 55 to 59 feet but Liner is Stained with Potassium Permanganate	
60				Geoprobe refusal at 60 feet	

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-133**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Equipment: Geoprobe 7822DT
Checked By: R. Clark	Boring Date: 12/19/2018
Approximate Ground Surface Elevation (feet): 2415 ft.	

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
0-5			60%	Gravel	Gravel
5-10			95%		Reddish Brown to Brown, Clayey Sandy SILT, Moist, Trace Gravel (Possible Fill)
10-15			95%		Red, Sandy SILT, Moist, Trace to Some Mica, Massive Appearance
15-20			95%		Reddish Brown, Micaceous, Silty SAND, Slightly Moist, Layered to Foliated
20-25			100%		Reddish Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Little/Some Mica, Massive Appearance with Dark Mineral Weathering
25-30			100%		
30-35			95%		
35-40			90%		
40-45			50%		
45-50			90%		43.9'-46.0': Potassium Permanganate Staining
50-55			35%		
55-60			80%		
60					Geoprobe refusal at 60 feet

Remarks:

Wood Environment & Infrastructure Solutions, Inc.  
 1308 Patton Avenue  
 Asheville, North Carolina 28806

**Boring ID: SB-134**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Checked By: R. Clark
Equipment: Geoprobe 7822DT	
Approximate Ground Surface Elevation (feet): 2415 ft.	Boring Date: 12/19/2018

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
			0-5 60%		Asphalt/Gravel
					Reddish Brown to Brown, Clayey Sandy SILT, Moist, Trace Gravel (Possible Fill)
5			5-10 95%		Red, Sandy SILT, Moist, Trace Mica, Quartz Rich Zone at 7.3 to 7.5 feet
					Red, Silty SAND, Slightly Moist, Trace Mica, Massive Appearance
10			10-15 95%		Brown to Reddish Brown, Micaceous, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Mostly Massive with Dark Mineral Weathering (Moist at 20 feet)
15			15-20 95%		
20			20-25 100%		
25			25-30 100%		
30			30-35 95%		
35			35-40 90%		
40			40-45 50%		
45			45-50 90%		
50			50-55 35%		
55			55-60 80%		
60					57.8'-60.0': Potassium Permanganate Staining (to the bottom of the liner) 58.3': Potassium Permanganate Emplacement (0.04' Thick) Geoprobe refusal at 60 feet
Remarks:					



Wood Environment & Infrastructure Solutions, Inc.  
1308 Patton Avenue  
Asheville, North Carolina 28806

**Boring ID: SB-135**

Project: CTS of Asheville, Inc. Superfund Site	Drilling Company: Cascade Drilling
Location: Asheville, North Carolina	Driller: Dan Ferrell (NC 3221)
Project Number: 6252162012	Boring Method: Direct-Push Technology
Logged By: S. Avritt	Checked By: R. Clark
Equipment: Geoprobe 7822DT	
Approximate Ground Surface Elevation (feet): 2415 ft.	Boring Date: 12/19/2018

Depth (feet)	Sample	Sample Name	Recovery (%)	Lithology	Lithologic Description
			0-5 60%		Asphalt/Gravel
					Reddish Brown to Brown, Clayey Sandy SILT, Moist, Trace Gravel (Possible Fill)
5			5-10 90%		Red, Sandy SILT, Moist, Trace Mica
					Red, Silty SAND, Slightly Moist, Little Mica, Massive Appearance
10			10-15 80%		Reddish Brown to Brown, Micaceous, Silty SAND, Slightly Moist, Foliated
					Reddish Brown to Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Massive with Dark Mineral Weathering
15			15-20 80%		Reddish Brown to Brown, Micaceous, Silty SAND, Slightly Moist, Foliated
20			20-25 75%		Reddish Brown to Brown, Fine to Medium SAND, Slightly Moist, Little/Some Silt, Massive with Dark Mineral Weathering (Moist at 20 feet)
25			25-30 75%		
30			30-35 80%		
35			35-40 80%		34.0'-35.0': Potassium Permanganate Staining
40			40-45 80%		39.2'-43.3': Potassium Permanganate Staining
45			45-50 80%		
50			50-55 80%		
55			55-59 90%		
					58.8'-59.0': Potassium Permanganate Staining (to the bottom of the liner) Geoprobe refusal at 59 feet

Remarks:

## **APPENDIX E**

### **WASTE MANIFESTS**

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number <b>NCD003149556</b>		2. Page 1 of <b>1</b>		3. Emergency Response Phone <b>800-235-3025-M12000705</b>		4. Manifest Tracking Number <b>009964698 JJK</b>			
		5. Generator's Name and Mailing Address <b>CTS Corporation-Skyland 905 West Blvd North Elkhart, IN 46514 574-523-3000</b>						Generator's Site Address (if different than mailing address) <b>CTS Corp. 235 Mills Gap Road Skyland, NC 28580</b>			
6. Transporter 1 Company Name <b>A&amp;D Environmental Services (SC), LLC</b>		U.S. EPA ID Number <b>50D507598331</b>									
7. Transporter 2 Company Name <b>Clean Harbors Environmental Solutions, LLC</b>		U.S. EPA ID Number <b>50D507598331</b>									
8. Designated Facility Name and Site Address <b>Clean Harbors Deerpark, L.P. 2027 Independence Parkway South La Porte, TX 77571 USA 215-822-8995</b>		U.S. EPA ID Number <b>TAD055141378</b>									
Facility's Phone:											
GENERATOR	9a. HM:	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))				10. Containers		11. Total Quantity	12. Unit Wt/Vol.	13. Waste Codes	
						No.	Type				
		1. <b>UN3082, Waste Environmentally Hazardous Substance, Liquid, n.o.s. (trichloroethylene), 9, PG III, ERGN 171</b>				<b>010</b>	<b>DM</b>	<b>4000</b>	<b>P</b>	<b>0040</b>	
		2. <b>UN3077, Waste Environmentally Hazardous Substance, Solid, n.o.s. (trichloroethylene), 5, PG III, ERGN 171</b>				<b>041</b>	<b>DM</b>	<b>21,000</b>	<b>P</b>	<b>0040</b>	
		3.									
	4.										
14. Special Handling Instructions and Additional Information <b>SA.1) CH392220 (liquids) 10 x 55gal. 2) CH392220 (solids) 41 x 55gal. 1800 581043</b>											
Job Number: <b>1801-0004</b> PON <b>1804-0004</b> Transporter <b>1-800-434-7750</b>											
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.											
Generator's/Offeror's Printed/Typed Name <b>Susan Arritt</b> Signature <b>Susan Arritt as agent for CTS Corporation</b> Month <b>12</b> Day <b>11</b> Year <b>18</b>											
INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: <b>Corporation</b> Date leaving U.S.:										
	17. Transporter Acknowledgment of Receipt of Materials										
TRANSPORTER	Transporter 1 Printed/Typed Name <b>Math wray</b> Signature <b>Math wray</b> Month <b>10</b> Day <b>21</b> Year <b>18</b>										
	Transporter 2 Printed/Typed Name <b>Gina Chambers</b> Signature <b>Gina Chambers</b> Month <b>12</b> Day <b>17</b> Year <b>18</b>										
DESIGNATED FACILITY	18. Discrepancy										
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection										
	18b. Alternate Facility (or Generator) Manifest Reference Number: U.S. EPA ID Number:										
	Facility's Phone: 18c. Signature of Alternate Facility (or Generator) Month Day Year										
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)											
1. <b>H040</b> 2. <b>H040</b> 3. 4.											
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a											
Printed/Typed Name <b>A. Gohring</b> Signature <b>A. Gohring</b> Month <b>12</b> Day <b>26</b> Year <b>18</b>											

EPA Form 8700-22A (Rev. 3-05) Previous editions are obsolete

DESIGNATED FACILITY TO GENERATOR

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number NCD003149556	2. Page 1 of 2	3. Emergency Response Phone 800-255-3825-MI80007051	4. Manifest Tracking Number 009964756 JJK		
5. Generator's Name and Mailing Address CTS Corporation 905 West Blvd North Elkhart, IN 46514 574-523-3800		Generator's Site Address (if different than mailing address) CTS Corp. 235 Mills Gap Road Smyland, NC 28803 Asheville					
6. Transporter 1 Company Name A&D Environmental Services (SC), LLC		U.S. EPA ID Number SCD987598331					
7. Transporter 2 Company Name Clean Harbors Env. Svcs Inc.		U.S. EPA ID Number mad039322250					
8. Designated Facility Name and Site Address Clean Harbors Deerpark, L.P. 2027 Independence Parkway South La Porte, TX 77571 USA 281-930-2300		U.S. EPA ID Number TXD055141378					
Facility's Phone:							
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No. Type		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	X	UN3082, Waste Environmentally Hazardous Substance, Liquid, n.o.s. (trichloroethylene), 9, PG III, ERG# 171	13	DM	5,460	P	0040
	2.						
	3.						
	4.						
14. Special Handling Instructions and Additional Information 9a.1) CH392211 (3 x 55gal) Job Number: 1802-0726 PO# 1000189 Transporter 1-800-434-7750 1801099151							
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.							
Generator's/Offeror's Printed/Typed Name Rodney Clark, as agent for CTS Corporation							
Signature [Signature]							
Month Day Year 3 1 18							
INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: Date leaving U.S.:						
	Transporter signature (for exports only):						
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials						
	Transporter 1 Printed/Typed Name Williams, Kyle						
Signature [Signature]							
Month Day Year 03 01 18							
DESIGNATED FACILITY	Transporter 2 Printed/Typed Name Gina Chambers						
	Signature [Signature]						
Month Day Year 13 18 18							
18. Discrepancy							
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection							
Manifest Reference Number:							
18b. Alternate Facility (or Generator) U.S. EPA ID Number							
Facility's Phone:							
18c. Signature of Alternate Facility (or Generator)							
Month Day Year							
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1. H010 2. 3. 4.							
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a							
Printed/Typed Name [Signature]							
Signature [Signature]							
Month Day Year 03 30 18							

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator ID Number NCD 003149556	22. Page 2	23. Manifest Tracking Number 009964756 JJK			
24. Generator's Name CTS Corp							
25. Transporter 3 Company Name Robbie D. Wood			U.S. EPA ID Number ALD 067138891				
26. Transporter 4 Company Name Clean Harbors Env. Serv.			U.S. EPA ID Number MA003932250				
GENERATOR	27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No. Type		29. Total Quantity	30. Unit WT/Vol.	31. Waste Codes
32. Special Handling Instructions and Additional Information							
TRANSPORTER	33. Transporter 3 Acknowledgment of Receipt of Materials Printed/Typed Name: Curtis Robertson Signature: [Signature] Month: 13 Day: 14 Year: 18						
	34. Transporter 4 Acknowledgment of Receipt of Materials Printed/Typed Name: T. Woods Signature: [Signature] Month: 13 Day: 24 Year: 18						
DESIGNATED FACILITY	35. Discrepancy						
	36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)						

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number <b>NCD003149556</b>	2. Page 1 of <b>1</b>	3. Emergency Response Phone <b>800-255-3824-MI8000795</b>	4. Manifest Tracking Number <b>011561290 JJK</b>	
5. Generator's Name and Mailing Address <b>CTS Corporation-Skyland 905 West Blvd North Elkhart, IN 46514 574-523-3800</b>			Generator's Site Address (if different than mailing address) <b>235 Mills Gap Road Asheville, NC 28803</b>			
6. Transporter 1 Company Name <b>A&amp;D Environmental Services (SC), LLC</b>			U.S. EPA ID Number <b>SCD987598331</b>			
7. Transporter 2 Company Name <i>Clean Harbors Environmental Services, Inc.</i>			U.S. EPA ID Number <i>TXD055141378</i>			
8. Designated Facility Name and Site Address <b>Clean Harbors Deepark, L.P. 2027 Independence Parkway South La Porte, TX 77571 USA 281-930-2300</b>			U.S. EPA ID Number <b>TXD055141378</b>			
Facility's Phone:						
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.
			No.	Type		
		1. <b>UN3082, Waste Environmentally Hazardous Substance, Liquid, n.o.s. (Trichloroethylene), 9, PG III, ERG# 171</b>	<b>3</b>	<b>DM</b>	<b>1,200</b>	<b>P</b>
		2. <b><del>NON-DOT Regulated</del> (42)</b> <b>"DID NOT SHIP" (Empty Drum)</b>	<b>1</b>	<b>DM</b>	<b>37</b>	<b>P</b>
		3.				
		4.				
14. Special Handling Instructions and Additional Information <b>9a.1) CH411113 3 55gal 2) 1806483919</b>						
Job Number: <b>1812-0308</b> PO# <b>1002045</b> Transporter <b>1-800-434-7750</b>						
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						
Generator's/Offor's Printed/Typed Name <i>Susan Arritt as agent for CTS Corporation</i>						
Signature <i>Susan Arritt</i>						
Month Day Year <b>11 2 19 18</b>						
TRANSPORTER	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S.		Port of entry/exit: Date leaving U.S.:			
	Transporter signature (for exports only):					
	17. Transporter Acknowledgment of Receipt of Materials					
	Transporter 1 Printed/Typed Name <i>A. Williams, Inc.</i>		Signature <i>[Signature]</i>		Month Day Year <b>11 2 19 18</b>	
	Transporter 2 Printed/Typed Name <i>[Signature]</i>		Signature <i>[Signature]</i>		Month Day Year <b>11 26 19</b>	
DESIGNATED FACILITY	18. Discrepancy					
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection					
	18b. Alternate Facility (or Generator) Manifest Reference Number: U.S. EPA ID Number					
	Facility's Phone:					
	18c. Signature of Alternate Facility (or Generator) Month Day Year					
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)						
1. <b>H040</b>		2. <b>—</b>		3.		4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a						
Printed/Typed Name <i>[Signature]</i>		Signature <i>[Signature]</i>		Month Day Year <b>10 10 19</b>		

<b>UNIFORM HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number <b>NCD003149556</b>	2. Page 1 of 1	3. Emergency Response Phone <b>800-255-3924</b>	4. Manifest Tracking Number <b>013307752 FLE</b>	
5. Generator's Name and Mailing Address <b>CTS Corporation-Skyland</b> <b>1308 Patton Ave, Suite C</b> <b>Asheville, NC 28806</b>						
Generator's Phone <b>574-523-3800</b>		Generator's Site Address (if different than mailing address) <b>235 Mills Gap Road</b> <b>Asheville, NC 28803</b>				
6. Transporter 1 Company Name <b>A&amp;D Environmental Services (SC) LLC</b>				U.S. EPA ID Number <b>SCD9K7598331</b>		
7. Transporter 2 Company Name <b>Clean Harbors Emerson Lucas Inc</b>				U.S. EPA ID Number <b>MAAD09320023</b>		
8. Designated Facility Name and Site Address <b>Clean Harbors Deerpark, L.P.</b> <b>2027 Independence Parkway South</b> <b>La Porte, TX 77571 USA</b>						
Facility's Phone <b>281-930-2300</b>		U.S. EPA ID Number <b>TXD055141378</b>				
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No. Type		11. Total Quantity	12. Unit Wt./Vol.
	X	1. <b>HA30777 Hazardous Waste Solid, n.o.s. (Tetrachloroethylene), 9, PG III, ERGN 171</b>	1	DM	490	P
		2.				
		3.				
		4.				
14. Special Handling Instructions and Additional Information <b>9a.1) CH392220 (Solids) 1 x 55gal. 2)</b> <b>Job Number: 1204-0004</b> <b>1901834595</b> <b>Emergency Response Number: 800-255-3924</b>						
15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.						
Generator's/Offeror's Printed/Typed Name <b>Susan Auvitt as agent for CTS Corporation</b>						
Signature <i>Susan Auvitt</i>						
Month Day Year <b>14 15 19</b>						
TRANSPORTER	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: Date leaving U.S.:					
	17. Transporter Acknowledgment of Receipt of Materials					
DESIGNATED FACILITY	Transporter 1 Printed/Typed Name <b>Kim Williams</b>					
	Signature <i>Kim Williams</i>					
Month Day Year <b>14 15 19</b>						
Transporter 2 Printed/Typed Name <b>Chris Hester</b>						
Signature <i>Chris Hester</i>						
Month Day Year <b>14 11 19</b>						
18. Discrepancy						
18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection						
Manifest Reference Number:						
18b. Alternate Facility (or Generator) U.S. EPA ID Number						
Facility's Phone:						
18c. Signature of Alternate Facility (or Generator) Month Day Year						
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)						
1. <b>H040</b>		2.		3.		4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a						
Printed/Typed Name <b>A. Gschwing</b>						Month Day Year <b>14 15 19</b>
Signature <i>A. Gschwing</i>						



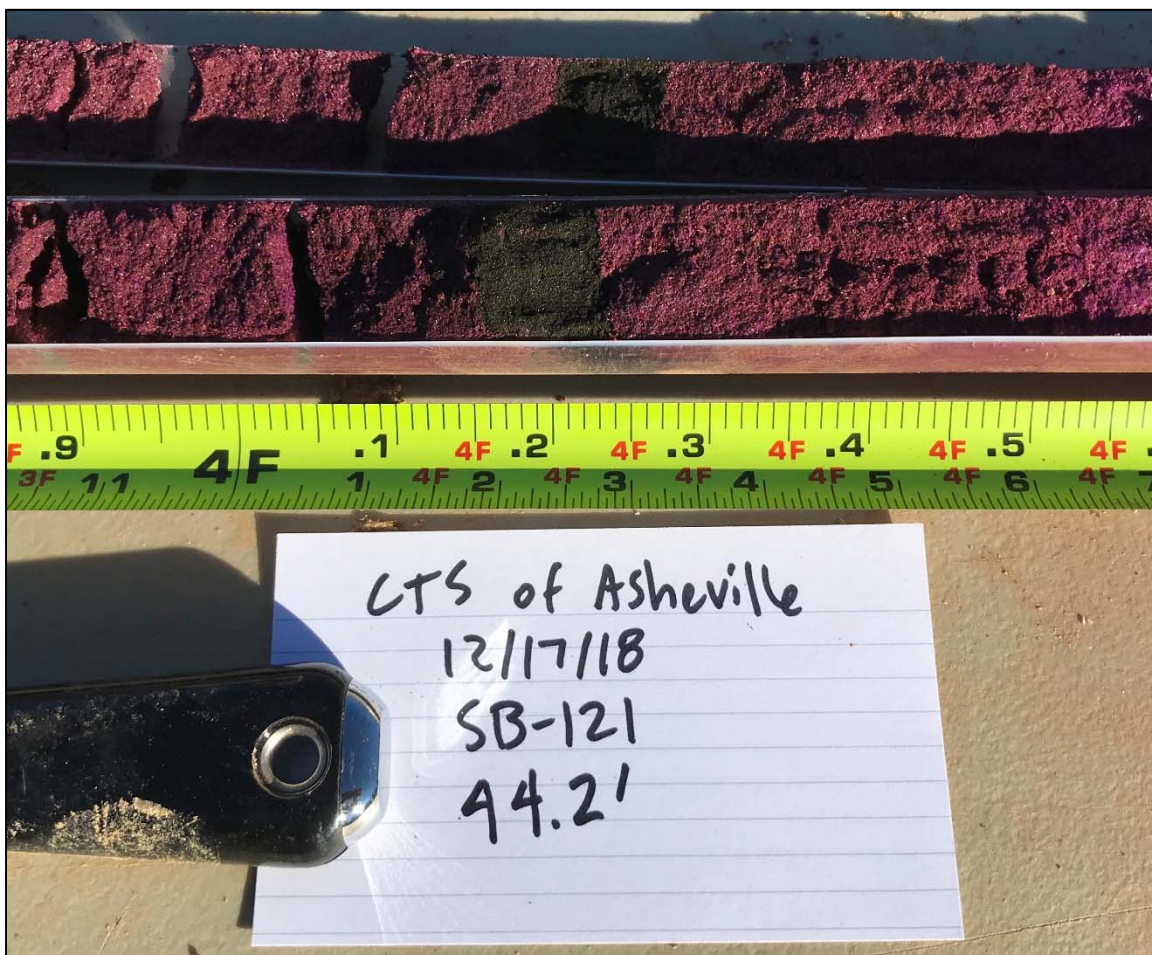
DESIGNATED FACILITY TO GENERATOR

**APPENDIX F**  
**PHOTOGRAPHS FROM THE POTASSIUM PERMANGANATE**  
**DISTRIBUTION EVALUATION**



<b>Photograph No. 1:</b> View of soil core from SB-132 showing permanganate staining (soil depth is from upper right to lower left).	<b>Location:</b> 235 Mills Gap Road
<b>Photographer:</b> Susan Avritt (Wood)	<b>Date:</b> December 12, 2018





**Photograph No. 2:** View of granular permanganate emplacement at 44.2 feet below ground surface (bgs) in soil boring SB-121.

**Location:** 235 Mills Gap Road

**Photographer:** Susan Avritt (Wood)

**Date:** December 17, 2018



**Photograph No. 3:** View of light permanganate staining from 38.25 to 40 feet bgs in soil boring SB-132.

**Location:** 235 Mills Gap Road

**Photographer:** Susan Avritt (Wood)

**Date:** December 19, 2018



**Photograph No. 4:** View of medium permanganate staining from 33.6 to 35 feet bgs in soil boring SB-127.

**Location:** 235 Mills Gap Road

**Photographer:** Susan Avritt (Wood)

**Date:** December 18, 2018