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LIMITED SOIL AND GROUNDWATER ASSESSMENT REPORT
ATKINSON STREET SITE
109 ATKINSON STREET
NCDENR ID# NONCD0002867
HAMLET, RICHMOND COUNTY, NORTH CAROLINA
ORPHAN PRIORITY SITE CONTRACT #N10005S

Prepared for:

North Carolina Department of Environment and Natural Resources
Division of Waste Management
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1.0 INTRODUCTION

&ME, Inc.'s (S&ME's) scope of services were performed in general accordance with our proposal P135-10V, dated July 15, 2010, and as authorized by the North Carolina Department of Environment and Natural Resources' (NCDENR's) Task Authorization dated August 10, 2010 for the Orphan Site Cleanup under Contract No. N10005S.

S&ME completed the following scope of services approved for this task authorization:

- Prepared a site specific Health and Safety Plan (HASP)for the site based upon suspected contamination of chlorinated solvents;
- Reviewed database listings and available public records in the NCDENR's incident file and Richmond County Health Department files for the Atkinson Street site and facilities in the vicinity to collect information on possible source areas of contamination that may be contributing to the contamination of the groundwater resource used by area water supply wells;
- Obtained permission to install soil borings (B-109-1 through B-109-4) and monitor wells (SMW-3, and DMW-1 through DMW-3) from the Richmond County Health Department and obtained monitor well installation permits from the North Carolina Division of Water Quality;
- Completed five soil borings to approximately 20 feet below the ground surface (ft-bgs);
- Collected one soil sample from each borehole (B-109-1 through B109-4 and SMW-1) for volatile organic compounds (VOCs) by EPA Method 8260B analysis;
- Installed one shallow Type II monitor well (~25 ft-bgs) on the Haught property and three deep Type II monitor wells monitor wells (one on the Haught property and two on the Butler property to a depth of approximately 95 ft-bgs);
- Collected and analyzed for VOCs by EPA Method 8260B on soil samples collected from each boring drilled for the monitor well installations and one groundwater sample from each monitor well location;
- Sampled residential water supply wells at the Haughts, Jernigans, and Butlers for analysis of VOCs by EPA Method 8260B;
- Surveyed the location and top of casing elevations from the newly installed monitor wells; and,
- Prepared this report.

2.0 PROJECT BACKGROUND

The Haught Property has a water supply well that has had concentrations of 1,1-dichloroethylene (1,1-DCE) detected in water quality samples analyzed by the Division of Waste Management (DWM) Inactive hazardous Sites Branch (IHSB). Mr. Haught's water supply well is located at 109 Atkinson Street in Hamlet, Richmond County, North Carolina. The site and vicinity are shown in **Figure 1**. Previous analytical tests performed on water sampled from the Atkinson Street site supply well detected 1,1-DCE concentrations ranging from 4.8 to 23.4 micrograms per liter (µg/L). The North Carolina groundwater quality standard for 1,1-DCE is 7.0 µg/L. The construction record on the Haught supply well indicated that the well is constructed to a depth of approximately 89 ft-bgs and was screened between 79 ft-bgs and 89 ft-bgs.

Mr. David Wells of S&ME, along with Mr. Keith Snavely, Mr. John Walch, Mr. Sean Boyles, and Mr. David Brown of NCDENR IHSB visited the Atkinson Street site on June 24, 2010. During this site visit, boring locations were reviewed and the area was observed for access restrictions. Mr. Mike Norton of the Richmond County Health Department also visited the site and communicated locations of septic tanks and drainage fields at the drill sites. Mr. Norton also checked boring locations for compliance with buffer rules for well installations. A site map showing the well and boring locations is on **Figure 2**.

Previous investigations that included sampling water supply wells were performed in the area by the North Carolina Division of Water Quality or Richmond County Health Department. S&ME is aware that two monitor wells (SMW-1 and SMW-2) were installed and sampled previously at the at the Atkinson Street site by Solutions IES Inc.

This limited investigation of the Atkinson Street site is intended to assess potential sources for the 1,1-DCE detected in the water supply well at the subject property. Other potential sources of the constituents detected in the groundwater may include the CSX railroad and the CSX Transportation Hamlet Yard site (NONCD0001420). The southern portion of the CSX property is located about 500 feet to the north of the Haught residence. The CSX railroad is located approximately 1000 feet to the northeast of the Haught residence.

3.0 SITE ACTIVITIES

S&ME personnel performed site activities to clear utilities, sample soils, describe lithology, install monitor wells, sample water supply wells, and sample groundwater from the monitor wells between September 7 and 21, 2010.

3.1 Scope Preparation, Health & Safety

The Scope of Services were designed to assess potential soil and groundwater contamination possibly originating on-site or coming from off-site sources by collecting soil and groundwater samples at predetermined locations throughout the site. S&ME prepared a site-specific HASP and notified North Carolina One-Call to have subsurface utilities marked. Bateman Civil Survey Company (BCSC) to located and marked underground utilities at the site prior to commencing field activities. S&ME obtained monitor well installation permits form the Richmond County Health Department and from the North Carolina Division of Water Quality. In addition, S&ME reviewed the public record made available by the NCDENR and by Richmond County Health Department.

3.2 Review of Public Records

S&ME obtain database listings and historical aerial photographs of the Atkinstreet Site and vicinity from Environmental Data Resources, Inc. (EDR). Based on the database listing for the Atkinson Street site, S&ME reviewed the public records made available by the NCDENR and the Richmond County Health Department. A copy of the EDR database report and associated records (i.e., historical topographic maps and aerial photographs) is included in **Appendix I**. Available public records reviewed are listed in **Section 6.0** of this report.

3.2.1 Historical Use Information (Aerial Photograph and Topographic Maps)

The historical aerial photographs showing the Atkinson Street site and surrounding area that were reviewed are dated 1958, 1976, 1983, 1993, 1999 and 2006. Historical topographic maps reviewed are dated 1942 (7.5 minute series), 1949 (15 minute and 7.5 minute series), 1957, 1982 and 2002 (7.5 minute series). Copies of the aerial photographs and the topographic maps are included with the EDR report in **Appendix I**.

The 1958 and 1976 aerial photographs show the Atkinson Street site as an agricultural field boarded by woodlands to the east, south and west. A road, railroad track, and a railroad yard are located to the north and northwest. The 1983 aerial photograph shows residential development at the Atkinson Street site. The general vicinity of the site in 1983 is similar in appearance as it was shown in the 1976 aerial photograph with additional residential development north of the railroad yard.

The 1993 aerial photograph shows additional residential development east and south of the Atkinson Street site. It appears that additional development is present at the railroad yard

site as shown with the addition of a building, roadways, and a large aboveground storage tank.

The general appearance of the Atkinson Street site and general vicinity as shown in the 1990 and 2006 aerial photographs are similar to the 1993 aerial photograph with some changes in increased residential development.

The historical topographic maps dated 1942 shows the Atkinson Street site as agricultural fields. The Seaboard Air Line railroad track is shown at a similar or same location where the current Campbell Road is located. The 1949 topographic maps also so the location of the Seaboard Air Line railroad track where Campbell Road is currently located, which is adjacent to the current Atkinson Street site's location. The 1957 topographic map no longer shows the Seaboard Air line railroad track present. Campbell Road is shown in its place, and the 1957 map not show the Seaboard railroad yard, which was not shown in the 1942 or 1949 topographic maps.

The Atkinson Street residence is shown in the 1982 topographic map along with several other residences south of Campbell Road. The general vicinity north, east and west of the site appears to be similar in site use as was depicted in 1957 topographic map. No obvious changes are noted between the 1982 and 2002 topographic maps of for the Atkinson Street site or its general vicinity, including the railroad yard to the north.

3.2.2 Summary of the Public Record Review (NCDENR & Richmond County)

S&ME obtained records from NCDENR and from Richmond County for nearby sites and properties. The NCDENR file contained reports that contained groundwater quality data for the Atkinson Street site, neighboring water supply wells, and the CSX Hamlet Diesel Shop.

Historical groundwater data obtained during the state and county file review indicated several water supply wells to the northeast, east, south and southwest of the Atkinson Street site have been sampled and analyzed for VOCs. Data from 14water supply wells including the Atkinson Street site were tabulated (reference **Groundwater Quality Summary** table in **Appendix I**). Low levels of 1,1-DCE, 1,1-Dichloroethane (1,1-DCA) and other chlorinated and non-chlorinated VOCs were detected in the water supply well samples at adjoining and adjacent properties to the south and southwest of the Haught property.

CSX Railroad operates a railroad yard on property that is located within 500 feet northeast of the Atkinson Street Site. The CSX facility has reported release incidents for contaminants that included but were not limited to petroleum hydrocarbons and chlorinated organic compounds. CSX has detected chlorinated compound concentration above 15A NCAC 2L Groundwater Standards. Chlorinated constituents detected by CSX included: 1,1-DCE, 1,1-DCA,Tetrachloroethene (PCE), Trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE) and, 1,1,1-Trichloroethane (1,1,1-TCA).

According to the CSX Remedial Investigation (RI) Report (ARCADIS 2010), the analysis of groundwater elevations from monitor wells that intersect the aquifer zone

similar in depth to area water supply wells indicated flow was to the south-southwest, which is toward the Atkinson Street Site.

3.2.3 Regional Geology

Richmond County, North Carolina is located in the Coastal Plain Physiographic Province just east of the Fall Line described by M.D. Winner and R.W. Coble (Winner and Coble 1996). Richmond County is in an area of the Coastal Plain that is commonly called the Sand Hills and is distinguished by sand deposits that are either exposed or are near the land surface. The Coastal Plain sediments near Hamlet according to James P. Owens (Geologic Map of Cape Fear Region, 1989) include the Tertiary Pinehurst Formation, which is described as deposits of fluvial origin (Daniels and others, 1966). The deposits are massive thick bedded white medium sand with fine to coarse sand that is orange brown and may be as thick as 30 meters. Thin clay lamina may be present in the unit. The heavy mature mineral deposits are quartz-rich and include zircon, tourmaline and rutile. Moderate mineral assemblages include stauralite, sillimanite and kyanite. The Pinehurst Formation rests over the Tarheel Formation, which is Cretaceous in age and is the basal unit of the Black Creek Group. Owens describes the Tarheel Formation as thick red to white cross bedded sand and white to black thick bedded clays. The Tarheel may have a thickness of 60 meters and rests unconformably on the Cape Fear formation.

3.2.4 Regional Hydrogeology

According to Winner and Coble, the Black Creek aquifer is present in Richmond County and the area of the subject site, which likely pinches out near the Fall Line. The Black Creek Aquifer rests over the Cape Fear confining unit, which overlies the Upper Cape Fear Aquifer. The Upper Cape Fear Aquifer may be present as a thin unit below Hamlet, North Carolina. Crystalline bedrock underlies the Cape Fear Units.

A municipal water supply well was drilled for the Town of Hamlet. The well location is approximately 1.2 miles southwest of the intersection of Campbell Road and Atkinson Drive. Based on a description of the lithology by Arcadis (Remedial Investigation Report – CSX Hamlet) from the log presented in Winner and Coble, the Black Creek Confining Unit was present at elevation of 303 feet above mean sea level (ft-msl) and had a thickness of approximately 20 feet. The confining unit was underlain by the Black Creek Aquifer which had a thickness of approximately 136 feet starting from a top elevation of 283 ft-msl. The Upper Cape Fear Confining Unit was reportedly encountered at an elevation of 147 ft-msl and appears to rest on bedrock at an elevation near 117 ft-msl.

3.3 Limited Soil and Groundwater Sampling

On September 10 and 13, 2010, S&ME utilized direct-push drilling technology to advance five soil borings. On September 14, 16, and 17 three additional soil samples were collected using wash drilling techniques and split spoon samples. A photographic log of the project area is included in **Appendix II**.

In all, nine soil samples (eight record samples and one duplicate) were collected for VOC analysis by EPA Method 8260B. After the soil borings were completed, monitor wells

were installed in four of the eight soil borings. Five groundwater samples (Four record samples and one duplicate) were collected for analysis. Two quality control samples (one equipment blank and one trip blank) were collected to review the integrity of the procedures between samples and management of the sample containers through the sampling event.

3.3.1 Soil Assessment

Soil borings B-109-1 through B-109-4 and SMW-3 were advanced below the ground surface with the direct-push hydraulic drill rig. Soil samples from the borings for DMW-1, DMW-2 and DMW-3 were collected using a stainless steel split spoon driven into the subsurface soil with blows from a 140 pound hammer that was dropped thirty inches. The soil samples were classified in the field and descriptions were recorded on field log forms and summarized in a field book. The lithology based on the field classifications from the borings to depths of approximately 20 ft-bgs consisted of sandy soil described as: tan brown medium sand; tan to red clayey medium grained sand; and white or gray fine grained sand. The sand units rest on very stiff or hard tan gray silty clay encountered between 16 to 21 ft-bgs. The lithology described from borings terminated between 85 and 95 ft bgs encountered silty sand units separated by silty or sandy clay layers that varied in thickness that were present between 19 and 23 ft-bgs, 40 and 60 ft-bgs and near the termination of the borings between 72 and 95 ft-bgs.

Soil samples were field-screened for total organic vapor concentrations using a photo-ionization detector (PID). One portion of each sample was placed in a re-sealable plastic bag. A second portion of the sample was placed in a labeled laboratory-supplied container and placed on ice in an insulated container. The sample headspace PID readings were obtained after waiting approximately 15 minutes to allow the soil sample to reach ambient temperature and to allow the organic vapors from the soil sample to equilibrate with the headspace in the sample bag. After 15 minutes, the PID probe was inserted into the bag to obtain a headspace reading on with the instrument. The results from the PID screening are summarized in **Table 1**.

After recording the PID readings of organic vapor concentrations, one sample from each boring that exhibiting the highest organic vapor concentration, or had visual signs of contamination, was selected for laboratory analysis. The corresponding soil samples that were stored on ice in a jar and selected for analysis were shipped under standard Chain-of-Custody procedures to Environmental Conservation Laboratories (ENCO) of Cary, North Carolina for laboratory analysis following standard EPA Test Methods.

The soil samples were analyzed for VOCs by EPA Method 8260B. A complete list of all soil samples and their corresponding detections by the laboratory analysis are included as **Table 2** and the summary of VOC detections at soil sample locations is presented in **Figure 3.** Subsurface lithology and field screening results for the soil borings are provided in the boring logs and in the field notes, which are included as **Appendix III.**

It should be noted that the split spoon samples collected from wash drilling techniques may have been exposed to drilling fluids. The drilling fluids may impact the sample

integrity including moisture content and chemical constituents that may be present in the drilling fluid that may have contacted the soil samples.

The source of drilling fluid for DMW-1 was groundwater obtained from the Jernigan residence water supply well as authorized by an on-site IHSB staff member and with permission from Mrs. Jernigan. The drilling fluid used to drill borings for DMW-2 and DMW-3 was obtained from the City of Hamlet Public Works municipal water supply.

3.3.2 Groundwater Assessment

Installation of Monitor Wells

Boring locations where monitor wells were installed were given a "SMW" for shallow groundwater or "DMW" for groundwater depths similar to the water supply wells in the area of the site. The boring for SMW-3 was installed with a hydraulic drill that advanced 4 ¼ -inch inside diameter (ID) hollow stem augers to the termination depth of the well. The boring for SWM-3 encountered a very stiff to very hard silty clay layer at a depth of 19 ft-bgs and terminated at a depth of 21.8 feet without fully penetrating the clay layer. The shallow monitor well was installed with a ten foot well screen interval from 11.8 to 21.8 ft-bgs.

The borings for the DMW monitor wells encountered a hard sandy silty clay layer between 82 and 95 ft-bgs. The termination depths of the monitor wells DMW-1, DMW-2 and DMW-3 were 93.5 ft-bgs, 83 ft-bgs and 84 ft-bgs, respectively. The soil boring and monitor well locations are shown on **Figure 2**.

The monitor wells were constructed by installing approximately ten or five foot lengths of two-inch diameter polyvinyl chloride (PVC) slotted (0.010-inch) screens. Quartz filter sand filled the boring annulus around the well screen and bentonite was used to seal the boring annulus above the well screen and sand pack interval. Sufficient lengths of two-inch diameter PVC riser pipe were added on top of the well screens to bring the monitor wells to elevations that were above ground surface. The monitor wells were completed by hydrating the bentonite seals and then filling the boring annulus from the top of the bentonite seal to the ground surface with cement grout. The details of the monitor well construction are depicted on the boring logs are included in **Appendix III** and are summarized in **Table 3**.

Monitor well development was performed upon the completion of the well installations using a decontaminated Monsoon® stainless steel submersible well pump. During drilling, the volume of water used to wash drill or that was used to mix with drilling mud for the drilling process was monitored. Upon completion of each boring, the total volume of water used during drilling was estimated. The volume of water extracted during well development was based the volume of water introduced to the boring during drilling and on the clarity of the discharged development water. At a minimum, the volume of water removed during development exceeded the volume of water introduced into the boring during drilling. Approximately 300 to 400 gallons were pumped during the well development activities from monitor wells DMW-1, DMW-2 and DMW-3. Well development was performed to attempt to remove liquids and sediment suspended in the

water column in the well and in the surrounding sand pack that may have been impacted by drilling fluids during drilling.

Depth to Water

Upon completion of the monitor well installations, the wells were developed and allowed to equilibrate before water levels were measured for at least 24 hours. S&ME personnel measured the depth to groundwater with an electronic interface probe that was decontaminated before each use. Groundwater elevations were calculated from the water level measurements and the top of the well casing (TOC) elevations surveyed by BCSC. The groundwater level in monitor well SMW-3 was 15.16 ft-bgs. Groundwater was encountered at depths ranging from 29.2 ft-bgs in SMW-2 to 45.16 ft-bgs in DMW-1. The groundwater elevations are summarized in **Table 4.**

Only one shallow groundwater measurement point was available for measurement in the shallow monitor well network. Therefore, no groundwater flow or gradient information could be determined to estimate the potentiometric surface of the shallow groundwater.

The September 21, 2010 water level measurements were used to prepare the potentiometric surface of groundwater (**Figure 4**) from wells screened to total depths ranging between 83 ft-bgs and 93.5 ft-bgs. Based upon current groundwater elevations of wells screened at depths similar to the water supply wells in the area, this aquifer zone appears to flow generally to the southwest at a gradient of approximately 0.012. Groundwater gradient calculations are included in **Appendix IV**.

Monitor Well Sample Collection

After measuring the depth-to-water on September 21, 2010, S&ME personnel purged the four newly installed monitor wells using the Monsoon® submersible well pump. Discharge tubing from the pump was connected to a flow through cell (YSI) to measure purge parameters (pH, temperature, conductivity, dissolved oxygen, turbidity, and oxygen reduction potential) on the effluent purge water. A summary of the field parameters recorded on September 21, 2010 is included in **Table 5.** A copy of the field groundwater sampling logs is in **Appendix V.**

S&ME personnel collected groundwater samples from each of the four monitor wells after purge parameters stabilized. The monitor well locations are shown on **Figure 5**. The pump flow rate was slowed to less than one liter per minute and water flowing from the discharge tube from the pump was collected directly into the laboratory supplied containers (40 ml vials). The groundwater samples were stored in an insulated cooler with ice. Sample management was documented from collection through delivery to Environmental Conservation Laboratories, Inc., (ENCO) in Cary, North Carolina under chain-of-custody procedures. ENCO is a North Carolina certified laboratory who analyzed the groundwater samples by EPA Method 8260B for VOCs (North Carolina Certification Numbers 424, 442, and 591).

Boring Abandonment / IDW Management

Soil borings identified as B-109-1 through B-109-4 were not converted to monitor wells and were permanently abandoned by filling the boreholes with a bentonite grout mix.

Investigative derived wastes (IDW), such as soil cuttings, fluids from the wash drilling and/or mud rotary drilling methods, and purgewater generated during the soil boring advancement, well installation and groundwater sampling were collected in a sealed roll-off container that was transported to A&D Environmental Services' permitted facility for disposal.

Water Supply Well Sampling

On September 10, 2010, S&ME collected a sample from the water supply wells at the Haught residence (WSW-1), the Jernigan residence (WSW-2), and the Butler residence (WSW-3). The water supply wells were purged from the spigot located closest to the wellhead. The spigot was fully opened and water was purged until field parameters stabilized. After the parameters were stable, the flow rate from the spigot was reduced and sample containers provided by ENCO were filled for laboratory analysis. The groundwater samples were stored in an insulated cooler with ice. Sample management was documented from collection through delivery under chain-of-custody procedures to ENCO. The groundwater samples were analyzed for VOCs by EPA Method 8260B. The water supply well locations are shown on **Figure 6**.

4.0 FINDINGS

4.1 Lithology

The soil borings at the subject site encountered fine to medium sand separated by clayey sand layers with variable thicknesses. Generally up to three sandy clay layers were encountered in the borings for the Atkinson Street assessment. The elevations of the clayey units from shallow to deep ranged from 367.4 to 358.2 ft-mean sea level (ft-MSL), 340.2 to 325.5 ft-MSL and 298.2 to 282.4 ft-MSL. The less permeable sandy clay layers likely act to retard downward migration of groundwater and its constituents and may also provide a surface for groundwater and its constituents to move laterally with the gradient of the lithologic surface. Detailed descriptions of the lithology encountered at the boring locations are presented on the boring logs (**Appendix III**).

4.2 Soil Analyses

Regulatory Standards

The DWM IHSB holds regulatory jurisdiction for the site. Therefore, the detected constituents are compared to the IHSB preliminary soil remediation goals (PSRGs). The IHSB has two PSRGs: a "health-based" remediation goal for total concentrations of contaminants, and a "protection of groundwater" remediation goal for leachable concentrations of contaminants.

Organic Compounds

Acetone, tetrachloroethylene (PCE), toluene, and naphthalene concentrations were detected by the analytical tests on one or more of the record soil samples that were above the laboratory method detection limit (MDL). Only three detections of acetone in record soil samples (B-109-1 from 13-15 ft-bgs, DMW-1 from 13-15 ft-bgs, and DMW-2 from 8.5-10 ft-bgs) were above the method reporting level (MRL). The reported constituent concentrations in the soil samples were below both the IHSB health-based and groundwater protection PSRGs. The summary of soil analyses is presented in **Table 2**.

4.3 Groundwater Sampling Results

Regulatory Standards

Constituent concentrations detected in the groundwater samples that were above the laboratory MDLs are summarized on **Table 6**. As a point of reference, the detected constituents are compared to:

- Groundwater quality protection standards promulgated by Title 15A of the North Carolina Administrative Code, Subchapter 2L (15A NCAC 2L), .0200 Groundwater Quality Standards, hereafter referred to as 2L Standards.
- USEPA Drinking Water Maximum Contamination Level (MCL)

Monitor Wells

One VOC constituent 1,1-DCE was detected in the record (11 µg/L) and duplicate (12 µg/L) groundwater samples that were analyzed from monitor well DMW-1. Monitor well DMW-1 is located on the Haught property and appears to be upgradient to the Haught water supply well WSW-1 based on groundwater potentiometric contours. These 1,1-DCE concentrations detected were above the listed State and Federal regulatory standard of 7 µg/L. Concentrations of acetone, chloroform bromodichloromethane, and 1,1-DCA were detected in groundwater sampled from one or more of the four wells, but none of reported concentrations exceeded the 15A NCAC 2L groundwater standard or the Federal MCLs. Acetone was detected (3.7J) above the MDL, but below the MRL in the Trip Blank. The groundwater analytical results are summarized in **Table 6**, and a Groundwater Constituent Concentration Map is included as **Figure 5**.

Water Supply Wells

Organic Compounds

Groundwater samples were collected on September 10, 2010 from three water supply wells. The laboratory analytical results indicated that 1,1-DCE was detected at concentrations that were greater than the compound-specific NCAC 2L Standard of 7 µg/L in water from the Haught Residence water supply well (Sample ID WSW-1). 1,1-DCE was also detected in the water from the Jernigan Residence supply well (Sample ID WSW-2) at a concentration of 0.7 µg/L; and in the water supply well on the Butler Residence (WSW-3) at a concentration of 2.60 µg/L. However, 1,1-DCE concentrations at the Jernigan and Butler residences were below the NCAC 2L Standard. The groundwater analytical results are summarized in **Table 7**. The Groundwater Constituent Map for the water supply wells is in **Figure 6**. A copy of the laboratory analytical results and chain-of-custody form is included in **Appendix VI**.

With 1,1-DCE being the chemical of concern at the Haught's water supply wells (a.k.a., Atkinson Street site), S&ME compared the historical data of 1,1-DCE concentrations of samples collected from water supply wells at the Haught's water supply well and at neighboring properties (**Figure 7**). Also listed in **Figure** 7 are the concentrations of 1,1-DCE for wells located north of the Atkinson Street site at the CSX site.

Four supply wells located to the south-southeast and south of the site similarly had no detections of 1,1-DCE that were above 0.5 µg/L. 1,1-DCE concentrations were not detected above the detection limit of 0.5 µg/L in the three supply wells north of the Haught property (near Lances Run).

5.0 CONCLUSIONS

A limited soil and groundwater assessment was conducted at the Atkinson Street site located at the Haught Residence on 109 Atkinson Street in Hamlet, North Carolina. The assessment was performed in an effort to locate potential sources of 1,1-DCE contamination detected in the on-site water supply well. The assessment reviewed subsurface soils, shallow groundwater quality, groundwater quality in the aquifer zone similar to that intersected by area water supply wells, groundwater quality from the drinking water supply well on site, and drinking water quality from two supply wells in the area of the subject site.

The findings at the site are as follows:

- The soil borings at the subject site encountered fine to medium sand separated by sandy clay layers with variable thicknesses. Generally three sandy clay layers were encountered by the borings. The less permeable sandy clay layers likely act to retard downward migration of groundwater and its constituents and may also provide a surface for groundwater and its constituents to move laterally with the gradient of the lithologic surface.

- No concentrations of VOCs exceed IHSB action levels in the shallow soil. 1,1-DCE was not detected above the analytical method's detection limit. PCE was reported in three of the eight collected soil samples at concentrations above the analytical method's detection limit, but below the method's reporting limit in soil at depths above any confining clay layer.

- The September 21, 2010 groundwater elevations measured for monitor wells screened at depths between 83 ft-bgs and 93.5 ft-bgs, which is similar to the screened interval of water supply wells in the area, indicate flow was generally to the southwest at a gradient of approximately 0.012.

- Based on analytical testing, the shallow groundwater (<20 ft-bgs) is not contaminated with 1,1-DCE.

- 1,1-DCE was detected in the groundwater sample from DMW-1 at a concentration of 11 µg/L, which is above the listed 15A NCAC 2L Standards and the Federal MCL standards. DMW-1 is located on the Haught property and is screened between 83 ft-bgs and 93.5 ft-bgs, which is hydraulically upgradient to the Haught residence supply well. This data is qualified in that water used in drilling fluids was obtained from the neighboring Jernigan property, which had a reported 1,1-DCE concentration of 0.7 µg/L. There is a level of confidence in the result from well DMW-1 in that 400 gallons of water was purged during well development, and approximately 200 gallons was from the Jernigan well was used in the drilling fluids.

- Groundwater analyzed from monitor wells on the Butler property had levels of 1,1-DCE reported that were below the listed 15A NCAC 2L Standards and the Federal MCL standards.

- Analytical results of the groundwater sampled from the Haught Residence water supply well detected a 1,1-DCE concentration above the listed 15A NCAC 2L Standards and the Federal MCL standards. Groundwater analyzed from water supply wells at the Jernigan residence and the Butler residence had levels of 1,1-DCE reported that were below the listed 15A NCAC 2L Standards, and the Federal MCL standards.

- Historical groundwater analyses obtained from state and county file records indicated 14 water supply wells to the northeast, east, south and southwest of the Atkinson Street site were sampled and analyzed for VOCs. Low levels of 1,1-DCE were detected in the drinking water on three adjacent properties to the south and on three adjacent properties to the southwest of the Haught property. Three supply wells north and four supply wells located to the south-southeast and south of the Haught property did not report 1,1-DCE concentrations above the detection limit of 0.5 μg/L. The concentrations of 1,1-DCE detected in off-site supply wells were below the NCAC 2L Standard.

- The file review included reports of incidents from CSX located northeast of the Atkinson Street site just north of Campbell Road. The CSX file included summary reports the described incidents where petroleum and/or chlorinated compounds were released to the soil and groundwater. Chlorinated compounds not limited to 1,1-DCE, 1,1-DCA, PCE and TCE were reported to have impacted groundwater quality at the CSX site. Groundwater flow for the deep aquifer (i.e, the screened depth for the Haught well) is to the south-southwest, which is from the CSX property toward the Atkinson Street site.

The data obtained from this assessment did not provide sufficient evidence to indicate that a source of 1,1-DCE exists on-site. The groundwater aquifer above a confining layers at a depth of approximately 20 ft-bgs had no reported concentrations of 1,1-DCE that were above the analytical method's detection limit. In addition, the water supply well for the Atkinson Street site (a.k.a. the Haught's well) is apparently screened at a depth interval between 79 feet and 89 feet below the top of casing, which is in an aquifer below two semi confining clay layers encountered by the soil borings at depths of approximately 19 ft-bgs and 40 ft-bgs.

Since 1,1-DCE was not detected in the shallow aquifer above the confining layer at 20 ft-bgs, this evidence indicates that a potential source of 1,1-DCE appears to exist hydraulically upgradient. Additional evidence supporting this theory exists in historical analytical data that reported low levels of 1,1-DCE in water supply wells in the vicinity of the Atkinson Street site as well as monitor well test data reported in the Remedial Investigation for CSX Hamlet Yard (ARCADIS 2010). Additional analytical and subsurface data from the groundwater aquifer upgradient to the Haught property at elevations above the confining unit at approximately 20 ft-bgs, between the confining layers at approximately 20 ft-bgs and 40 ft-bgs, and from locations that directly

correspond to the aquifer zone intersected by the Atkinson Street site well are needed to assess and/or approximate the source of 1,1-DCE detected in the deeper aquifer zone.

6.0 REFERENCES

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Tables

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Table 1
Soil Field Screening Results
Atkinson Street
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002
Soil Samples Collected on September 10, 13, 15, 2010

Boring ID	Depth (ft-bgs)	PID (PPM)
B-109-1	0-5	0.0
B-109-1	5-9	0.0
B-109-1	9-13	0.6
B-109-1	**13-17**	**1.6**
B-109-1	17-20	2.8
B-109-2	0-5	0.0
B-109-2	**5-9**	**2.9**
B-109-2	9-13	0.0
B-109-2	13-17	1.7
B-109-2	17-20	1.6
B-109-3	0-5	0.1
B-109-3	5-9	1.5
B-109-3	**9-13**	**2.8**
B-109-3	13-17	0.0
B-109-3	17-20	0.0
B-109-4	0-5	0.7
B-109-4	5-9	1.1
B-109-4	**9-13**	**1.2**
B-109-4	13-17	0.8
B-109-4	17-20	0.0
SMW-3	0-5	0
SMW-3	5-9	0.1
SMW-3	9-13	0.3
SMW-3	**13-17**	**0.6**
SMW-3	17-21	0.9
SMW-3	21-24	1.9
DMW-1	3-5	0
DMW-1	8-10	0
DMW-1	**13-15**	**0.2**
DMW-1	18-20	0
DMW-1	23-25	0
DMW-1	28-30	0.1
DMW-1	33-35	0.0
DMW-2	3.5-5	0.0
DMW-2	**8.5-10**	**0.0**
DMW-2	13.5-15	0.0
DMW-2	18.5-20	0.0
DMW-2	23.5-25	0.0
DMW-2	28.5-30	0.0
DMW-2	33.5-35	0.0
DMW-3	3.5-5	0.0
DMW-3	**8.5-10**	**0.0**
DMW-3	13.5-15	0.0
DMW-3	18.5-20	0.0
DMW-3	23.5-25	0.0
DMW-3	28.5-30	0.0
DMW-3	33.5-35	0.0

Notes:
1) ft-bgs = Feet below the ground surface.
2) PID = Photo-ionization detector.
3) PPM = Parts per million, volume in air.
4) **Bold** face type and shading indicates that the sample was sent the to lab for analysis.
5) See Figure 2 for soil boring locations.

TABLE 2
Summary of Soil Sampling Results
Atkinson Street Site
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Analytical Method			VOC[5] by EPA Method 8260B			
Sample ID	Contaminant of Concern: Date Collected (m/dd/yy)	Contaminant of Concern: Sample Depth (ft-bgs[2])	Acetone	Tetrachloroethene	Toluene	Naphthalene
			mg/Kg[1]	mg/Kg	mg/Kg	mg/Kg
B-109-1	9/10/2010	13-15	**0.0065**	<0.00027	<0.00019	<0.00023
B-109-2	9/10/2010	5-9	<0.0011[6]	**0.00061J**	<0.00019	<0.00023
B-109-3	9/10/2010	9-13	<0.0013	<0.00030	<0.00022	<0.00026
B-109-4	9/10/2010	9-13	<0.0011	<0.00026	<0.00018	<0.00022
Eq Blank*	9/10/2010	-	<0.0015	<0.00036	<0.00027	<0.00039
Trip Blank*	9/3/2010	-	<0.0015	<0.00036	<0.00027	<0.00039
DMW-1	9/14/2010	13-15	**0.011**	<0.00027	<0.00019	**0.00087J**
DMW-2	9/16/2010	8.5-10	**0.0056**	<0.00028	<0.00020	<0.00024
DMW-3	9/17/2010	8.5-10	<0.0011	**0.00046J**	<0.00019	<0.00022
SMW-3	9/13/2010	13-15	**0.0055J**	**0.00072J**	<0.00022	<0.00027
Trip Blank*	9/3/2010	-	<0.0015	<0.00036	<0.00027	<0.00039
Duplicate Soil	09/17/10	-	**0.0071**	<0.00026	**0.00040J**	<0.00022
IHSB Soil Remediation Goal Preliminary HB PSRG[3]			12,000	0.55	820	3.60
IHSB Soil Remediation Goal PG PSRG[4]			2.40	0.005	5.5	0.21

Notes:
* Equipment blank and Trip Blank sample concentrations in mlligram per liter = part per million.
J = concentration detected above the method detection limit but below the sample method reporting limit.
1. All results are listed in milligram per kilogram (mg/kg) = parts per million.
2. ft-bgs = feet below ground surface.
3. HB PSRGs = NDCENR Inactive Hazardous Sites Branch Health-Based Prelimimary Soil Remediation Goals. January 2010.
4. PG PSRGs = NDCENR Inactive Hazardous Sites Branch Groundwater Protection-Based Prelimimary Soil Remediation Goals. J
5. VOCs = Volatile Organic Compounds.
6. < = denotes less than sample detection limit.
Bold depicts constiuents detected above the sample method detection limit.
Bold and shaded depicts constiuents detected above IHSB or US EPA Region 9 Residential Risk-Based Level.

Table 3
Monitor Well Construction
Atkinson Street Site
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Well ID	Date Installed (m/dd/yy)	Date Water Level Measured (m/dd/yy)	Well Casing Depth (ft-bgs)	Screen Interval (x to y ft-bgs)			Bottom of Well (ft-bgs)	Top of Casing Elevation* (ft)	Depth to Water from Top of Casing (ft-btoc)	Groundwater Elevation** (ft)	Comments
HMW-1	02/18/09	9/13/2010	70.0	70.0	to	80.0	80.00	382.3	NM	NC	Constructed for CSX
HMW-2	02/18/09	09/13/10	26.0	26.0	to	36.0	36.00	382.45	NM	NC	Constructed for CSX
SMW-1	03/18/10	09/21/10	85.0	85.0	to	90.0	90.00	374.23	37.31	336.92	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.
SMW-2	03/18/10	09/21/10	75.0	75.0	to	85.0	85.00	368.65	29.20	339.45	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.
SMW-3	09/13/10	09/21/10	11.8	11.8	to	21.8	21.80	383.92	15.16	368.76	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.
DMW-1	09/14/10	09/21/10	88.5	88.5	to	93.5	93.50	385.28	45.16	340.12	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.
DMW-2	09/15/10	09/21/10	78.0	78.0	to	83.0	83.00	379.99	41.36	338.63	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.
DMW-3	09/17/10	09/21/10	78.5	79.0	to	84.0	84.00	367.03	30.34	336.69	Type II - 2" Sch. 40 PVC casing w/ 0.010 slot screen.

Notes:
ft-bgs = Feet below ground surface.
ft-btoc = Feet below top of well casing.
Elevations from a site survey by Bateman Civil Survey Company dated September 20, 2010.

Table 4
Groundwater Elevations September 2010
Atkinson Street Site
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Well ID	Date Measured	Top of Casing Elevation (ft.)	Depth to Water from Top of Casing (ft.)	Groundwater Elevation* (ft.)
Shallow				
HMW-1	NM	382.30	NM	NC
SMW-3	9/21/2010	383.92	15.16	368.76
Deep				
HMW-2	NM	382.45	NM	NC
SMW-1	9/21/2010	374.23	37.31	346.61
SMW-2	9/21/2010	368.65	29.20	354.72
DMW-1	9/21/2010	385.28	45.16	338.76
DMW-2	9/21/2010	379.99	41.36	342.56
DMW-3	9/21/2010	367.03	30.34	353.58

NM = Not measured.
NC = Not calculated.
Elevations from a site survey by Bateman Civil Survey Company dated September 20, 2010.

Table 5
Field Parameters
Atkinson Street Site
109 Atkinston Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Well Number	Field Parameter					
	pH[1]	Conductivity (mS/cm)[2]	Temperature (°C)[3]	Dissolved Oxygen (mg/L)[4]	Oxygen Reduction Potential (mV)[5]	Turbidity (NTUs)[6]
SMW-3	4.37	0.151	20.60	6.04	124.0	126
DMW-1	5.64	0.140	18.62	6.06	91	8.0
DMW-2	10.21	0.204	19.71	4.70	-106	6.1
DMW-3	7.47	0.055	18.96	7.54	-17.0	12

1. pH - Standard units.
2. mS/cm^2 - milliseimens per square centimeter.
3. °C - degrees Centigrade.
4. mg/L - milligram per liter.
5. mV - millivolt.
6. NTUs - nephrotelemetric units.

Table 6
Groundwater Sample Analyses
Atkinson Street Site
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Analytical Method		EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B
Contaminant of Concern										
Well ID	Date Collected (m/dd/yy)	Acetone	Bromodichloromethane	2-Butanone	Chloroform	Chloromethane	1,1-Dichloroethane	1,1-Dichloroethene	Trichloroethene	Naphthalene
DMW-1	9/21/2010	<1.5	<1.0	<1.0	<0.20	<0.30	**1.40**	**11.00**	<0.38	<0.39
DMW-2	9/21/2010	**3.5J**	**0.41J**	<1.0	**2.20**	<0.34	<0.33	**0.90J**	<0.38	<0.39
DMW-3	9/21/2010	**4.6J**	<1.0	<1.0	**1.0**	<0.34	<0.33	**2.60**	<0.38	<0.39
SMW-3	9/21/2010	**4.0J**	<1.0	<1.0	<0.20	<0.34	<0.33	<0.24	<0.38	<0.39
Duplicate (DMW-1)	9/21/2010	<1.5	<1.0	<1.0	<0.20	<0.34	**1.30**	**12.00**	<0.38	<0.39
Equipment Blank	9/21/2010	<1.5	<1.0	<1.0	<0.20	<0.34	<0.33	<0.24	<0.38	<0.39
Trip Blank	9/21/2010	**3.7J**	<1.0	<1.0	<0.20	<0.34	<0.33	<0.24	<0.38	<0.39
15A NCAC 2L Groundwater Standard (µg/l)		6,000	0.6	4,000	70	3	6	7	3	6
National Primary (or Secondary*) Drinking Water MCL		NL	Zero	NL	70	NL	NL	7	5	NL

Notes:
All sample analytical concentrations are reported in micrograms per liter (µg/l).
J = concentration detected above the method detection limit but below the sample method reporting limit.
BOLD depicts constituents detected above the sample practical quantitation limit.
15A NCAC 2L Groundwater Standard (µg/l) amended January 1, 2010.
USEPA MCL = National Primary Drinking Water Regulations for Contaminants in Drinking Water checked 10/15/2010.
NL = Not Listed.
SHADED AND BOLD numbers indicate concentrations above NCAC 2L Groundwater Quality Standard.

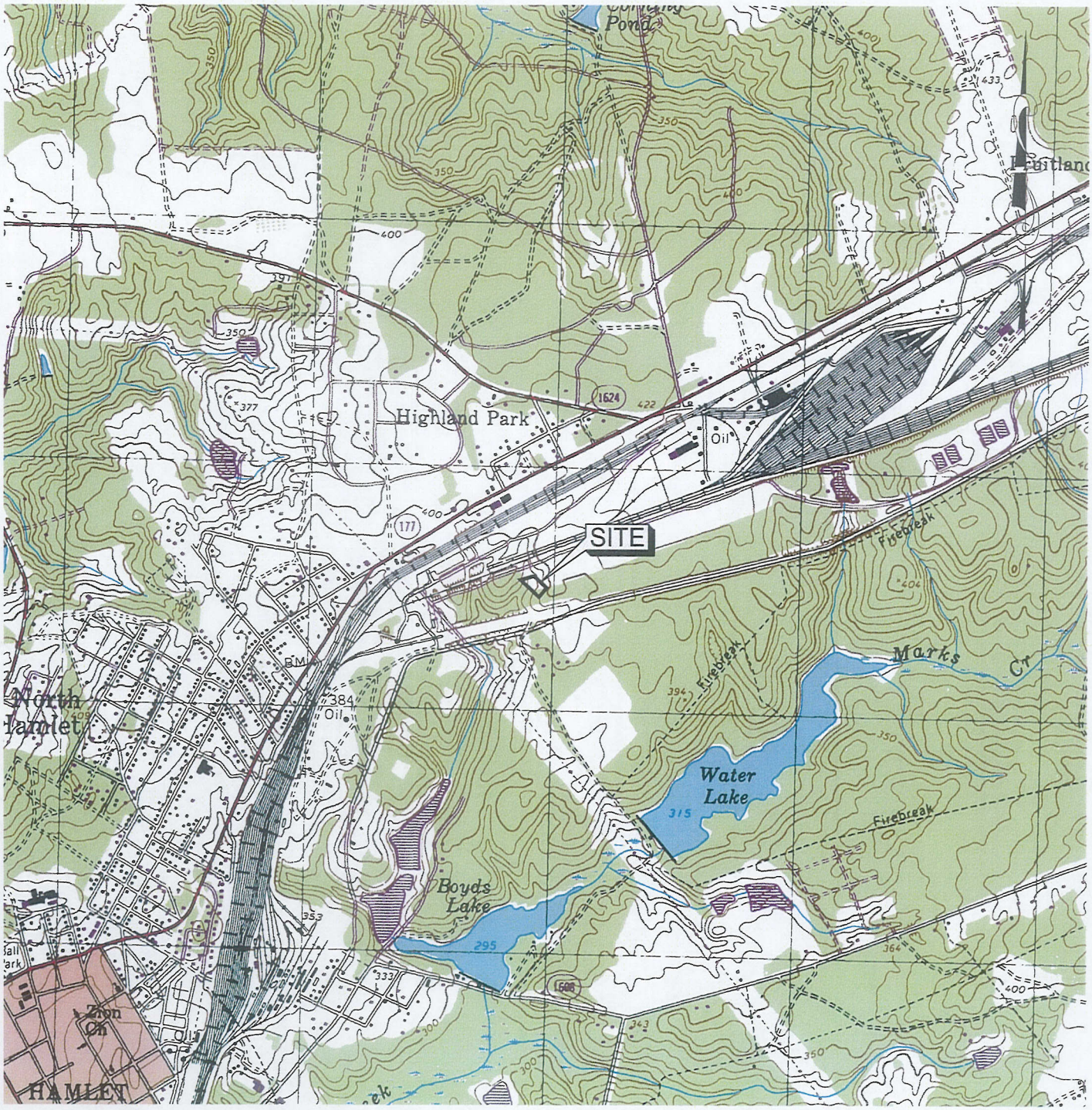
Table 7
Water Supply Well Sample Analyses
Atkinson Street Site
109 Atkinson Street
Hamlet, North Carolina
S&ME Project No. 1054-10-2002

Analytical Method (e.g., VOC by EPA 601)			EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B
Contaminant of Concern										
Well ID	Sample ID	Date Collected (m/dd/yy)	Acetone	2-Butanone	Chloroform	Chloromethane	1,1,-Dichloroethane	1,1-Dichloroethene	Trichloroethene	Naphthalene
Haught Residence	WSW-1	9/10/2010	<1.5	<1.0	<0.20	<0.30	**1.20**	**7.10**	<0.38	<0.39
Jernigan Residence	WSW-2	9/10/2010	<1.5	<1.0	<0.20	<0.34	<0.33	**0.70**	<0.38	<0.39
Butler Residence	WSW-3	9/10/2010	<1.5	<1.0	<0.20	<0.34	<0.33	**2.60**	<0.38	<0.39
Trip Blank	Trip Blank	9/10/2010	<1.5	<1.0	<0.20	<0.34	<0.33	<0.24	<0.38	<0.39
15A NCAC 2L Groundwater Standard (µg/l)			6,000	4,000	70	3	6	7	3	6
National Primary (or Secondary*) Drinking Water MCL			NL	NL	70	NL	NL	7	5	NL

Notes:
All sample analytical concentrations are reported in micrograms per liter (µg/l).
J = concentration detected above the method detection limit, but below the sample method reporting limit.
BOLD depicts constituents detected above the sample practical quantitation limit.
15A NCAC 2L Groundwater Standard (µg/l) amended January 1, 2010.
USEPA MCL = National Primary Drinking Water Regulations for Contaminants in Drinking Water checked 10/15/2010.
NL = Not Listed.
SHADED AND BOLD numbers indicate concentrations above NCAC 2L Groundwater Quality Standard.

Figures

Figure 1	Vicinity Map
Figure 2	Site Map
Figure 3	VOC Constituents in Soil – September 2010
Figure 4	Groundwater Contour Map – September 2010
Figure 5	Groundwater Constituents – September 2010
Figure 6	Water Supply Well Groundwater Constituents – September 2010
Figure 7	Historical Water Supply Well Groundwater Constituents



GRAPHIC SCALE

1000 0 500 1000 2000

(IN FEET)

TOPO SOURCE: NCGS DRG
HAMLET NC, DATE 2002, CONTOUR INTERVAL 10 FOOT

A-1987

SCALE: 1" = 2000'	S&ME WWW.SMEINC.COM	VICINITY MAP	FIGURE NO.
DATE: NOV. 2010		ATKINSON STREET CONTAMINATION SITE	1
DRAWN BY: BTR		109 ATKINSON STREET	
PROJECT NO: 1054-10-2003	NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD, RALEIGH, NC 27616	HAMLET, NORTH CAROLINA	

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LEGEND

- EXISTING MONITOR WELL LOCATION
- EXISTING SOIL BORING LOCATION

GRAPHIC SCALE

50 0 25 50

(IN FEET)

IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

SCALE: 1" = 50'	DATE: NOV. 2010
PROJECT NUMBER: 1054-10-2002	DRAWN BY: BTR
DRAWING NUMBER: B-1402	CHECKED BY:

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

SITE MAP

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
2

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LEGEND

- EXISTING MONITOR WELL LOCATION
- EXISTING SOIL BORING LOCATION

CONSTITUENT CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM (mg/Kg)

NOTE: REFER TO TABLE 2 FOR DETAILED SAMPLE DATA, SAMPLE DATES AND SAMPLE INTERVALS.

GRAPHIC SCALE

50 0 25 50

(IN FEET)

IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

SCALE: 1" = 50'
DATE: NOV. 2010
PROJECT NUMBER: 1054-10-2002
DRAWN BY: BTR
DRAWING NUMBER: B-1403
CHECKED BY:

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD. RALEIGH, NC 27616

VOC CONSTITUENTS IN SOIL
SEPTEMBER 2010

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
3

S:\PROJECTS\2_HSB Orphan Priority Sites 2010\IHSB Contract Projects\1054-10-2002 Atkinson_Str_Hamlet_NCD096158696\CAD\B1403.dwg, Layout1, 11/18/2010 8:26:08 AM, 1:1

LEGEND

- EXISTING MONITOR WELL LOCATION
- EXISTING SOIL BORING LOCATION
- 377 — GROUNDWATER CONTOUR
- (378.67) MEASURED GROUNDWATER ELEVATION
- 0.012 → HYDRAULIC GRADIENT AND GROUNDWATER FLOW DIRECTION ON SEPTEMBER 21, 2010
- * WELL NOT INCLUDED IN GROUNDWATER CONTOUR CALCULATION

GRAPHIC SCALE

50 0 25 50

(IN FEET)

IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

SCALE: 1" = 50'	DATE: NOV. 2010
PROJECT NUMBER: 1054-10-2002	DRAWN BY: BTR
DRAWING NUMBER: B-1404	CHECKED BY:

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

GROUNDWATER CONTOUR MAP
SEPTEMBER 2010

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
4

S:\PROJECTS\2_IHSB Orphan Priority Sites 2010\IHSB Contract Projects\1054-10-2002 Atkinson_Str_Hamlet_NCD096158696\CAD\B1404.dwg, Layout1, 11/11/2010 4:00:09 PM, 1:1

LEGEND

- EXISTING MONITOR WELL LOCATION
- EXISTING SOIL BORING LOCATION

CONSTITUENT CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

NOTE: REFER TO TABLE 6 FOR DETAILED SAMPLE DATA, SAMPLE DATES AND SAMPLE INTERVALS.

GRAPHIC SCALE

50 0 25 50

(IN FEET)

IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

SCALE: 1" = 50'	DATE: NOV. 2010
PROJECT NUMBER: 1054-10-2002	DRAWN BY: BTR
DRAWING NUMBER: B-1405	CHECKED BY:

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

GROUNDWATER CONSTITUENTS
SEPTEMBER 2010

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
5

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IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

LEGEND

- EXISTING MONITOR WELL LOCATION
- EXISTING SOIL BORING LOCATION
- CONSTITUENT CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

NOTE: REFER TO TABLE 7 FOR DETAILED SAMPLE DATA, SAMPLE DATES AND SAMPLE INTERVALS.

GRAPHIC SCALE

50 0 25 50

(IN FEET)

SCALE: 1" = 80'	DATE: NOV. 2010
PROJECT NUMBER: 1054-10-2002	DRAWN BY: BTR
DRAWING NUMBER: B-1406	CHECKED BY:

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD. RALEIGH, NC 27616

WATER SUPPLY WELL
GROUNDWATER CONSTITUENTS - SEPT. 2010

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
6

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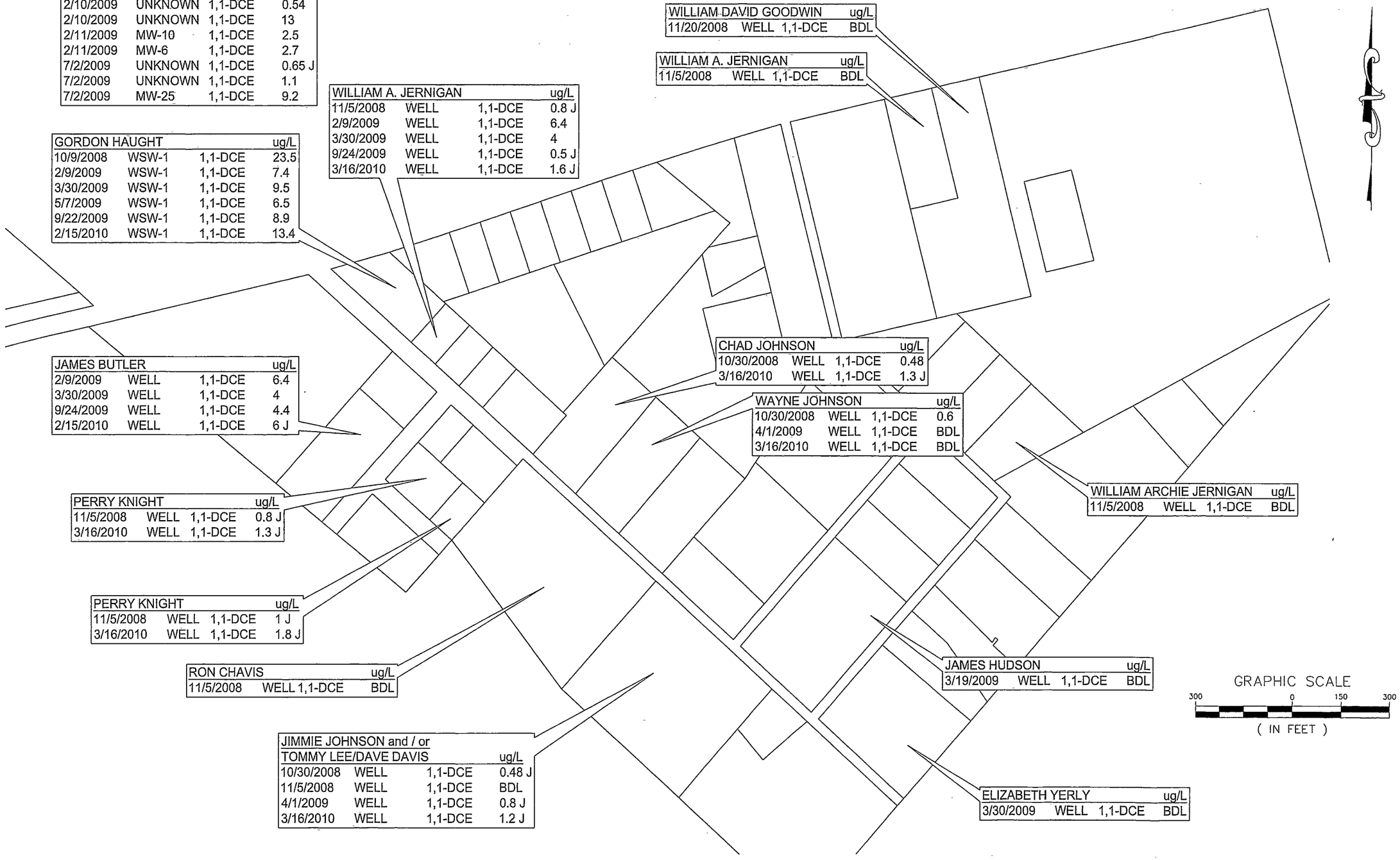

CSX			ug/L
2/10/2009	UNKNOWN	1,1-DCE	0.54
2/10/2009	UNKNOWN	1,1-DCE	13
2/11/2009	MW-10	1,1-DCE	2.5
2/11/2009	MW-6	1,1-DCE	2.7
7/2/2009	UNKNOWN	1,1-DCE	0.65 J
7/2/2009	UNKNOWN	1,1-DCE	1.1
7/2/2009	MW-25	1,1-DCE	9.2

GORDON HAUGHT			ug/L
10/9/2008	WSW-1	1,1-DCE	23.5
2/9/2009	WSW-1	1,1-DCE	7.4
3/30/2009	WSW-1	1,1-DCE	9.5
5/7/2009	WSW-1	1,1-DCE	6.5
9/22/2009	WSW-1	1,1-DCE	8.9
2/15/2010	WSW-1	1,1-DCE	13.4

WILLIAM A. JERNIGAN			ug/L
11/5/2008	WELL	1,1-DCE	0.8 J
2/9/2009	WELL	1,1-DCE	6.4
3/30/2009	WELL	1,1-DCE	4
9/24/2009	WELL	1,1-DCE	0.5 J
3/16/2010	WELL	1,1-DCE	1.6 J

WILLIAM DAVID GOODWIN			ug/L
11/20/2008	WELL	1,1-DCE	BDL

WILLIAM A. JERNIGAN			ug/L
11/5/2008	WELL	1,1-DCE	BDL

JAMES BUTLER			ug/L
2/9/2009	WELL	1,1-DCE	6.4
3/30/2009	WELL	1,1-DCE	4
9/24/2009	WELL	1,1-DCE	4.4
2/15/2010	WELL	1,1-DCE	6 J

CHAD JOHNSON			ug/L
10/30/2008	WELL	1,1-DCE	0.48
3/16/2010	WELL	1,1-DCE	1.3 J

WAYNE JOHNSON			ug/L
10/30/2008	WELL	1,1-DCE	0.6
4/1/2009	WELL	1,1-DCE	BDL
3/16/2010	WELL	1,1-DCE	BDL

PERRY KNIGHT			ug/L
11/5/2008	WELL	1,1-DCE	0.8 J
3/16/2010	WELL	1,1-DCE	1.3 J

WILLIAM ARCHIE JERNIGAN			ug/L
11/5/2008	WELL	1,1-DCE	BDL

PERRY KNIGHT			ug/L
11/5/2008	WELL	1,1-DCE	1 J
3/16/2010	WELL	1,1-DCE	1.8 J

RON CHAVIS			ug/L
11/5/2008	WELL	1,1-DCE	BDL

JAMES HUDSON			ug/L
3/19/2009	WELL	1,1-DCE	BDL

JIMMIE JOHNSON and / or TOMMY LEE/DAVE DAVIS			ug/L
10/30/2008	WELL	1,1-DCE	0.48 J
11/5/2008	WELL	1,1-DCE	BDL
4/1/2009	WELL	1,1-DCE	0.8 J
3/16/2010	WELL	1,1-DCE	1.2 J

ELIZABETH YERLY			ug/L
3/30/2009	WELL	1,1-DCE	BDL

IMAGE SOURCE: NC ONEMAP, RICHMOND NC, DATED 2005

DATE: NOV. 2010
DRAWN BY: BTR
CHECKED BY:
SCALE: 1" = 300'
PROJECT NUMBER: 1054-10-2002
DRAWING NUMBER: B-1407

S&ME
WWW.SMEINC.COM
NC ENGINEER LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

HISTORICAL GROUNDWATER CONSTITUENTS

ATKINSON STREET CONTAMINATION SITE - 109 ATKINSON ST
HAMLET, NORTH CAROLINA

FIGURE NO.
7

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