VOLUNTARY REMEDIATION PLAN AND APPLICATION

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, FULTON COUNTY, GEORGIA
HSI SITE NO. 10637

Submitted to:

Georgia Department of Natural Resources
Hazardous Waste Management Branch
Suite 1462, East Tower
2 Martin Luther King Jr. Drive SE
Atlanta, Georgia 30334

Prepared for:

Master Marketing Sunlow, Inc.
1071 Howell Mill Road
Atlanta, Georgia 30305

Prepared by:

AMEC Environment & Infrastructure, INC.
396 Plasters Avenue, NE
Atlanta, Georgia 30024

September 2012

amec

September 7, 2012

Mr. David Reuland
Georgia Department of Natural Resources
Hazardous Waste Management Branch
Suite 1462, East Tower
2 Martin Luther King Jr. Drive SE
Atlanta, Georgia 30334

Subject: **Voluntary Remediation Plan, Application and Fee**
Former Sunlow Inc.
1071 Howell Mill Road
Atlanta, Fulton County, Georgia
HSI Site No. 10637

Dear Mr. Reuland:

AMEC Environment & Infrastructure, Inc. (AMEC) respectfully submits this Voluntary Remediation Plan and Application on behalf of Master Marketing Sunlow, Inc. along with the attached $5,000 application fee to enroll this site in the Georgia Voluntary Remediation Program.

Please contact the undersigned with any questions you may have regarding this submittal.

Sincerely,

AMEC Environment & Infrastructure, Inc.

Charles T. Ferry

Tyler J. Boyles
Project Geologist

Charles T. Ferry, P.E.
Senior Principal Engineer

cc: Mr. William D. Graham, Jr., c/o Sunlow Master Marketing
Mr. Chris Faussemagne, Westbridge Partners
Mr. John C. Spinrad, Arnall Golden Gregory LLP

Project No. 6121-12-0124

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1.0 INTRODUCTION

This Voluntary Remediation Plan and Application (VRPA) has been prepared for the former Sunlow, Inc. property located at 1071 Howell Mill Road in Atlanta, Fulton County, Georgia ("Site"). The Site is an approximate 0.9-acre parcel of land, identified on the Fulton County Tax Assessor's website as Tax Parcel ID 17-0150-009-14. The majority of the property is occupied by a 32,186 square foot vacant commercial building and a small parking lot west of the building. A Legal Description and Survey Plat are included in Appendix A. An aerial photograph of the Site and surrounding area is included as Figure 1. A site location/topographic map is provided as Figure 2.

Historically, the Site was undeveloped from at least 1938 until the early 1950s. According to Fulton County tax records, the Site appears to have been commercially developed in 1951. The 1928 topographic map indicates elevations on-Site ranging from approximately 940 to 965 feet. The current site grade is relatively level with a building floor slab at approximate elevation 968 feet. Therefore, considerable filling has occurred.

Historical sources indicate that the Site was occupied by several commercial and light industrial businesses from the 1950s until the 1970s including: Young Hardware Company, Consolidated General Products and Cody Company. Sunlow Inc. appears to have occupied the Site from at least 1971 until approximately 2010 for use as a kitchen equipment distribution center. The Site has been vacant since 2010.

1.1 PROPERTY ELIGIBILITY

This VRPA describes the proposed corrective actions consistent with provisions of the Georgia Voluntary Remediation Program Act, and is submitted with the intention of qualifying the property's participation in the Voluntary Remediation Program (VRP).

The Site meets the eligibility criteria for the VRP. A release of regulated substances has occurred on the Site. The Site is not listed on the National Priorities List, is not currently undergoing response activities required by an order of the Regional Administrator of the United States Environmental Protection Agency (EPA), and is not required to have a permit under Code Section 12-8-66. Qualifying the Site under the VRP would not violate the terms and conditions under which the division operates and administers remedial programs by delegation or by similar authorization from the EPA. There are no, and never have been any, outstanding liens filed against the Property pursuant to Code Sections 12-8-96 and 12-13-12.

1.2 PREVIOUS DOCUMENTS

This VRPA is based at least partly on information obtained from the following assessments reports and other documents.

- Letter by Georgia EPD to Mr. William Graham, Jr., Compliance Status Report Call-In Letter, dated April 8, 2003.
- Compliance Status Report, prepared by Environmental Management Associates for Mr. William Graham, Jr., dated September 10, 2003.
- Letter by Georgia EPD to Mr. William Graham, Jr., Notice of Deficiency, dated September 16, 2005.
- Revised Compliance Status Report, prepared by Environmental Management Associates for Mr. William Graham, Jr., dated December 6, 2006.
- Response to Georgia EPD Notice of Deficiency Letter, prepared by Environmental Management Associates, dated December 8, 2006.
- Revised Corrective Action Plan for 1085 Howell Mill Road, prepared by United Consulting for Iron Works International, Inc., dated August 13, 2008 (original CAP dated July 20, 2006).

On April 8, 2003, the Georgia Environmental Protection Division (EPD) notified the current property owner, Mr. William Graham, Jr., that the Site may have been impacted by the historical placement of contaminated fill material. As a result, Environmental Management Associates (EMA) completed an environmental assessment at the Site and prepared a Compliance Status Report (CSR) dated September 10, 2003 as directed by the Georgia EPD. The results of EMA's assessment identified a number of metals in soil, including: arsenic, barium, cadmium, chromium, and lead. Based on the soil data obtained in 2003, the Site was sub-listed on the Hazardous Site Inventory (HSI) as part of the Welcome Years HSI Site No. 10637 located to the north.

According to the 2003 CSR, fill material was placed on the Site between 1938 and 1951, as well as adjacent property to the north, Iron Works International, Inc., to the east, Ethel Street Associates, and to the south, 1061 Howell Mill Road (United Refrigerating Wholesale Distributors) which have also been sub-listed as part of the Welcome Years HSI Site. The fill material consists of black stained soils with some high concentrations of slag material. Slag is a waste product from metal manufacturing operations. These byproducts most likely originated from former metal manufacturing companies which historically operated in the vicinity of the Site. Metals detected in the subsurface soil at the subject Site include arsenic, barium, cadmium, chromium and lead. The arsenic, barium and lead levels were detected at concentrations above their respective HSRA regulatory notification concentrations. Barium and lead were detected in the groundwater in 2003, but were reported to be associated with high turbidity levels at the time of sampling.

A follow-up environmental assessment was conducted in 2006 in response to Georgia EPD's notice of deficiency letter dated September 16, 2005. An amended CSR was submitted on December 6, 2006. The results of these investigations conducted at the Site are summarized further herein.

2.0 SITE SETTING

Understanding the Site setting is important in evaluating the fate and transport of contaminants in the subsurface. Refer to the geologic cross sections in Figure 4 and Figure 5.

2.1 PHYSICAL SETTING

This Site is located topographically in an area of moderately to gently sloping terrain. According to current topographic maps, the subject site is situated east of a ridgeline that runs along or just west of Howell Mill Road. According to the 1928 topographic map, a drainage swale was mapped on the eastern portion of the Site and drained to the east into a former creek, which flowed to the northeast. This swale was filled and the Site was leveled in the 1940s or 1950s, prior to construction of the existing building.

2.2 SITE SPECIFIC GEOLOGY

The Site is located in the Piedmont Geologic Region of the Appalachian Province in an area underlain by late Precambrian to early Paleozoic bedrock of the Clairmont Formation (McConnell and Abrams, 1984). The Clairmont Formation in the area of the Site is mapped as consisting of interlayered biotite-plagioclase gneiss and hornblende-plagioclase amphibolite. The residual soils present in this geologic area have been formed by in-place chemical and physical weathering of the parent rock types. Weathering is facilitated by fractures, joints, and the presence of less resistant rock types. The typical residual soil profile consists of clayey soils near the ground surface, transitioning to sandy silts and silty sands that generally become harder with depth to the top of the parent rock.

The soil test borings advanced at the Site generally encountered a significant amount of fill material. Across the Site, the depth and thickness of fill varies from depths ranging from 9 to 29 feet. The fill material consists of sandy silt interlayer with black gravelly sand. Debris was encountered in the fill material and was comprised mostly of concrete, brick, gravel, wood, glass and slag. Native soils beneath the fill material were generally described as clayey or sandy silt.

2.3 SITE SPECIFIC HYDROGEOLOGY

In the Piedmont Geologic Region, groundwater generally occurs under water table conditions and is stored in the overlying mantle of residuum and in the structural features (i.e. joints, fractures, or faults) present in the underlying rock. Recharge to the water table is primarily by precipitation infiltrating the upper soils and percolating downward, under the influence of gravity, to the groundwater table. Typically, the water table is not a level surface, but a subdued reflection of the land surface. Depth to the water table is variable, being dependent on many factors which include: the amount of rainfall, the permeability of the residuum, the extent of fracturing in the underlying rock, and the amount of groundwater being pumped in the area.

2.3.1 Groundwater Flow Direction

Groundwater generally flows in directions subparallel to the ground surface slopes and under the influence of gravity towards points of discharge such as creeks, swamps, drainage swales, or pumped groundwater wells. As stated earlier, the water table is generally a subdued replica of the original topographic surface. As such, based on historical topographic maps and other public records, groundwater at the Site is expected to generally flow to the northeast. According to the September 2003 CSR and December 2006 revised CSR, the depth to groundwater in two on-site wells, MW-1 and MW-2 were measured at 18.9 feet and 21.04 feet, respectively.

AMEC installed three additional wells on-Site (MW-3, MW-4 and MW-5) in June 2012 as part of a pre-purchase due diligence assessment. At that time, it was discovered that the two existing wells, MW-1 and MW-2, installed by EMA were both dry. MW-1 was dry at a depth of 24.48 feet and MW-2 was dry at a depth of 24.23 feet. As such, in order to further characterize current groundwater conditions on-Site AMEC installed a replacement well adjacent to MW-1.

The depth to groundwater was measured by AMEC in monitoring wells MW-3, MW-4 and MW-5 from the top of the well casing on June 6, 2012 and from MW-1R on July 5, 2012. The water table in the four wells was again measured on August 28, 2012.

The depths to groundwater in the four wells installed by AMEC were used to calculate the elevation of the groundwater in each well, develop groundwater elevation contours and interpret the flow direction. Depths to groundwater in August ranged from approximately 24.8 feet to 26.1 feet, as tabulated in Table 1. This represents a water table drop of approximately 5 to 7 feet since 2003. The water table surface for the Site is shown on Figure 6 and confirms a general groundwater flow direction to the northeast, consistent with historical topography.

2.3.2 Groundwater Flow Rate

As detailed in the December 2006 revised CSR, the Georgia EPD approved the use of variable head slug test data from two monitoring wells (MK-1 and MK-2) located on the adjacent property to the south (1061 Howell Mill Road) which is also sub-listed as part of the Welcome Years HSI Site. The hydraulic conductivity value for MK-1 and MK-2 was 15.9 ft/day to 26.2 ft/day, respectively, with an average hydraulic conductivity value of 21.05 ft/day.

The representative seepage velocity (*v*) of groundwater flow through the interstitial space of the saturated porous media is calculated by multiplying hydraulic conductivity (*K*) by hydraulic gradient (*i*) and dividing by effective porosity (n_e). Effective porosity was assumed to be 15% (Applied Hydrology, C.W. Fetter, 1994). A hydraulic gradient of 0.02 (or 2%) was calculated from the August 2012 potentiometric map (Figure 6) as the change in the hydraulic head between MW-4 (contour line 943.5 ft) and the area near MW-5 (contour line 941.5 ft) divided by the distance between these two elevations along a groundwater flow path: (943.5 ft – 941.5 ft) / 88 ft = 0.02.

$$\text{Velocity} = \frac{K\ i}{n_e}$$

where: K = hydraulic conductivity (feet per day) = 21.05 ft/day
i = hydraulic gradient (feet per foot) = 0.02 ft/ft
n_e = effective porosity (unit less) = 0.15

Based on the data input, an estimated groundwater velocity of 2.8 feet/day was calculated; however, this value may be considerably higher than the residual aquifer flow rate since the hydraulic conductivity value was influenced by the fill.

3.0 REGULATED CONSTITUENTS

Results of soil and groundwater assessment activities indicate the presence of substances regulated under the Hazardous Site Response Act (HSRA) in soil and groundwater at the Site. The regulated substances in soil include: arsenic, barium, cadmium, chromium and lead. The regulated substances in groundwater include: 1,1,1-trichloroethane, 1,1 dichloroethane, 1,1 dichloroethene, barium, bromodichloromethane, cadmium, chloroethane, chloroform, chromium, cis-1,2 dichloroethane, lead, tetrachloroethene and trichloroethene.

3.1 SOURCE

According to data obtained by AMEC during a Phase I assessment, the Site was undeveloped until the early 1950s. According to the 1928 topographic map, a drainage swale was mapped on the eastern portion of the Site and drained to the east into a former creek, which flowed to the northeast. The metals-impacted fill material encountered at the Site is interpreted to have been placed on-Site between 1938 and the early 1950s, prior to the construction of the existing building in 1951. The impacted fill material is described as a sandy silt and black sandy gravel. Debris was encountered within the fill material and consists of concrete, brick fragments, wood, glass and some slag.

Data from assessments of properties to the north and east revealed that chlorinated VOCs, primarily tetrachloroethene (PCE) has been identified in groundwater which is believed to have originated from the Welcome Years, HSI No. 10637 located at 1115 Howell Mill Road, north of the Site. However, based on the interpreted groundwater flow direction on-Site, the Welcome Years site appears to be located downgradient of the Site. Historical sources indicate that the Site was occupied by businesses which are unlikely to have been the source of groundwater impacts. In addition, the pattern of groundwater impacts on-Site indicate an upgradient source. Upgradient historical businesses to the west and southwest which could have been the source of groundwater impacts include: Buffalo Cab Company, American Cab Company and S&S Muffler and Brake located at 1075 Brady Avenue, Atlanta Safety Brake located at 1077 Brady Avenue, Speedway Auto Repair and Howell Mill Auto Service Repair located at 1054 Howell Mill Road, and Smiths Service Station located at 1060 Howell Mill Road.

3.2 SOIL QUALITY CONDITIONS

The regulated substances identified in soil at the Site include: arsenic (CAS No. 7440-38-2), barium (CAS No. 7440-39-3), cadmium (CAS No. 7440-73-9), chromium (CAS No. 7440-47-3) and lead (CAS No. 7439-92-1).

The assessment of soil conditions was accomplished through the installation and sampling of drilled soil borings and direct push borings. The results of the soil laboratory analysis are summarized in Table 2 and illustrated on Figure 7. The following paragraphs describe the sampling events.

As discussed, an initial environmental investigation was performed by EMA in July 2003 as a result of a CSR call-in letter issued by the Georgia EPD. EMA installed nine soil borings (BH-1 through BH-9) on the Site. A total of twenty-one soil samples were analyzed from the nine soil borings for arsenic, barium, cadmium, chromium and lead. Soil testing revealed the presence of arsenic and barium in two samples and lead in five samples at concentrations greater than their Hazardous Site Response Act (HSRA) notification concentrations (NC). The results of initial assessment was submitted to the Georgia EPD in the September 2003 CSR.

A follow-up environmental assessment was conducted in 2006 in response to Georgia EPD's notice of deficiency letter dated September 16, 2005. The follow-up assessment consisted of advancing one additional soil boring on the northwestern portion of the Site. Additionally, as directed by EPD, EMA submitted additional soil samples from the initial 2003 assessment even though the samples were outside the laboratory holding limits. A total of five additional soil samples from the borings completed in 2003 and one soil sample from the one soil boring advanced in 2006 were again analyzed for the metals arsenic, barium, cadmium, chromium and lead. The additional soil testing revealed the presence of arsenic in two samples, and barium and lead in four samples at concentrations in excess of their respective HSRA NCs.

As previously mentioned AMEC performed an environmental investigation at the Site as part of a pre-purchase due diligence assessment. AMECs investigation included the installation of four direct push borings, two of which were located within the on-Site building and two outside the building on the western portion of the Site. Soil samples were collected from the direct push borings and examined for the presence of debris and slag and screened in the field for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). No elevated PID readings were registered during field activities. In order to further delineate soil impacts on the western portion of the Site, two soil samples from boring MW-3 were analyzed for RCRA metals. Barium, chromium and lead were detected in both soil samples above the laboratory detection limit, but below their respective HSRA NC.

Boring records are included in Appendix C.

3.3 GROUNDWATER QUALITY CONDITIONS

The regulated substances identified in groundwater at the Site include: 1,1,1-trichloroethane (CAS No. 71-55-6), 1,1 dichloroethane (CAS No. 75-34-3), 1,1 dichloroethene (CAS No. 75-34-4), barium (CAS No. 7440-39-3), bromodichloromethane (CAS No. 75-27-4), cadmium (CAS No. 7440-73-9), chloroethane (CAS No. 75-00-3), chloroform (CAS No. 676-6-3), chromium (CAS No. 7440-47-3), cis-1,2 dichloroethane (CAS No. 156-59-2), lead (CAS No. 7439-92-1), tetrachloroethene (CAS No. 127-18-4) and trichloroethene (CAS No. 790-1-6).

As discussed, EMA performed an initial environmental investigation in July 2003 as a result of a CSR call-in letter issued by the Georgia EPD. EMA installed nine soil borings (BH-1 through BH-9) on the Site. Two soil borings, BH-8 and BH-9, were extended below the groundwater table and converted to groundwater monitoring wells, MW-2 and MW-1, respectively. MW-1 was installed on the southwestern end in the parking area with a hollow-stem auger drill rig and MW-2 was installed within the building with a direct push drill rig. MW-1 was constructed using two-inch diameter PVC casing to the surface with the bottom 15 feet consisting of slotted 0.001-inch PVC screen, and MW-2 was constructed using one-inch casing with the bottom 6 feet consisting of pre-packed stainless steel screen. EMA analyzed a groundwater sample from the two monitoring wells for arsenic, barium, cadmium, chromium and lead. The results of groundwater laboratory analysis identified barium in both wells and lead in one well (MW-2) at concentrations above the laboratory detection limits. However, EMA reported that the presence of barium and lead in groundwater was a result of high turbidity levels at the time of sampling [MW-1 at 35 nephelometric turbidity units (NTUs) and MW-2 at 95 NTUs] based on the discrepancy between dissolved and total analysis results in MW-2. Please note that a dissolved sample was not collected from MW-1. The results of the groundwater laboratory analyses from the EMAs sampling event is summarized in Tables 3 and illustrated on Figure 8.

In June/July 2012, AMEC installed three monitoring wells (MW-3 through MW-5) and a replacement well (MW-1R) adjacent to EMA's well MW-1 which was dry. The monitoring wells were installed in borings advanced using a drill rig and hollow stem augers. The wells were constructed using two-inch diameter PVC casing to the surface with the bottom 10 feet consisting of slotted 0.001-inch PVC screen. A filter pack consisting of bagged quartz sand was placed around the well screens to approximately two feet above the screen. At least two feet of hydrated bentonite chips were placed above the filter pack. The remainder of the borehole annulus of each boring was filled with cement grout. A lockable well cap and protective well covers were installed at the surface.

Boring logs and well construction diagrams are included in Appendix C.

3.3.1 Sampling and Analysis Procedures

Following are a description of AMEC's procedures during the June/July 2012 activities. EMA's sampling procedures were similar as previously reported in the September 2003 CSR and December 2006 revised CSR.

Well development consisted of pumping the wells until at least five well volumes of water had been removed and groundwater was relatively clear of fine particles. The water quality parameters of temperature, pH, specific conductivity and turbidity were measured during well development. Groundwater samples were collected upon stabilization of the water quality parameters and/or adequate recharge of the wells. AMEC's field groundwater sampling forms are included in Appendix D.

Groundwater samples were collected from wells MW-3, MW-4, and MW-5 by AMEC in June 2012, and from well MW-1R in July 2012. Clean nitrile gloves were worn during all development and sampling activities and were changed between each well location. Samples were collected and poured into clean sample containers, supplied by the laboratory, which contained the preservative appropriate for each test. Following sample collection, the bottles were stored on ice in a cooler until they were transferred to the laboratory. The samples were maintained under chain-of-custody control from the time they were collected until they were relinquished to the laboratory.

3.3.2 Laboratory Analytical Procedures

Following delivery to Analytical Environmental Services, Inc. (AES), the groundwater samples collected by AMEC were analyzed for VOCs (EPA Test Method 8260B), polycyclic aromatic hydrocarbons (PAHs, EPA Test Method 8260B), polychlorinated biphenyls (PCBs, EPA Test Method 8082A), pesticides (EPA Test Method 8081B) and metals (EPA Test Methods 6010C and 7470A). AES maintains a current National Environmental Laboratory Accreditation Conference (NELAC) certification for the analysis of these parameters.

The groundwater samples were maintained under chain-of-custody control and submitted to the analytical laboratory for testing. Trip blanks prepared by the laboratory were also submitted for testing. QA/QC was conducted in accordance with the laboratory analysis selected. Backup QA/QC data and chain-of-custody records are included in the laboratory reports in Appendix B.

3.3.3 Summary of groundwater testing data

A summary of the groundwater test results are presented in Table 3 and are graphically depicted on Figure 8. Complete laboratory reports are documented in Appendix B.

The findings of metals in groundwater samples by EMA were inconclusive due to turbidity issues. In comparison, the wells installed by AMEC were developed until field turbidity measurements were at or below 10 NTUs. Refer to Appendix D for AMEC field groundwater sampling forms.

Barium (total and dissolved) was detected below its drinking water standard in each groundwater sample collected by AMEC. Additionally, the metals cadmium in one groundwater sample, chromium in two groundwater samples and lead in three groundwater samples, were detected at concentrations below their drinking water standards. In AMEC's experience, the metals detected in groundwater are consistent with naturally occurring concentrations.

Several chlorinated VOCs were detected in MW-3, MW-4 and MW-5. Tetrachloroethene (PCE) and chloroform were detected in groundwater from well MW-3 located on the northwest corner of the Site. The chlorinated VOCs of chloroform, 1,1,1-trichloroethane, 1,1 dichloroethane and cis-1,2 dichloroethane, were detected in groundwater from well MW-4 located within the central portion of the building. AMEC requested the laboratory to report the groundwater data to the method detection limits in order to ascertain if additional VOC constituents could be identified. As a result the following additional VOC constituents were reported in one or more wells as estimated values (ie. J flag): 1,1 dichloroethene, bromodichloromethane, chloroethane and trichloroethene. No VOCs were detected in MW-1R.

No PAHs, PCBs or pesticides were detected in the groundwater samples tested.

4.0 DELINEATION CONCENTRATION CRITERIA

The data from previous investigations conducted by EMA in July 2003 and November 2006 and AMEC's June/July 2012 investigation were used to evaluate the extent of regulated constituents in soil and groundwater. Based on the results of previous subsurface investigations, as reported to the HSRP and detailed above, the Constituents of Concern (COCs) for soil at the Site consist of metals, primarily arsenic, barium and lead.

4.1 SOIL

As reported in EMA's September 2003 CSR and December 2006 revised CSR, previous soil testing has identified impacts of arsenic, barium and lead at concentrations greater than their HSRA NCs. Based on EMA's on-Site investigations and investigations performed on the adjacent properties to the north, east and south which are also part of the Welcome Years HSI Site No. 10637 sub-listing, the impacted soil is interpreted to be associated with the placement of impacted fill material. The impacted fill material is described as a sandy silt and black sandy gravel which also contains debris comprised of concrete, brick fragments, wood, glass and some slag. Across the Site, the depth and thickness of the fill material varies from depths ranging from 9 to 29 feet.

As previously mentioned AMEC performed an environmental investigation at the Site as part of a pre-purchase due diligence assessment. AMEC installed a soil boring, MW-3, west of EMA's soil boring BH-10 in order to further delineate soil impacts on the western portion of the Site west. AMEC collected two soil samples from MW-3 at depths of four feet and eight feet. Barium, chromium and lead were detected in both soil samples from MW-3 at concentrations above the laboratory detection limit, but below their respective HSRA NC.

As discussed in Section 3.1, fill material placed in the area over 60 years ago is the source of metals on the subject Site and on the adjacent properties which have been sub-listed for the same condition. Therefore, it was not practicable to delineate metals in soil to Type 1 risk reduction standard (RRS) per Code Section 12-8-108(1). Further, although there has been a disposal of hazardous substances at the property, there has not been a release that extends beyond the property lines and, therefore, there is no requirement to further delineate the Site.

4.2 GROUNDWATER

As described in Section 3.3, the metals detected in the groundwater on-Site are below drinking water standards. Additionally, recent testing of groundwater detected several chlorinated VOCs at low concentrations in wells MW-3, MW-4 and MW-5 which indicate an off-Site source. Furthermore, no PAHs, PCBs or pesticides were detected in groundwater samples collected from MW-1R, MW-3, MW-4 and MW-5.

Based on the combined groundwater testing results completed at the Site, metals have not contaminated groundwater and the chlorinated VOCs have been delineated as depicted on Figure 9.

5.0 REMEDIATION CRITERIA AND EXPOSURE

An examination of potential exposure pathways and receptors was presented in previous reports and, in part, supplemented by recent research. Based on the data collected to date, the potential exposure pathways include:

- Potential exposure to regulated constituents in soil;
- Potential exposure to regulated constituents in groundwater; and
- Potential exposure to regulated constituents due to vapor intrusion from impacted groundwater beneath occupied buildings.

The Site is commercially developed with a 32,186 square foot building which covers a majority of the approximate 0.9 acre parcel of land. A small parking lot is located west of the building. The Site is located within a historically industrial area and some nearby properties have been partially redeveloped with retail, commercial and residential properties. The property is bound to the north, east and south by commercial properties which have also been sub-listed as part of the Welcome Years HSI Site No. 10637. The Site is bound to the west by Howell Mill Road beyond which is commercial developed.

In conjunction with and as a companion to this VRPA, a prospective purchaser has also submitted an Application for Limitation of Liability and Corrective Action Plan pursuant to Section 12-8-200 of the Hazardous Site Reuse and Redevelopment Act. The prospective purchaser is planning to acquire the property for redevelopment purposes. Current plans are to demolish the building super-structure and refurbish the property utilizing the Site's current concrete slab foot-print.

It is important to note that the Site has been sub-listed for metals in soil only and not for any groundwater condition.

5.1 SOIL CRITERIA

As discussed, previous soil testing has identified impacts of arsenic, barium and lead at concentrations greater than their HSRA NCs. The metals cadmium and chromium were also detected in soil but not at concentrations above their respective HSRA NCs. Based on EMA's on-Site investigations and investigations performed on the adjacent properties to the north, east and south which are also part of the Welcome Years HSI Site No. 10637 sub-listing, soil impacts are interpreted to be associated with the placement of impacted fill material. The impacted fill material is described as a sandy silt and black sandy gravel which also contains debris comprised of concrete, brick fragments, wood, glass and some slag. Across the Site, the depth and thickness of the fill material varies from depths ranging from 9 to 29 feet.

The proposed immediate future use of the Site will likely include a restaurant; however long term us of the Site could include residential occupancy. Therefore, the condition of the impacted fill material has been compared to residential risk reduction standards (RRS). Based on the combined soil testing results completed at the Site, the metals arsenic, barium, cadmium and lead have been detected at concentrations above their respective default Type 1 RRS.

Nevertheless, the potential for direct exposure of residents and/or commercial workers to impacted soil at the Site is incomplete as the Site will remain almost entirely covered by the on-Site building slab and asphalt parking area. As discussed in Section 6.1, the applicant will utilize provisions set forth in the Georgia Voluntary Remediation Program Act to apply engineering and institutional controls as a Type 5 RRS. The applicant will utilize the Site's current developed foot-print to certify compliance with a Type 5 RRS designed to provide long-term protection of human health and the environment through the application of both engineering and institutional controls as recorded in an Environmental Covenant.

5.2 GROUNDWATER CRITERIA

As detailed in EMA's September 2003 CSR and December 2006 revised CSR, EMA previously conducted a water usage survey for the area surrounding the Site to identify active drinking water sources. As reported, no active drinking water wells were identified within a three-mile radius of the Site. Additionally, based on historical topographic maps, other public records and on-Site groundwater elevations, groundwater at the Site is expected to generally flow to the northeast toward other sub-listed and listed properties. The downgradient properties have submitted either a HSRA Type 5 CAP or a VRP application that includes a deed restriction regarding the use of groundwater. Therefore, the exposure pathway for human consumption of impacted groundwater is incomplete.

Other potential receptors include construction workers and utility workers. The Site is almost entirely covered by the on-Site building foot print and asphalt parking area property and there are no plans for future construction. In addition, the depths to groundwater in the four wells installed by AMEC ranged from approximately 24.8 feet to 26.1 feet. Therefore, the potential for exposure of construction and/or utility workers is considered inconsequential.

Based on groundwater data obtained on-Site, nine chlorinated VOCs and the metals barium, cadmium, chromium and lead have been detected in groundwater at the Site. Pursuant to Code Section 12-8-107(g)(2), corrective action for groundwater is not required since a release exceeding a reportable quantity for groundwater does not now exist at the Site and did not exist at the time of sub-listing as part of the Welcome Years HSI Site No. 10637. In addition, the metals impacts to on-Site soils have not resulted in a regulated groundwater condition and the VOCs in groundwater are a result of an off-site release.

Because the Site was not listed on the HSI for a groundwater condition, restricting the use of groundwater is not required. Nevertheless, an Environmental Covenant will be recorded which restricts the use of on-Site groundwater.

5.3 VAPOR INTRUSION

Because of the presence of several chlorinated VOCs in groundwater, the potential for vapor intrusion to indoor air was evaluated. Refer to Appendix E for the complete Vapor Intrusion Risk Evaluation.

Risk calculations were completed using the 2012 groundwater concentrations in the Johnson and Ettinger Model for Subsurface Vapor Intrusion Into Buildings (J&E Model). Risk and hazard associated with estimated indoor air exposures were then calculated by estimating exposure concentrations and comparing these concentrations to inhalation toxicity benchmarks. The calculations indicate no unacceptable risk or hazards for occupational or residential receptors potentially exposed to vapor emissions via indoor air. Therefore, the exposure pathway for vapor inhalation is inconsequential based on the continued use of the existing concrete slab-on-grade construction.

6.0 PROPOSED REMEDIATION PLAN

It is the intent of the responsible party, Mr. William Graham Jr., to remove the Site from the Hazardous Site Inventory (HSI) through implementation of an efficient Voluntary Remediation Program plan which is protective of human health and the environment. Based on the soil-only listing, the completed soil and groundwater testing and the absence of complete pathways of exposure to constituents in soil and groundwater, the responsible party proposes the following voluntary remediation remedies.

6.1 SOIL AND SOURCE

Based on the completed investigations at the Site, extensive soil testing has identified impacts of arsenic, barium, cadmium and lead at concentrations greater than their default Type 1 RRS. The metal chromium was also detected in soil but not at a concentration above its Type 1 RRS. As previously discussed, the soil impacts identified on-Site are interpreted to be associated with the placement of impacted fill material. The impacted fill material is described as a sandy silt and black sandy gravel which also contains debris comprised of concrete, brick fragments, wood, glass and some slag. Across the Site, the depth and thickness of the fill material varies from depths ranging from 9 to 29 feet.

Therefore, it is the applicant's intent to certify compliance with a Type 5 risk reduction standard (RRS) on the basis of the following:

- Remediation of the impacted soil to residential RRS is not feasible based on the volume and depth of impacted fill material present on the Site.
- Exposure to the impacted fill material is incomplete because of current engineering controls which consist of the Site being almost entirely covered by the on-Site building foot print and asphalt parking area.
- Site redevelopment will retain the existing floor slab and any ground-disturbing activities will be performed under an Environmental Covenant.
- Engineering and institutional controls protective of human health and the environment will be maintained.

The Type 5 RRS is designed to provide long-term protection of human health and the environment through the application of both engineering and institutional controls. The corrective action elements to certify compliance with the Type 5 RRS will consist of maintaining the engineering controls (building floor slab and other hard groundcover) and implementation of institutional controls through land use restrictions set forth in an Environmental Covenant filed with the Recorder of Deeds for Fulton County.

The Environmental Covenant will conform to the Georgia Uniform Covenants Act, OCGA § 44-16-8(a), *et seq* and will include the following basic institutional controls at a minimum: (1) groundwater use will be restricted, (2) the existing concrete floor slab will be maintained as a hardcover to be protective of human health and the environment, (3) a written continuing care plan will be implemented to monitor and control future actions which could breach the hard cover, (4) requirements for documentation, including notices, legal recording and reporting will be specified, and (5) the responsibilities of all Parties to the agreement will be established.

6.2 GROUNDWATER

Based on groundwater data obtained on-Site, nine chlorinated VOCs and the metals barium, cadmium, chromium and lead have been detected in groundwater at the Site. Based on lack of groundwater use in the area, the Site should not be listed for the impacts of regulated constituents identified in groundwater.

Pursuant to Code Section 12-8-107(g)(2), corrective action for groundwater is not required since a release exceeding a reportable quantity for groundwater does not now exist at the Site and did not exist at the time of sub-listing the Site as part of the Welcome Years HSI Site No. 10637.

As such, the applicant does not propose any further evaluation of existing groundwater conditions at this time. Using groundwater data collected on-Site, this assertion is supported by the following factors:

- As previously reported to EPD, no active drinking water wells have been identified within a three-mile radius of the Site.
- The Site is sub-listed on the HSI as part of the Welcome Years HSI Site No. 10637 for the presence of impacted fill material and has not been listed for groundwater impacts. Additionally, using the "Guidance Manual for Reportable Quantities Screening Method" dated February 10, 1994, and considering no drinking water wells exists within three miles of the Site, the additional chlorinated VOCs recently identified in groundwater on-Site do not exceed the reportable quantities threshold for listing based on groundwater.
- No groundwater exposure pathway existed at the time of the Site's sub-listing as part of the Welcome Years HSI Site No. 10637.
- There are no complete pathways for exposure of on-Site or off-site receptors to groundwater.
- The applicant will record a deed restriction to prevent future use of groundwater on-Site for human consumption in order to ensure the maintenance of the incomplete pathway.

Following approval of this application by EPD, the monitoring wells located on the Site will be properly closed.

6.3 VAPOR INTRUSION

The results of the subsurface investigations identified the presence of chlorinated solvents in the groundwater on Site. As a result, an evaluation of the potential for vapor intrusion to indoor air has been completed. As discussed in Section 5.3 and Appendix E, a vapor intrusion risk evaluation was completed which indicated no unacceptable risk or hazard for occupational or residential receptors based on the J&E Model.

7.0 PROJECTED MILESTONE SCHEDULE AND COST ESTIMATE

Upon EPD's acceptance of the Site into the Voluntary Remediation Program, a Work Plan will be prepared that describes the immediate planned activities, along with a Projected Milestone Schedule for implementation and reporting.

ATTACHMENT

APPLICATION FORM AND CHECKLIST

Voluntary Remediation Plan Application Form and Checklist

VRP APPLICANT INFORMATION

COMPANY NAME	Master Marketing Sunlow, Inc.				
CONTACT PERSON/TITLE	William D. Graham, Jr.				
ADDRESS					
PHONE		**FAX**		**E-MAIL**	

GEORGIA CERTIFIED PROFESSIONAL GEOLOGIST OR PROFESSIONAL ENGINEER OVERSEEING CLEANUP

NAME	Charles T. Ferry			**GA PE/PG NUMBER**	PE 10957
COMPANY	AMEC Environment & Infrastructure.				
ADDRESS	396 Plasters Avenue				
PHONE	404-873-4761	**FAX**	404-817-0183	**E-MAIL**	Chuck.ferry@AMEC.com

APPLICANT'S CERTIFICATION

In order to be considered a qualifying property for the VRP:

(1) The property must have a release of regulated substances into the environment;
(2) The property shall not be:
  (A) Listed on the federal National Priorities List pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Section 9601.
  (B) Currently undergoing response activities required by an order of the regional administrator of the federal Environmental Protection Agency; or
  (C) A facility required to have a permit under Code Section 12-8-66.
(3) Qualifying the property under this part would not violate the terms and conditions under which the division operates and administers remedial programs by delegation or similar authorization from the United States Environmental Protection Agency.
(4) Any lien filed under subsection (e) of Code Section 12-8-96 or subsection (b) of Code Section 12-13-12 against the property shall be satisfied or settled and released by the director pursuant to Code Section 12-8-94 or Code Section 12-13-6.

In order to be considered a participant under the VRP:
  (1) The participant must be the property owner of the voluntary remediation property or have express permission to enter another's property to perform corrective action.
  (2) The participant must not be in violation of any order, judgment, statute, rule, or regulation subject to the enforcement authority of the director.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify that this property is eligible for the Voluntary Remediation Program (VRP) as defined in Code Section 12-8-105 and I am eligible as a participant as defined in Code Section 12-8-106.

APPLICANT'S SIGNATURE			
APPLICANT'S NAME/TITLE (PRINT)	DANNY GRAHAM Pres.	**DATE** 9/11/12	

QUALIFYING PROPERTY INFORMATION

TAX PARCEL ID	17-0150-009-14	PROPERTY SIZE (ACRES)	0.9
PROPERTY ADDRESS	1071 Howell Mill Road		
CITY	Atlanta	COUNTY	Fulton
LATITUDE	33.78410	LONGITUDE	-84.41164
PROPERTY OWNER(S)	Master Marketing Sunlow, Inc.	PHONE #	
MAILING ADDRESS			
CITY		STATE/ZIP	Georgia

ITEM #	DESCRIPTION OF REQUIREMENT	Location in VRP (i.e. pg., Table #, Figure #, etc.)	For EPD Comment Only (Leave Blank)
1.	**$5,000 APPLICATION FEE** IN THE FORM OF A CHECK PAYABLE TO THE GEORGIA DEPARTMENT OF NATURAL RESOURCES.	**Paid**	
2.	**WARRANTY DEED(S)** FOR QUALIFYING PROPERTY.	**Appendix A**	
3.	**TAX PLAT** OR OTHER FIGURE INCLUDING QUALIFYING PROPERTY BOUNDARIES, ABUTTING PROPERTIES, AND TAX PARCEL IDENTIFICATION NUMBER(S).	**Appendix A**	
4.	**ONE (1) PAPER COPY AND TWO (2) COMPACT DISC (CD) COPIES** OF THE VOLUNTARY REMEDIATION PLAN IN A SEARCHABLE PORTABLE DOCUMENT FORMAT (PDF).	**Attached**	
5.	The VRP participant's initial plan and application must include , using all reasonably available current information to the extent known at the time of application, a graphic three-dimensional preliminary conceptual site model (CSM) including a preliminary remediation plan with a table of delineation standards, brief supporting text, charts, and figures (no more than 10 pages, total) that illustrates the site's surface and subsurface setting, the known or suspected source(s) of contamination, how contamination might move within the environment, the potential human health and ecological receptors, and the complete or incomplete exposure pathways that may exist at the site; the preliminary CSM must be updated as the investigation and remediation progresses and an up-to-date CSM must be included in each semi-annual status report submitted to the director by the participant; a **PROJECTED MILESTONE SCHEDULE** for investigation and remediation of the site, and after enrollment as a participant, must update the schedule in each semi-annual status report to the director describing implementation of the plan during the preceding period. A Gantt chart format is preferred for the milestone schedule. The following four (4) generic milestones are required in all initial plans with the results reported in the participant's next applicable semi-annual reports to the director. The director may extend the time for or waive these or other milestones in the participant's plan where the director determines, based on a showing by the participant, that a longer time period is reasonably necessary:	**Sections 3.0, 4.0, 5.0 and 6.0, Table 1 through 3, Figures 3 through 9 and Appendix B**	

5.a.	Within the first 12 months after enrollment, the [illegible]ipant must complete horizontal delineation of the release and associated constituents of concern on property where access is available at the time of enrollment;	**Section 4.0**	
5.b.	Within the first 24 months after enrollment, the participant must complete horizontal delineation of the release and associated constituents of concern extending onto property for which access was not available at the time of enrollment;	**Section 4.0**	
5.c.	Within 30 months after enrollment, the participant must update the site CSM to include vertical delineation, finalize the remediation plan and provide a preliminary cost estimate for implementation of remediation and associated continuing actions; and	**Section 4.0**	
5.d.	Within 60 months after enrollment, the participant must submit the compliance status report required under the VRP, including the requisite certifications.	**Section 4.0**	
6.	**SIGNED AND SEALED PE/PG CERTIFICATION** AND SUPPORTING DOCUMENTATION: "I certify under penalty of law that this report and all attachments were prepared by me or under my direct supervision in accordance with the Voluntary Remediation Program Act (O.C.G.A. Section 12-8-101, et seq.). I am a professional engineer/professional geologist who is registered with the Georgia State Board of Registration for Professional Engineers and Land Surveyors/Georgia State Board of Registration for Professional Geologists and I have the necessary experience and am in charge of the investigation and remediation of this release of regulated substances. Furthermore, to document my direct oversight of the Voluntary Remediation Plan development, implementation of corrective action, and long term monitoring, I have attached a monthly summary of hours invoiced and description of services provided by me to the Voluntary Remediation Program participant since the previous submittal to the Georgia Environmental Protection Division. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." Charles T. Ferry 1095 9/17/2012 Printed Name and GA PE/PG Number Date Charles T. Ferry Signature and Stamp No. 10957 CHARLES T. FERRY		

TABLES

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 1 - SUMMARY OF WELL CONSTRUCTION/WATER LEVEL DATA

Well ID	Measurement Date	Well Elevation, FT*	Depth of Well, FT	Well Screen Interval, FT	Depth to Water, FT	Groundwater Elevation, FT
MW-1	7/3/2003	970.45	25	10-25	18.90	951.55
	6/6/2012				Dry	Dry @ 945.97
MW-1R	7/5/2012	970.43	34.1	24.10-34.10	25.5	944.93
MW-2	7/3/2003	968.23	25	19-25	21.04	947.19
	6/6/2012				Dry	Dry @ 944.03
MW-3	6/6/2012	968.75	32	22-32	26.13	942.62
MW-4	6/6/2012	968.17	32	22-32	24.84	943.33
MW-5	6/6/2012	967.56	32	22-32	25.87	941.69

* Relative to benchmark elevation of 968.38 feet at northwest corner building entrance

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:	**Type 1 RRS**	**BH-1**		**BH-1**		**BH-1**		**BH-2**		**BH-2**		**BH-2**	
Sample Date:		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**	
Sample Depth:		**2.5-10**		**10-15**		**25-30**		**0-5**		**10-15**		**15-20**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**	
Metals, mg/kg													
Arsenic	20	57.2	H*	<4.98	U	<4.03	U	13.1		11.8		<4.36	U
Barium	1,000	778	H*	137		70.5		155		109		53.6	
Cadmium	2	15.3	H*	<2.49	U	<2.01	U	<2.41	U	<1.83	U	<2.18	U
Chromium, Total	100	46.3	H*	11.5		8.75		18.5		37.4		4.27	
Lead	75	6,270	H*	479		8.23		136		195		20.2	

Notes:
RRS = Risk Reduction Standard
U = Constituent was not detected at the reporting limit
H* = Samples were exceeded laboratory holding times
mg/kg - milligrams per kilograms

Reference:
EMA's CSR dated September 10,2003, revised
December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:	**Type 1 RRS**	**BH-3**		**BH-3**		**BH-3**		**BH-4**		**BH-4**		**BH-5**	
Sample Date:		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**	
Sample Depth:		**0-5**		**15-20**		**35-40**		**15-20**		**25-30**		**0-5**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**	
Metals, mg/kg													
Arsenic	20	<4.92	H*	<4.30	U	<4.15	U	<3.66	U	<3.86	U	18.7	H*
Barium	1,000	154	H*	60.4		90.4		86.2		89.7		548	H*
Cadmium	2	<2.46	H*	<2.15	U	<2.08	U	<1.83	U	<1.93	U	<2.43	H*
Chromium, Total	100	16.1	H*	8.26		9.45		11.6		8.51		33	H*
Lead	75	24.7	H*	26.2		5.64		32.9		6.25		877	H*

Notes:
RRS = Risk Reduction Standard
U = Constituent was not detected at the reporting limit
H* = Samples were exceeded laboratory holding times
mg/kg - milligrams per kilograms

Reference:
EMA's CSR dated September 10,2003, revised
December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:		**BH-5**		**BH-5**		**BH-6**		**BH-6**		**BH-6**		**BH-7**	
Sample Date:	**Type 1 RRS**	**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**	
Sample Depth:		**15-20**		**25-30**		**0-5**		**15-20**		**20-25**		**5-10**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**	
Metals, mg/kg													
Arsenic	20	14		<4.34	U	<4.98	H*	19.3		<3.94	U	120	H*
Barium	1,000	229		47.6		2,780	H*	817		76.3		481	H*
Cadmium	2	<2.11	U	<2.17	U	<2.49	H*	4.14		<1.97	U	<2.43	H*
Chromium, Total	100	19.9		8.99		41.9	H*	23.6		7.61		40.2	H*
Lead	75	1,960		13.2		319	H*	884		11.8		1,650	H*

Notes:
RRS = Risk Reduction Standard
U = Constituent was not detected at the reporting limit
H* = Samples were exceeded laboratory holding times
mg/kg - milligrams per kilograms

Reference:
EMA's CSR dated September 10,2003, revised
December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:	**Type 1 RRS**	**BH-7**		**BH-7**		**BH-7**		**BH-8**		**BH-8**		**BH-8**	
Sample Date:		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**		**7/2/2003**	
Sample Depth:		**10-15**		**15-20**		**25-30**		**5-10**		**15-20**		**25-30**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**	
Metals, mg/kg													
Arsenic	20	46.4		47		<4.85	U	<3.11	U	<4.51	U	<3.84	U
Barium	1,000	509		509		84		118		311		52.1	
Cadmium	2	4.7		<2.30	U	<2.43	U	<1.56	U	<2.26	U	<1.92	U
Chromium, Total	100	29.6		25		10.3		30.8		14.5		22.6	
Lead	75	1,160		1,090		19.2		9.73		314		15.7	

Notes:
RRS = Risk Reduction Standard
U = Constituent was not detected at the reporting limit
H* = Samples were exceeded laboratory holding times
mg/kg - milligrams per kilograms

Reference:
EMA's CSR dated September 10,2003, revised
December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:	**Type 1 RRS**	**BH-9**		**BH-9**		**BH-10**		**BH-10 - DUP**	
Sample Date:		**7/2/2003**		**7/2/2003**		**11/2/2006**		**11/2/2006**	
Sample Depth:		**0-5**		**15-20**		**3-5**		**3-5**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Direct Push**		**Direct Push**	
Metals, mg/kg									
Arsenic	20	<4.67	U	<3.92	U	44.5		49.5	
Barium	1,000	161		57		1,540		1,330	
Cadmium	2	<2.34	U	<1.96	U	<2.41	U	<2.29	U
Chromium, Total	100	15.6		27.4		32.5		38.1	
Lead	75	192		9.86		783		1,220	

Notes:
RRS = Risk Reduction Standard
U = Constituent was not detected at the reporting limit
H* = Samples were exceeded laboratory holding times
mg/kg - milligrams per kilograms

Reference:
EMA's CSR dated September 10,2003, revised
December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 2 - SUMMARY OF SOIL TESTING RESULTS

Sample ID:		**MW-3**		**MW-3**		**SS-NE SLOPE**	
Sample Date:	**Type 1 RRS**	**5/31/2012**		**5/31/2012**		**6/6/2012**	
Sample Depth, Ft:		**4**		**8**		**0.5**	
Sample Collection Method:		**Direct Push**		**Direct Push**		**Hand Tool**	
Metals, mg/kg							
Arsenic	20	<5.71	U	<5.46	U	<6.53	U
Barium	1,000	241		102		90	
Cadmium	2	<2.85	U	<2.73	U	<3.27	U
Chromium, Total	100	30.6		17		30.4	
Lead	75	13		10.4		373	
Mercury	NA	<0.119	U	<0.109	U	0.399	
Selenium	NA	<5.71	U	<5.46	U	<6.53	U
Silver	NA	<2.85	U	<2.73	U	<3.27	U

Notes:
U = Constituent was not detected at the reporting limit
RRS = Risk Reduction Standard
mg/kg - milligrams per kilograms
NA = Not Applicable

Prepared By: Tyler Boyles
Checked By: Tonya Toby

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

TABLE 3 - SUMMARY OF GROUNDWATER TESTING RESULTS

Sample ID:	**MW-1**				**MW-2**			
Sample Date:	**7/7/2003**				**7/7/2003**			
Sample Matrix:	**Groundwater**				**Groundwater**			
Units:	**mg/L**				**mg/L**			
Metals	Total		Dissolved		Total		Dissolved	
Arsenic	<0.05	U	--		<0.05	U	<0.05	U
Barium	0.053		--		0.132		0.114	
Cadmium	<0.005	U	--		<0.005	U	<0.005	U
Chromium, Total	<0.001	U	--		<0.001	U	<0.001	U
Lead	<0.001	U	--		0.0178		<0.001	U

Notes:

-- = Not Analyzed
U = Constituent was not detected at the reporting limit
mg/L = milligrams per liter

Reference:

EMA's CSR dated September 10,2003,
revised December 6, 2006

Prepared By: Tyler Boyles
Checked By: Tonya Locket

FORMER SUNLOW, INC.
1071 HOWELL MILL ROAD
ATLANTA, GEORGIA

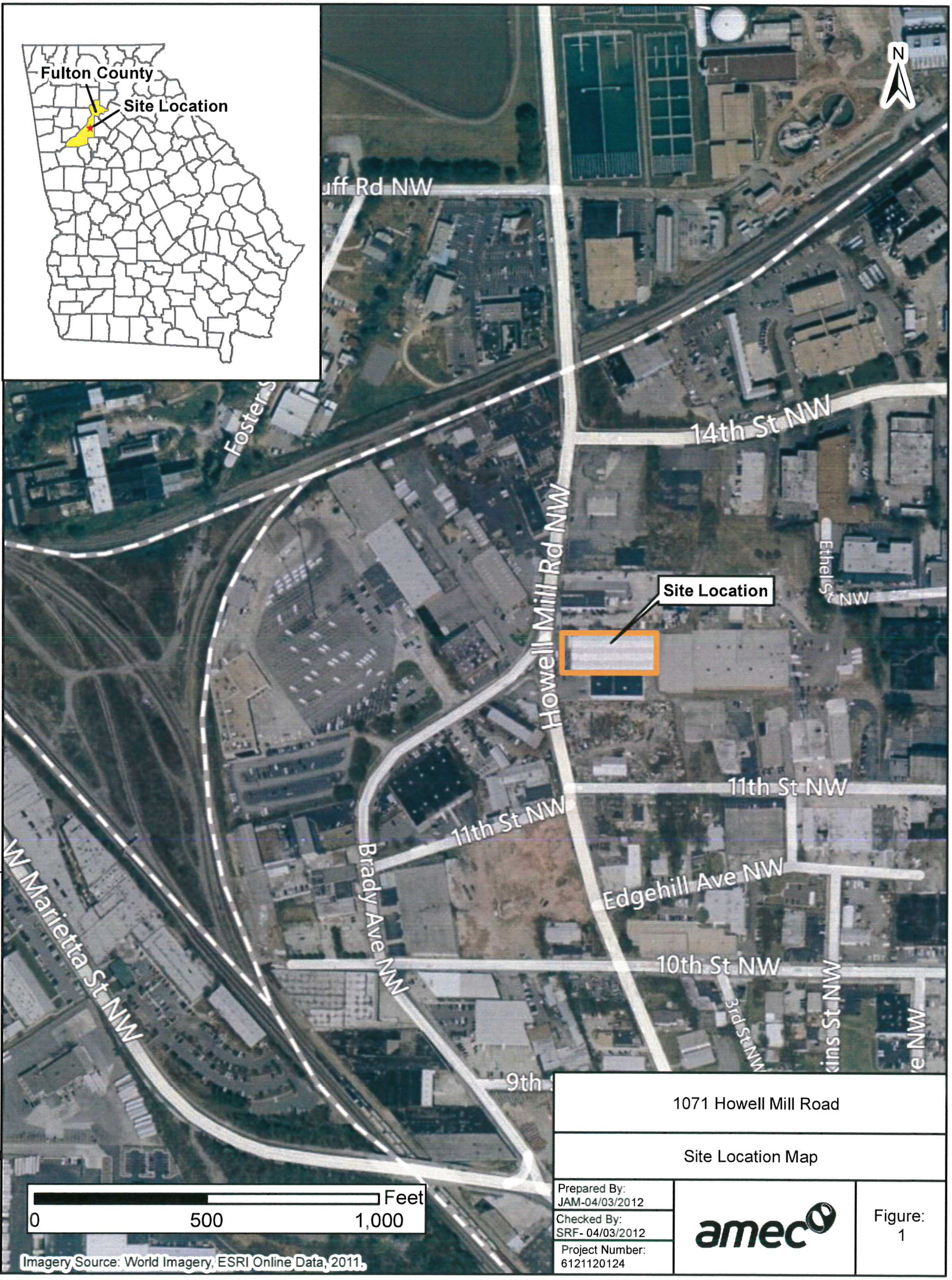
TABLE 3 - SUMMARY OF GROUNDWATER TESTING RESULTS

Sample ID:	**MW-1R**		**MW-3**		**MW-4**		**MW-4**		**MW-5**	
Sample Date:	**7/3-5/2012**		**6/1/2012**		**6/1/2012**		**6/7/2012**		**6/1/2012**	
Sample Matrix:	**Groundwater**		**Groundwater**		**Groundwater**		**Groundwater**		**Groundwater**	
Units:	**mg/L**		**mg/L**		**mg/L**		**mg/L**		**mg/L**	
Volatile Organic Compounds (VOCs)										
1,1,1-Trichloroethane	<0.005 U		<0.0004 U		0.0062		--		<0.0004 U	
1,1-Dichloroethane	<0.005 U		<0.00019 U		0.014		--		0.002 J	
1,1-Dichloroethene	<0.005 U		<0.00079 U		0.0021 J		--		<0.00079 U	
Bromodichloromethane	<0.005 U		0.0039 J		<0.00020 U		--		<0.00020 U	
Chloroethane (Ethyl chloride)	<0.010 U		<0.00069 U		<0.00069 U		--		0.0014 J	
Chloroform	<0.005 U		0.04		0.014		--		<0.00023 U	
cis-1,2-Dichloroethene	<0.005 U		0.0025 J		0.015		--		<0.00031 U	
Tetrachloroethene	<0.005 U		0.12		<0.00047 U		--		0.0011 J	
Trichloroethene	<0.005 U		0.0034 J		0.0043 J		--		<0.00038 U	
Polychlorinated Biphenyls (PCBs)										
	BRL		BRL		BRL		--		BRL	
Polycyclic Aromatic Hydrocarbons (PAHs)										
	BRL		BRL		BRL		--		BRL	
Pesticides										
	BRL		BRL		BRL		--		BRL	
Metals	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Arsenic	<0.05 U	<0.05 U	<0.0016 U	<0.0016 U	<0.0016 U	<0.0016 U	<0.005 U	<0.005 U	<0.0016 U	<0.0016 U
Barium	0.0987	0.0995	0.0704	0.0638	0.119	0.0605	0.0624	0.0539	1.1	0.935
Cadmium	<0.0007 U	<0.0007 U	<0.0003 U	0.0005 J	<0.0003 U	<0.0003 U	<0.0007 U	<0.0007 U	<0.0003 U	<0.0003 U
Chromium, Total	<0.005 U	<0.005 U	0.0011 J	<0.0006 U	0.0115	<0.0006 U	<0.005	<0.005 U	<0.0006 U	<0.0006 U
Lead	0.00167	<0.001 U	<0.0016 U	<0.0016 U	0.0178	<0.0016 U	0.00119	<0.001 U	<0.0016 U	<0.0016 U
Mercury	<0.0002 U	<0.0002 U	<0.00007 U	<0.00007 U	<0.00007 U	<0.00007 U	<0.0002 U	<0.0002 U	<0.00007 U	<0.00007 U
Selenium	<0.005 U	<0.005 U	<0.0044 U	<0.0044 U	<0.0044 U	<0.0044 U	<0.005 U	<0.005 U	<0.0044 U	<0.0044 U
Silver	<0.001 U	<0.001 U	<0.0006 U	<0.0006 U	<0.0066 U	<0.0066 U	<0.001 U	<0.001 U	<0.0066 U	<0.0066 U

Notes:
-- = Not Analyzed
U = Constituent was not detected at the reporting limit
mg/L = milligrams per liter

Prepared By: Tyler Boyles
Checked By: Tonya Locket

FIGURES



Imagery Source: World Imagery, ESRI Online Data, 2011.

Path: G:\Phase 1\1071 Howell Mill Road\Location Map.mxd

1071 Howell Mill Road

Site Location Map

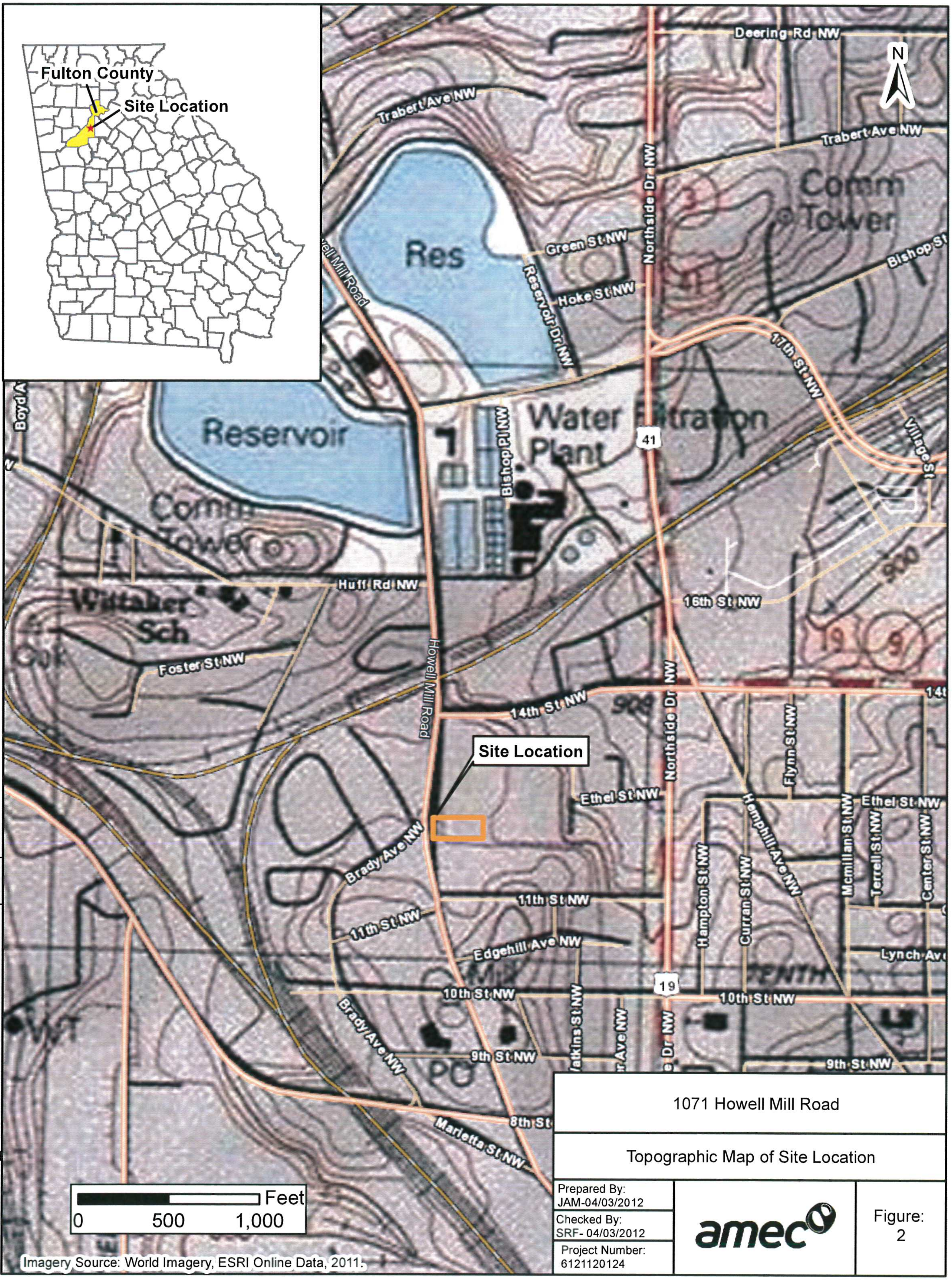
Prepared By:
JAM-04/03/2012

Checked By:
SRF- 04/03/2012

Project Number:
6121120124

amec

Figure:
1



Imagery Source: World Imagery, ESRI Online Data, 2011.

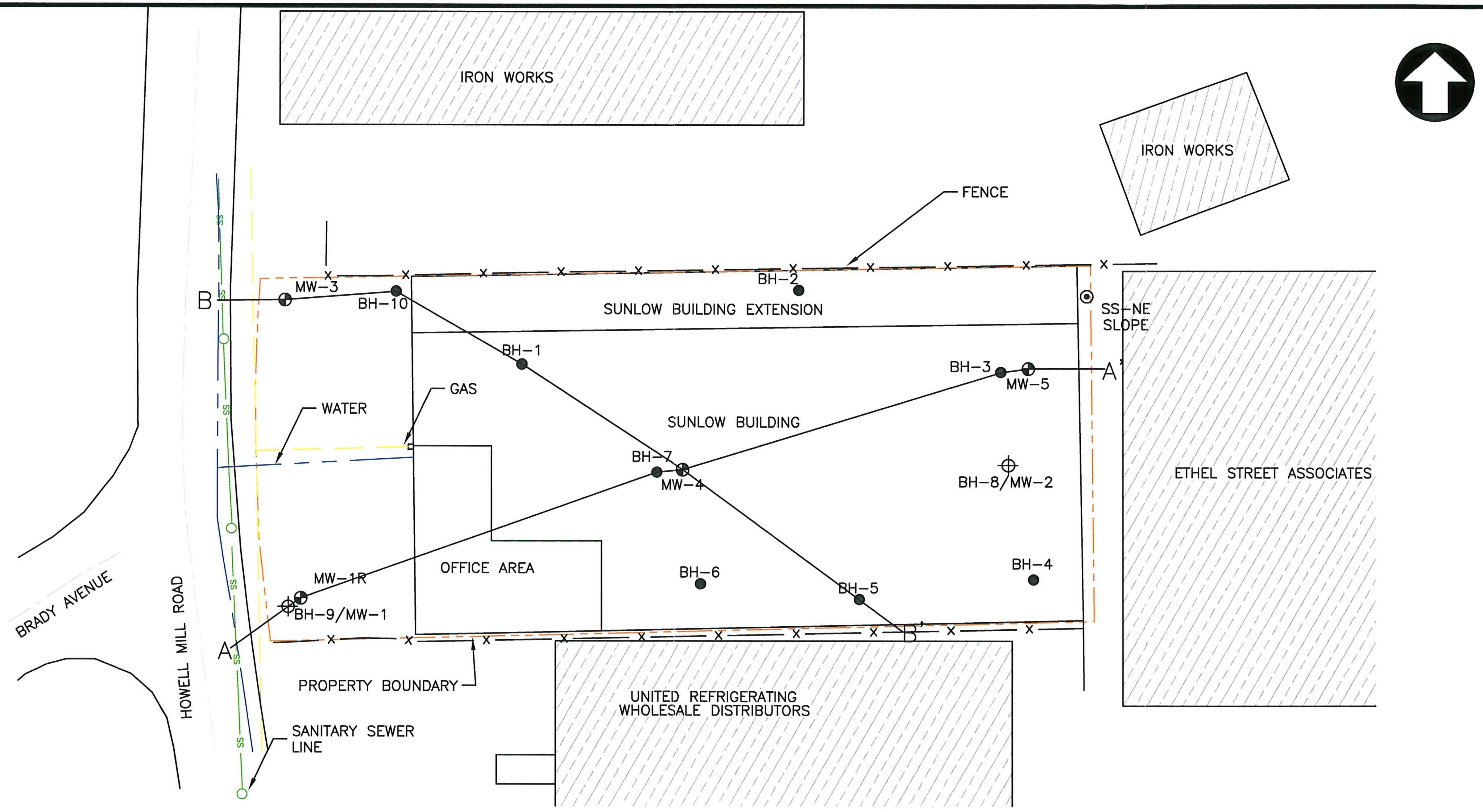
Path: G:\Phase_1\1071 Howell Mill Road\MXD\Topo Map.mxd

1071 Howell Mill Road

Topographic Map of Site Location

Prepared By: JAM-04/03/2012	amec	Figure: 2
Checked By: SRF- 04/03/2012		
Project Number: 6121120124		

M:\oldUdrive\Projects\1071 Howell Mill\VRP–Brownfield CAP\11–0115.dwg – Site Plan – Xsec Trace 08/27/2012 11:00am tyler.boyles



SOURCE: PDF FILE, LOGIC ENVIRONMENTAL, INC. 5455 OVERBEND TRAIL, SUWANEE, GA.

SCALE IN FEET

0 40 80

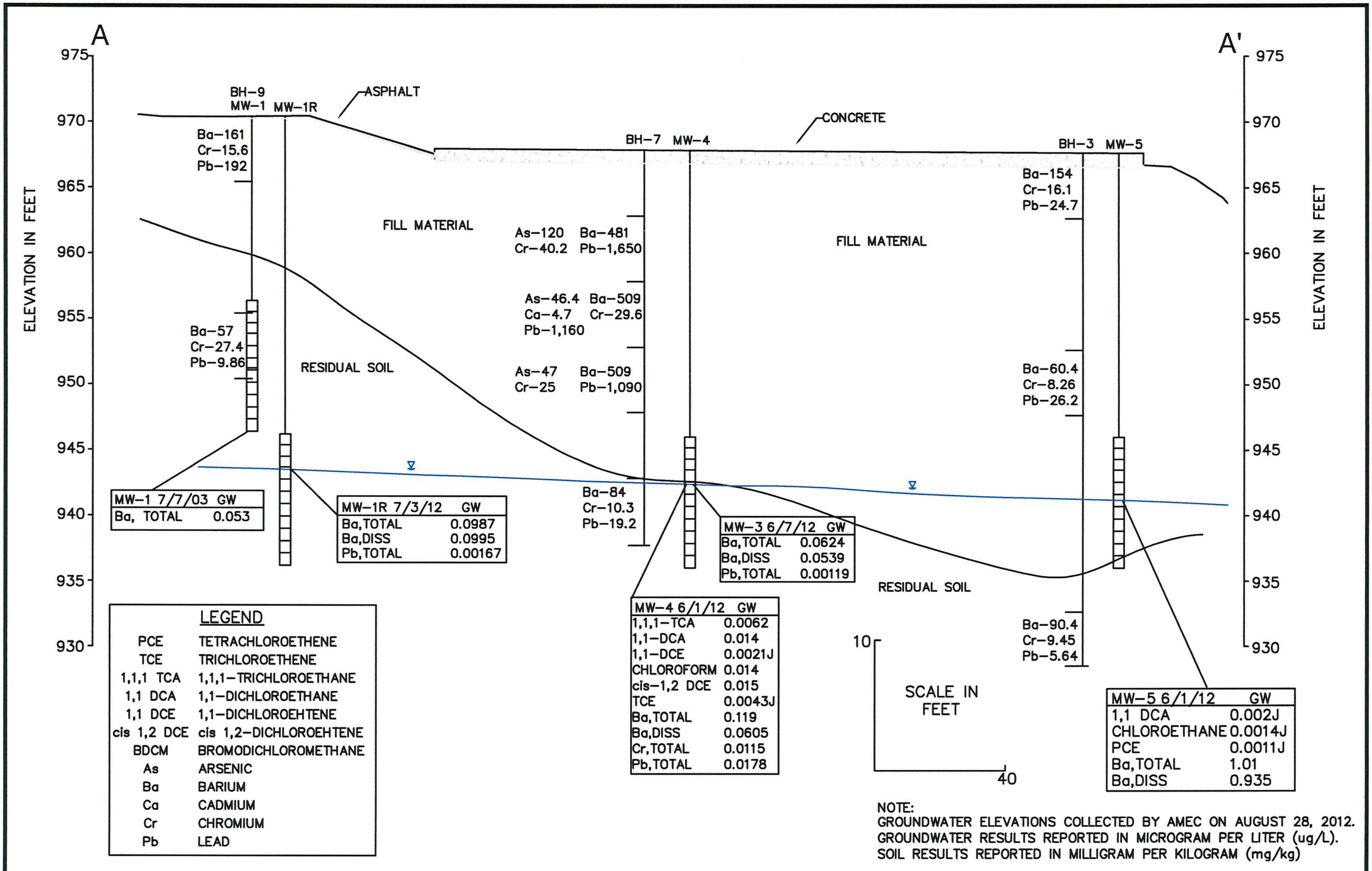
amec

AMEC Environment & Infrastructure, Inc.
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873–4761

FORMER SUNLOW, INC.
ATLANTA, GEORGIA

SITE PLAN WITH
CROSS SECTION TRACE

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6121–12–0124	02	AUG 2012	AS SHOWN	TB		3



MW-1 7/7/03	GW
Ba, TOTAL	0.053

MW-1R 7/3/12	GW
Ba,TOTAL	0.0987
Ba,DISS	0.0995
Pb,TOTAL	0.00167

MW-3 6/7/12	GW
Ba,TOTAL	0.0624
Ba,DISS	0.0539
Pb,TOTAL	0.00119

MW-4 6/1/12	GW
1,1,1-TCA	0.0062
1,1-DCA	0.014
1,1-DCE	0.0021J
CHLOROFORM	0.014
cis-1,2 DCE	0.015
TCE	0.0043J
Ba,TOTAL	0.119
Ba,DISS	0.0605
Cr,TOTAL	0.0115
Pb,TOTAL	0.0178

MW-5 6/1/12	GW
1,1 DCA	0.002J
CHLOROETHANE	0.0014J
PCE	0.0011J
Ba,TOTAL	1.01
Ba,DISS	0.935

LEGEND

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
1,1,1 TCA	1,1,1-TRICHLOROETHANE
1,1 DCA	1,1-DICHLOROETHANE
1,1 DCE	1,1-DICHLOROEHTENE
cis 1,2 DCE	cis 1,2-DICHLOROEHTENE
BDCM	BROMODICHLOROMETHANE
As	ARSENIC
Ba	BARIUM
Ca	CADMIUM
Cr	CHROMIUM
Pb	LEAD

NOTE:
GROUNDWATER ELEVATIONS COLLECTED BY AMEC ON AUGUST 28, 2012.
GROUNDWATER RESULTS REPORTED IN MICROGRAM PER LITER (ug/L).
SOIL RESULTS REPORTED IN MILLIGRAM PER KILOGRAM (mg/kg)

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ATLANTA, GEORGIA

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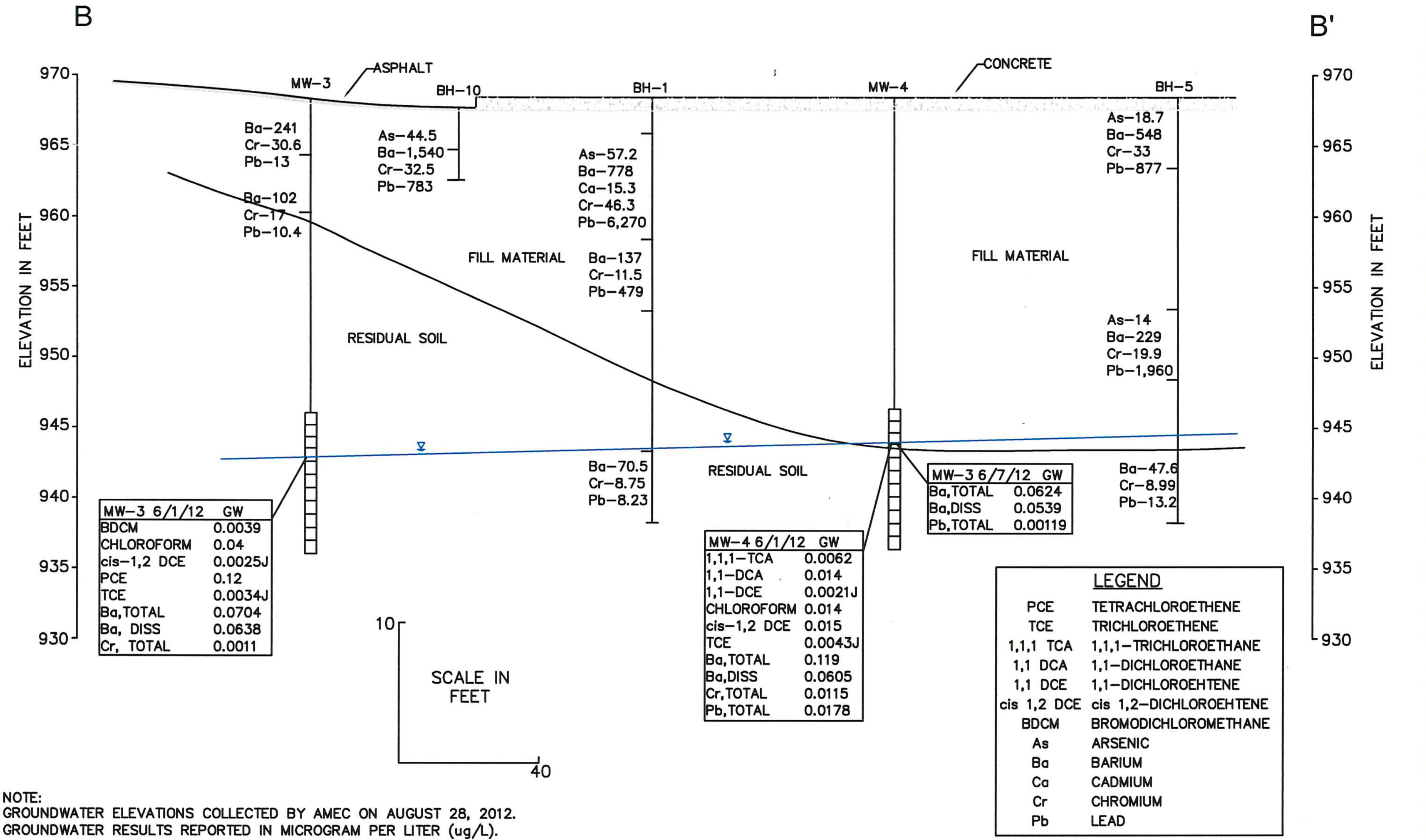
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324
(404)873-4761

CROSS SECTION
A – A'

JOB NO.	DATE:		FIGURE:
6121-12-0124	AUG 2012		4
TASK:	DRAWN:	REVIEWED:	SCALE:
02	TJB	CTF	AS SHOWN

M: \oldUdrive\Projects\1071 Howell Mill\Cross-Sections.dwg – B-B 2   09/05/2012



MW-3 6/1/12	GW
BDCM	0.0039
CHLOROFORM	0.04
cis-1,2 DCE	0.0025J
PCE	0.12
TCE	0.0034J
Ba, TOTAL	0.0704
Ba, DISS	0.0638
Cr, TOTAL	0.0011

MW-4 6/1/12	GW
1,1,1-TCA	0.0062
1,1-DCA	0.014
1,1-DCE	0.0021J
CHLOROFORM	0.014
cis-1,2 DCE	0.015
TCE	0.0043J
Ba, TOTAL	0.119
Ba, DISS	0.0605
Cr, TOTAL	0.0115
Pb, TOTAL	0.0178

MW-3 6/7/12	GW
Ba, TOTAL	0.0624
Ba, DISS	0.0539
Pb, TOTAL	0.00119

LEGEND

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
1,1,1 TCA	1,1,1-TRICHLOROETHANE
1,1 DCA	1,1-DICHLOROETHANE
1,1 DCE	1,1-DICHLOROEHTENE
cis 1,2 DCE	cis 1,2-DICHLOROEHTENE
BDCM	BROMODICHLOROMETHANE
As	ARSENIC
Ba	BARIUM
Ca	CADMIUM
Cr	CHROMIUM
Pb	LEAD

NOTE:
GROUNDWATER ELEVATIONS COLLECTED BY AMEC ON AUGUST 28, 2012.
GROUNDWATER RESULTS REPORTED IN MICROGRAM PER LITER (ug/L).
SOIL RESULTS REPORTED IN MILLIGRAM PER KILOGRAM (mg/kg)

FORMER SUNLOW, INC
ATLANTA, GEORGIA

amec

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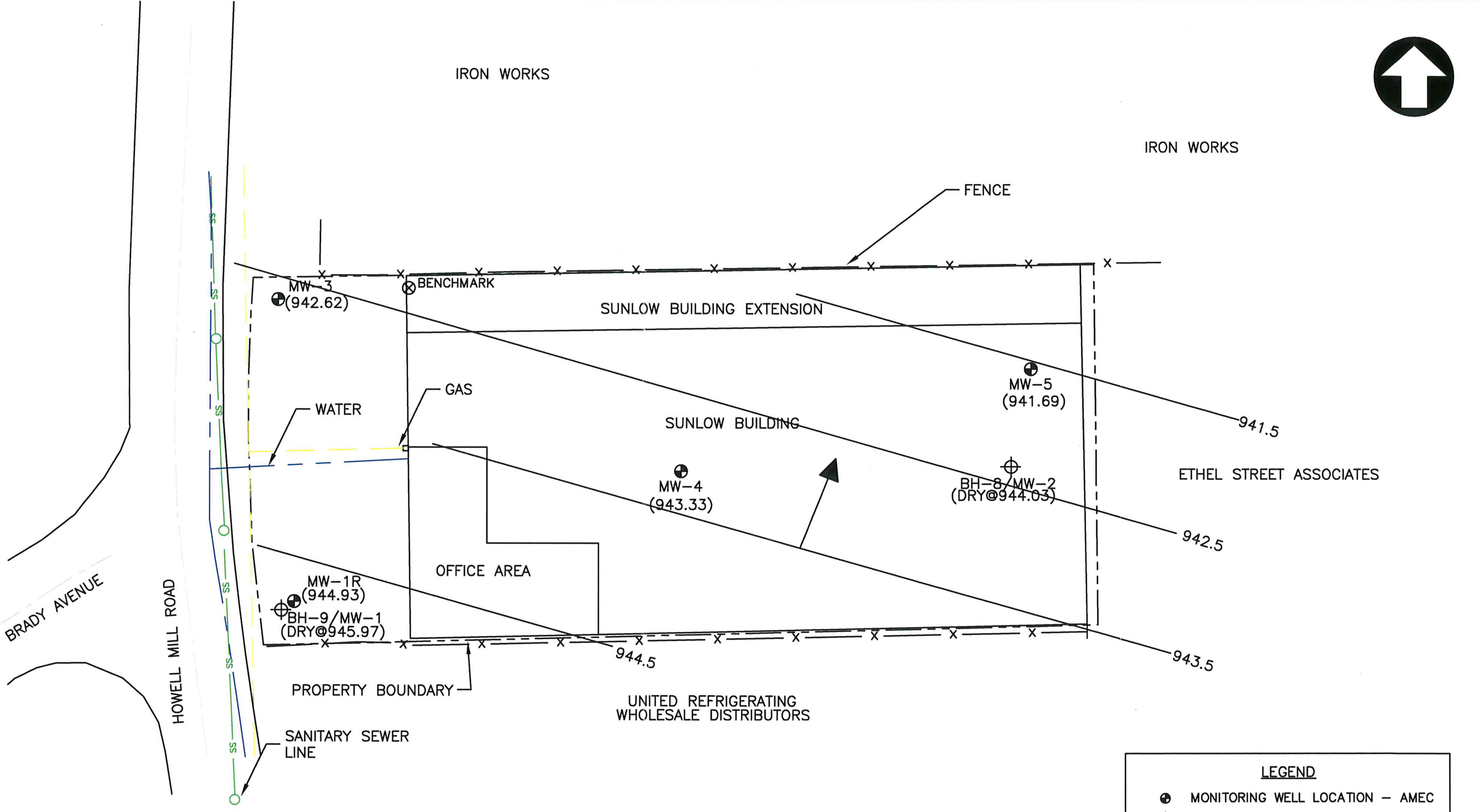
ATLANTA, GEORGIA 30324
(404)873-4761

CROSS SECTION
B – B'

JOB NO. 6121-12-0124	DATE: AUG 2012		FIGURE: 5
TASK: 02	DRAWN: TJB	REVIEWED: CTF	SCALE: AS SHOWN

M:\oldUdrive\Projects\1071 Howell Mill\VRP-Brownfield CAP\12-0124 VRP.dwg – POT MAP 09/17/2012 1:37pm tyler.boyles



LEGEND

● MONITORING WELL LOCATION – AMEC

⊕ MONITORING WELL LOCATION – EMC

(916.07) WATER TABLE ELEVATION

—942.5 GROUNDWATER CONTOUR

→ INTERPRETED GROUNDWATER FLOW DIRECTION

NOTE:
BENCHMARK ELEVATION OF 968.38 FEET FROM SURVEY BY VALENTINO & ASSOCIATES, INC. DATED 8/17/2012

SOURCE: PDF FILE, ADVANCE SURVEY INC., SURVEY FOR DANNY GRAHAM 12/30/02

SCALE IN FEET

0 40 80

amec

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396 PLASTERS AVENUE, N.E.
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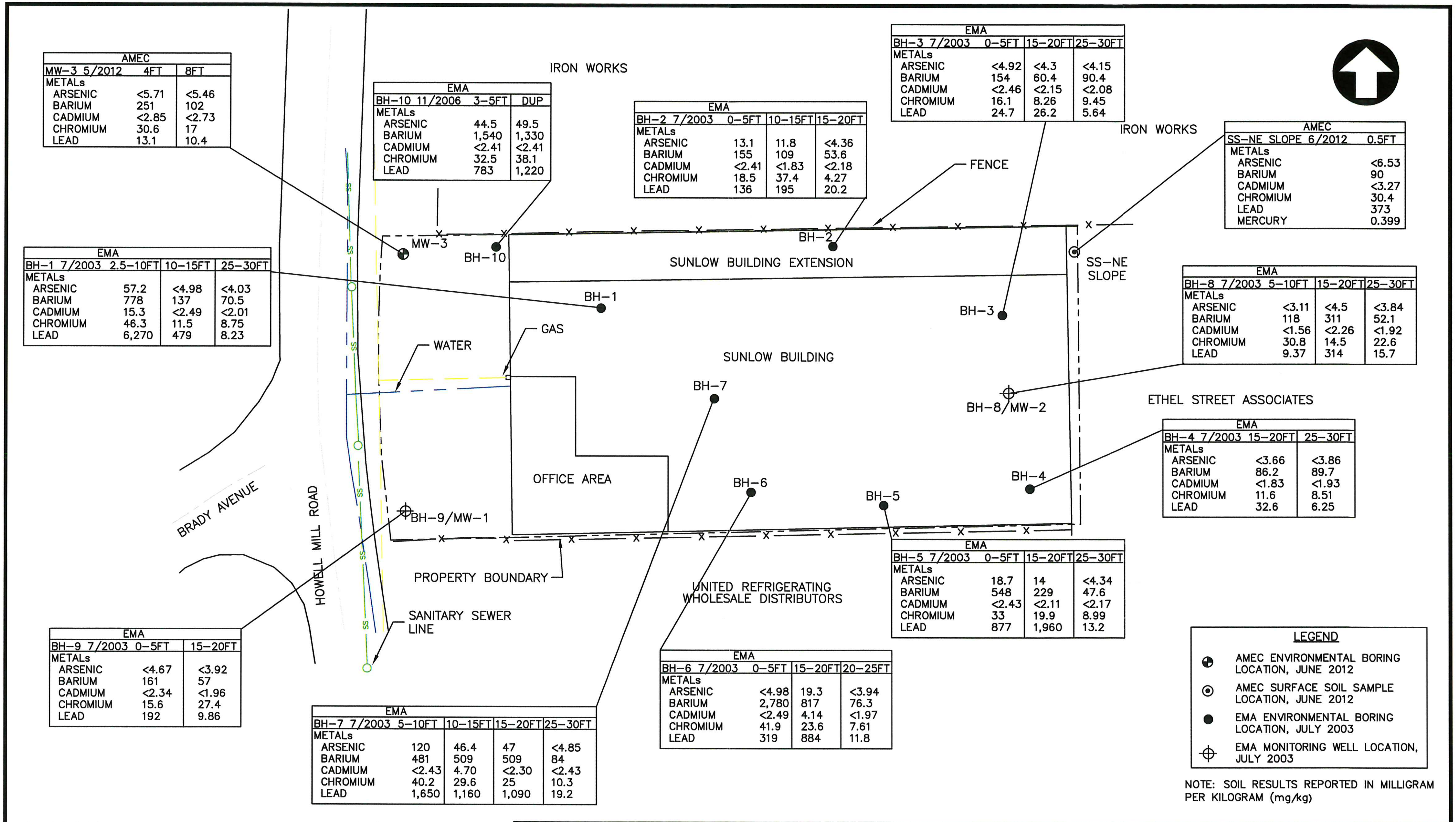
ATLANTA, GEORGIA

POTENTIOMETRIC
SURFACE MAP
AUGUST 28, 2012

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6121-12-0124	02	AUG 2012	AS SHOWN	TB		6



AMEC

MW-3 5/2012	4FT	8FT
METALs		
ARSENIC	<5.71	<5.46
BARIUM	251	102
CADMIUM	<2.85	<2.73
CHROMIUM	30.6	17
LEAD	13.1	10.4

EMA

BH-10 11/2006	3-5FT	DUP
METALs		
ARSENIC	44.5	49.5
BARIUM	1,540	1,330
CADMIUM	<2.41	<2.41
CHROMIUM	32.5	38.1
LEAD	783	1,220

EMA

BH-2 7/2003	0-5FT	10-15FT	15-20FT
METALs			
ARSENIC	13.1	11.8	<4.36
BARIUM	155	109	53.6
CADMIUM	<2.41	<1.83	<2.18
CHROMIUM	18.5	37.4	4.27
LEAD	136	195	20.2

EMA

BH-3 7/2003	0-5FT	15-20FT	25-30FT
METALs			
ARSENIC	<4.92	<4.3	<4.15
BARIUM	154	60.4	90.4
CADMIUM	<2.46	<2.15	<2.08
CHROMIUM	16.1	8.26	9.45
LEAD	24.7	26.2	5.64

AMEC

SS-NE SLOPE 6/2012	0.5FT
METALs	
ARSENIC	<6.53
BARIUM	90
CADMIUM	<3.27
CHROMIUM	30.4
LEAD	373
MERCURY	0.399

EMA

BH-1 7/2003	2.5-10FT	10-15FT	25-30FT
METALs			
ARSENIC	57.2	<4.98	<4.03
BARIUM	778	137	70.5
CADMIUM	15.3	<2.49	<2.01
CHROMIUM	46.3	11.5	8.75
LEAD	6,270	479	8.23

EMA

BH-8 7/2003	5-10FT	15-20FT	25-30FT
METALs			
ARSENIC	<3.11	<4.5	<3.84
BARIUM	118	311	52.1
CADMIUM	<1.56	<2.26	<1.92
CHROMIUM	30.8	14.5	22.6
LEAD	9.37	314	15.7

EMA

BH-4 7/2003	15-20FT	25-30FT
METALs		
ARSENIC	<3.66	<3.86
BARIUM	86.2	89.7
CADMIUM	<1.83	<1.93
CHROMIUM	11.6	8.51
LEAD	32.6	6.25

EMA

BH-5 7/2003	0-5FT	15-20FT	25-30FT
METALs			
ARSENIC	18.7	14	<4.34
BARIUM	548	229	47.6
CADMIUM	<2.43	<2.11	<2.17
CHROMIUM	33	19.9	8.99
LEAD	877	1,960	13.2

EMA

BH-9 7/2003	0-5FT	15-20FT
METALs		
ARSENIC	<4.67	<3.92
BARIUM	161	57
CADMIUM	<2.34	<1.96
CHROMIUM	15.6	27.4
LEAD	192	9.86

EMA

BH-6 7/2003	0-5FT	15-20FT	20-25FT
METALs			
ARSENIC	<4.98	19.3	<3.94
BARIUM	2,780	817	76.3
CADMIUM	<2.49	4.14	<1.97
CHROMIUM	41.9	23.6	7.61
LEAD	319	884	11.8

EMA

BH-7 7/2003	5-10FT	10-15FT	15-20FT	25-30FT
METALs				
ARSENIC	120	46.4	47	<4.85
BARIUM	481	509	509	84
CADMIUM	<2.43	4.70	<2.30	<2.43
CHROMIUM	40.2	29.6	25	10.3
LEAD	1,650	1,160	1,090	19.2

LEGEND

- ◐ AMEC ENVIRONMENTAL BORING LOCATION, JUNE 2012
- ◎ AMEC SURFACE SOIL SAMPLE LOCATION, JUNE 2012
- ● EMA ENVIRONMENTAL BORING LOCATION, JULY 2003
- ⌖ EMA MONITORING WELL LOCATION, JULY 2003

NOTE: SOIL RESULTS REPORTED IN MILLIGRAM PER KILOGRAM (mg/kg)

SOURCE: PDF FILE, ADVANCE SURVEY INC., SURVEY FOR DANNY GRAHAM 12/30/02

SCALE IN FEET

0 40 80

amec

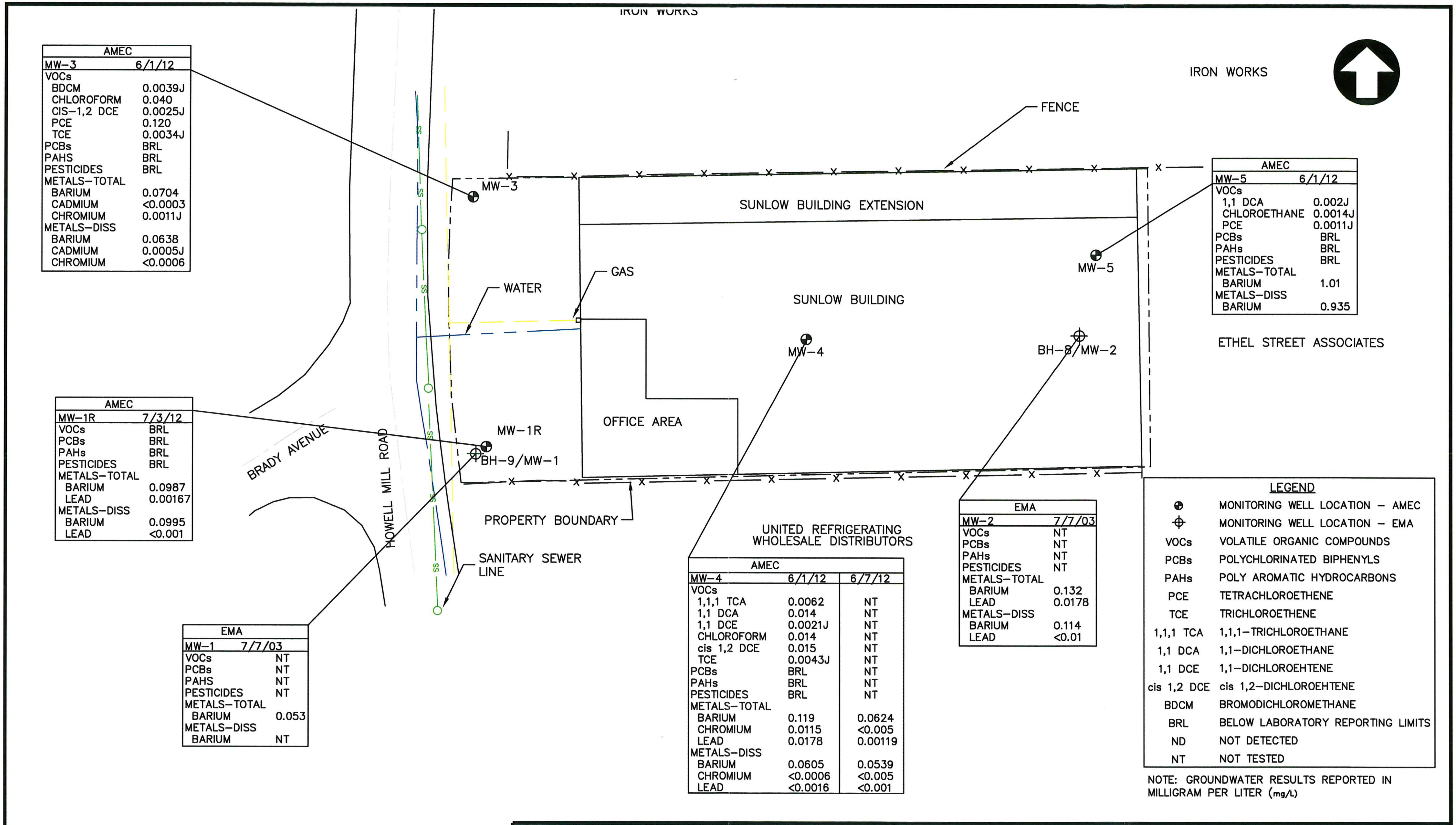
AMEC Environment & Infrastructure, Inc.
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

FORMER SUNLOW, INC.
ATLANTA, GEORGIA

SUMMARY OF SOIL
TESTING RESULTS

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6121-12-0124	02	AUG 2012	AS SHOWN	TB		7

M:\oldUdrive\Projects\1071 Howell Mill\VRP-Brownfield CAP\12-0124 VRP.dwg - GW RESULTS 09/05/2012 12:31pm tyler.boyles



AMEC	
MW-3	6/1/12
VOCs	
BDCM	0.0039J
CHLOROFORM	0.040
CIS-1,2 DCE	0.0025J
PCE	0.120
TCE	0.0034J
PCBs	BRL
PAHS	BRL
PESTICIDES	BRL
METALS-TOTAL	
BARIUM	0.0704
CADMIUM	<0.0003
CHROMIUM	0.0011J
METALS-DISS	
BARIUM	0.0638
CADMIUM	0.0005J
CHROMIUM	<0.0006

AMEC	
MW-5	6/1/12
VOCs	
1,1 DCA	0.002J
CHLOROETHANE	0.0014J
PCE	0.0011J
PCBs	BRL
PAHs	BRL
PESTICIDES	BRL
METALS-TOTAL	
BARIUM	1.01
METALS-DISS	
BARIUM	0.935

AMEC	
MW-1R	7/3/12
VOCs	BRL
PCBs	BRL
PAHs	BRL
PESTICIDES	BRL
METALS-TOTAL	
BARIUM	0.0987
LEAD	0.00167
METALS-DISS	
BARIUM	0.0995
LEAD	<0.001

EMA	
MW-1	7/7/03
VOCs	NT
PCBs	NT
PAHS	NT
PESTICIDES	NT
METALS-TOTAL	
BARIUM	0.053
METALS-DISS	
BARIUM	NT

AMEC		
MW-4	6/1/12	6/7/12
VOCs		
1,1,1 TCA	0.0062	NT
1,1 DCA	0.014	NT
1,1 DCE	0.0021J	NT
CHLOROFORM	0.014	NT
cis 1,2 DCE	0.015	NT
TCE	0.0043J	NT
PCBs	BRL	NT
PAHs	BRL	NT
PESTICIDES	BRL	NT
METALS-TOTAL		
BARIUM	0.119	0.0624
CHROMIUM	0.0115	<0.005
LEAD	0.0178	0.00119
METALS-DISS		
BARIUM	0.0605	0.0539
CHROMIUM	<0.0006	<0.005
LEAD	<0.0016	<0.001

EMA	
MW-2	7/7/03
VOCs	NT
PCBs	NT
PAHs	NT
PESTICIDES	NT
METALS-TOTAL	
BARIUM	0.132
LEAD	0.0178
METALS-DISS	
BARIUM	0.114
LEAD	<0.01

LEGEND

⊕	MONITORING WELL LOCATION – AMEC
⌖	MONITORING WELL LOCATION – EMA
VOCs	VOLATILE ORGANIC COMPOUNDS
PCBs	POLYCHLORINATED BIPHENYLS
PAHs	POLY AROMATIC HYDROCARBONS
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
1,1,1 TCA	1,1,1-TRICHLOROETHANE
1,1 DCA	1,1-DICHLOROETHANE
1,1 DCE	1,1-DICHLOROEHTENE
cis 1,2 DCE	cis 1,2-DICHLOROEHTENE
BDCM	BROMODICHLOROMETHANE
BRL	BELOW LABORATORY REPORTING LIMITS
ND	NOT DETECTED
NT	NOT TESTED

NOTE: GROUNDWATER RESULTS REPORTED IN MILLIGRAM PER LITER (mg/L)

SOURCE: PDF FILE, ADVANCE SURVEY INC., SURVEY FOR DANNY GRAHAM 12/30/02

SCALE IN FEET

0 40 80

amec

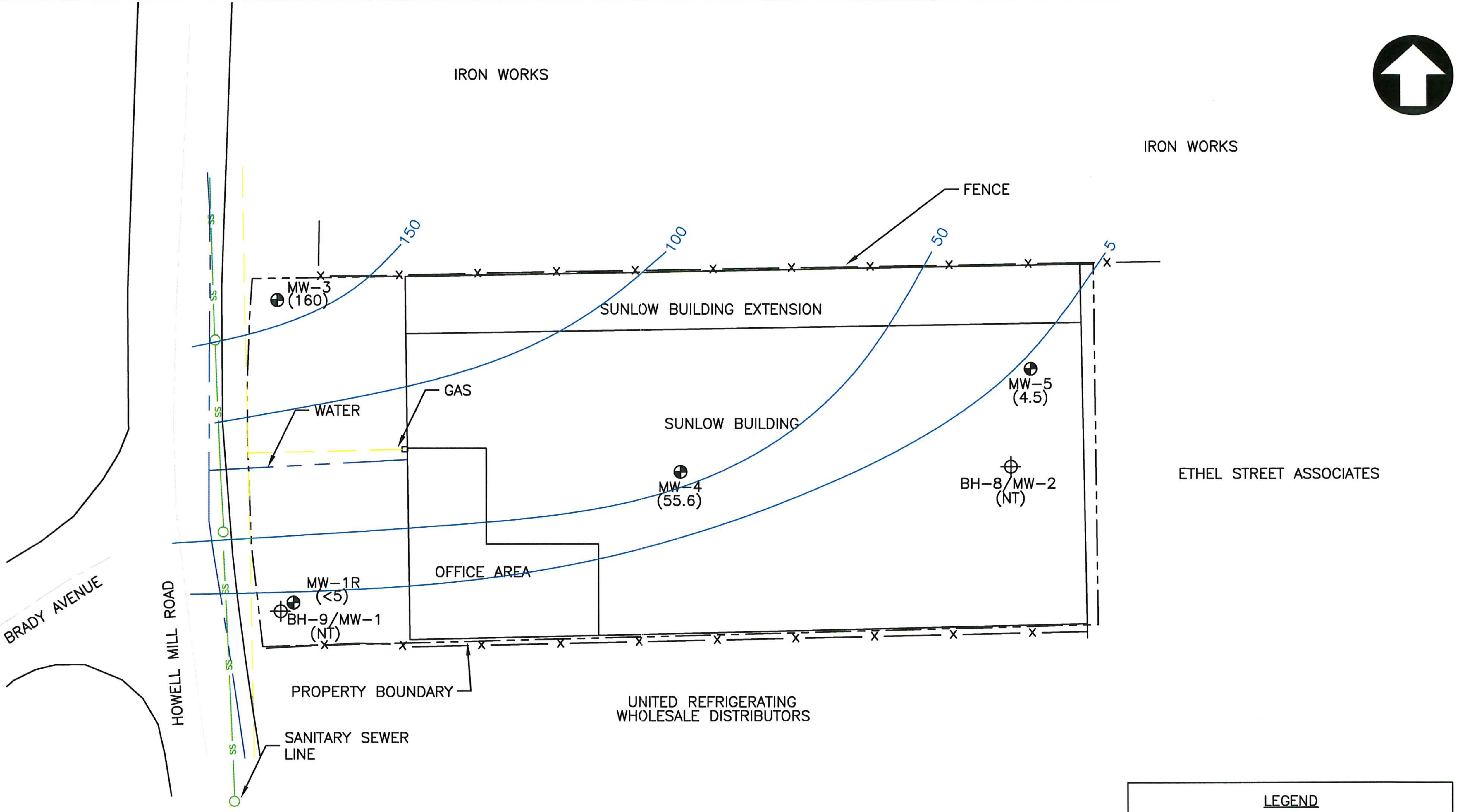
AMEC Environment & Infrastructure, Inc.
396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

FORMER SUNLOW, INC.
ATLANTA, GEORGIA

SUMMARY OF GROUNDWATER TESTING RESULTS

Job Number	*Task*	*Date*	*Scale*	*Drawn By*	*Approved By*	*Figure*
6121-12-0124	02	AUG 2012	AS SHOWN	TB		8

M:\oldUdrive\Projects\1071 Howell Mill\VRP-Brownfield CAP\12-0124 VRP.dwg – PLUME MAP 09/05/2012 12:32pm tyler.boyles



LEGEND

●	MONITORING WELL LOCATION – AMEC
⌖	MONITORING WELL LOCATION – EMC
(CVOC)	CHLORINATED VOLATILE ORGANIC COMPOUNDS
(160)	CVOC CONCENTRATION (ug/L)
—150	CVOC ISO-CONTOUR

SOURCE: PDF FILE, ADVANCE SURVEY INC., SURVEY FOR DANNY GRAHAM 12/30/02

SCALE IN FEET

0 40 80

amec

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396 PLASTERS AVENUE, N.E.
ATLANTA, GEORGIA 30324 (404)873-4761

FORMER SUNLOW, INC.
ATLANTA, GEORGIA

CHLORINATED VOC
ISOCONCENTRATION MAP

Job Number	*Task*	*Date*	*Scale*	*Drawn By*	*Approved By*	*Figure*
6121-12-0124	02	AUG 2012	AS SHOWN	TB		9

APPENDIX A

LEGAL DESCRIPTION AND PLAT MAP

EXHIBIT A

ALL THAT TRACT or parcel of land lying and being in the City of Atlanta in Land Lot 150 of the 17th District of Fulton County, Georgia, and being more particularly described as follows:

BEGINNING at a point on the easterly side of Howell Mill Road 320.9 feet northerly from Gerard Avenue (which said beginning point is marked by an iron pin located on the inner edge of the sidewalk line along the easterly side of Howell Mill Road) running thence northerly along the easterly side of Howell Mill Road and following the curvature of said road, 130.07 feet to an iron pin located at the southwest corner of property nor or formerly owned by Ironworks International, Inc.; running thence easterly (S89º26'31"E) along the southerly line of Ironworks property 300.00 feet to a point marked by an iron pin; thence southerly (S00º24'01"W) and at right angles from said northerly line, 130.00 feet to a point marked by an iron pin; thence westerly (N89º24'28"W) and parallel to the northerly line, 297.70 feet to the easterly side of Howell Mill Road at the point of beginning.

APPENDIX B

LABORATORY REPORTS

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

June 05, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1205P03

Analytical Environmental Services, Inc. received 2 samples on May 31, 2012 5:45 pm for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/11-06/30/12.
-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

AES ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1205P03
Date: 5/31/12 Page 1 of 1

COMPANY: AMEC E+I
ADDRESS: 396 PLASTERS AVE ATLANTA, GA 30324
PHONE: 404-817-0152
FAX:
SAMPLED BY: STEPHEN FOLEY
SIGNATURE:

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	VOCs	PAHs	PESTICIDES/ PCBs	RCRA METALS										REMARKS	No # of Containers
						PRESERVATION (See codes)	S/M I	I	I	I											
1	MW-3-4'	5/31/12	1451	X		SO				X										RCRA METALS 24 HR TAT HOLD OTHER TESTS	7
2	MW-3-8'	↓	1453	↓		↓				X										RCRA METALS 24 HR TAT HOLD OTHER TESTS	6
3	MW-4-6'	↓	0915	↓		↓														HOLD	5
4	MW-4-24	↓	0924	↓		↓														HOLD	5
5	MW-5-10'	↓	1122	↓		↓														HOLD	5
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	5/31/12 1745	1:	5/31/12 5:45
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER

PROJECT INFORMATION
PROJECT NAME: 1071 HOWELL MILL
PROJECT #: 6121-12-0124
SITE ADDRESS: 1071 HOWELL MILL RD ATLANTA, GA
SEND REPORT TO: TYLER BOYLES
INVOICE TO: (IF DIFFERENT FROM ABOVE)
QUOTE #: PO#:

RECEIPT
Total # of Containers 28

Turnaround Time Request
- ○ Standard 5 Business Days
- ○ 2 Business Day Rush
- ☒ Next Business Day Rush
- ○ Same Day Rush (auth req.)
- ○ Other

STATE PROGRAM (if any):
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES. SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water
PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc **Date:** 5-Jun-12

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-3-4'
Project Name:	1071 Howell Mill Road	**Collection Date:**	5/31/2012 2:51:00 PM
Lab ID:	1205P03-001	**Matrix:**	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TOTAL MERCURY SW7471B				**(SW7471B)**				
Mercury	BRL	0.119		mg/Kg-dry	162183	1	06/01/2012 14:10	MW
METALS, TOTAL SW6010C				**(SW3050B)**				
Arsenic	BRL	5.71		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Barium	251	5.71		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Cadmium	BRL	2.85		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Chromium	30.6	2.85		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Lead	13.1	5.71		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Selenium	BRL	5.71		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
Silver	BRL	2.85		mg/Kg-dry	161460	1	06/01/2012 17:03	TA
PERCENT MOISTURE D2216								
Percent Moisture	16.3	0		wt%	R222497	1	06/02/2012 18:00	SR

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-3-8'
Project Name:	1071 Howell Mill Road	**Collection Date:**	5/31/2012 2:53:00 PM
Lab ID:	1205P03-002	**Matrix:**	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TOTAL MERCURY SW7471B				**(SW7471B)**				
Mercury	BRL	0.109		mg/Kg-dry	162183	1	06/01/2012 14:12	MW
METALS, TOTAL SW6010C				**(SW3050B)**				
Arsenic	BRL	5.46		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Barium	102	5.46		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Cadmium	BRL	2.73		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Chromium	17.0	2.73		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Lead	10.4	5.46		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Selenium	BRL	5.46		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
Silver	BRL	2.73		mg/Kg-dry	161460	1	06/01/2012 17:07	TA
PERCENT MOISTURE D2216								
Percent Moisture	8.99	0		wt%	R222497	1	06/02/2012 18:00	SR

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client AMEC　　　　Work Order Number 1205P03

Checklist completed by ______ 05/31/2012
Signature　　　Date

Carrier name: FedEx __ UPS __ Courier __ Client ✓ US Mail __ Other ______

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ Not Present ✓

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Container/Temp Blank temperature in compliance? (4°C±2)* Yes ✓ No __

Cooler #1 4.0 Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted ✓ Yes __ No __

Water - pH acceptable upon receipt? Yes __ No __ Not Applicable ✓

Adjusted? ____________ Checked by ____________

Sample Condition: Good ✓ Other(Explain) ______________________________

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1205P03

ANALYTICAL QC SUMMARY REPORT

BatchID: **161460**

Sample ID: **MB-161460** Client ID: Units: **mg/Kg** Prep Date: **05/31/2012** Run No: **222404**
SampleType: **MBLK** TestCode: **METALS, TOTAL** **SW6010C** BatchID: **161460** Analysis Date: **06/01/2012** Seq No: **4652216**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0	0	
Barium	BRL	5.00	0	0	0	0	0	0	0	0	
Cadmium	BRL	2.50	0	0	0	0	0	0	0	0	
Chromium	BRL	2.50	0	0	0	0	0	0	0	0	
Lead	BRL	5.00	0	0	0	0	0	0	0	0	
Selenium	BRL	5.00	0	0	0	0	0	0	0	0	
Silver	BRL	2.50	0	0	0	0	0	0	0	0	

Sample ID: **LCS-161460** Client ID: Units: **mg/Kg** Prep Date: **05/31/2012** Run No: **222404**
SampleType: **LCS** TestCode: **METALS, TOTAL** **SW6010C** BatchID: **161460** Analysis Date: **06/01/2012** Seq No: **4652215**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	50.58	5.00	50	0	101	80	120	0	0	0	
Barium	51.70	5.00	50	0	103	80	120	0	0	0	
Cadmium	50.84	2.50	50	0	102	80	120	0	0	0	
Chromium	53.18	2.50	50	0	106	80	120	0	0	0	
Lead	50.58	5.00	50	0.04804	101	80	120	0	0	0	
Selenium	49.71	5.00	50	0.2324	99	80	120	0	0	0	
Silver	5.038	2.50	5	0	101	80	120	0	0	0	

Sample ID: **1205N79-025AMS** Client ID: Units: **mg/Kg-dry** Prep Date: **05/31/2012** Run No: **222404**
SampleType: **MS** TestCode: **METALS, TOTAL** **SW6010C** BatchID: **161460** Analysis Date: **06/01/2012** Seq No: **4652220**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	50.32	5.38	53.82	1.620	90.5	75	125	0	0	0	
Barium	120.1	5.38	53.82	68.06	96.8	75	125	0	0	0	
Cadmium	52.22	2.69	53.82	0	97	75	125	0	0	0	
Chromium	106.9	2.69	53.82	39.90	125	75	125	0	0	0	

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

Date: 5-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1205P03

ANALYTICAL QC SUMMARY REPORT

BatchID: **161460**

Sample ID: **1205N79-025AMS** Client ID: Units: **mg/Kg-dry** Prep Date: **05/31/2012** Run No: **222404**
SampleType: **MS** TestCode: **METALS, TOTAL SW6010C** BatchID: **161460** Analysis Date: **06/01/2012** Seq No: **4652220**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	93.64	5.38	53.82	45.77	88.9	75	125	0	0	0	
Selenium	44.74	5.38	53.82	0	83.1	75	125	0	0	0	
Silver	5.179	2.69	5.382	0.04777	95.3	75	125	0	0	0	

Sample ID: **1205N79-025AMSD** Client ID: Units: **mg/Kg-dry** Prep Date: **05/31/2012** Run No: **222404**
SampleType: **MSD** TestCode: **METALS, TOTAL SW6010C** BatchID: **161460** Analysis Date: **06/01/2012** Seq No: **4652222**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	52.14	5.38	53.78	1.620	93.9	75	125	50.32	3.53	20	
Barium	128.8	5.38	53.78	68.06	113	75	125	120.1	6.98	20	
Cadmium	53.73	2.69	53.78	0	99.9	75	125	52.22	2.85	20	
Chromium	104.9	2.69	53.78	39.90	121	75	125	106.9	1.91	20	
Lead	94.10	5.38	53.78	45.77	89.9	75	125	93.64	0.492	20	
Selenium	45.43	5.38	53.78	0	84.5	75	125	44.74	1.54	20	
Silver	5.284	2.69	5.378	0.04777	97.4	75	125	5.179	2.01	20	

Analytical Environmental Services, Inc

Date: 5-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1205P03

ANALYTICAL QC SUMMARY REPORT

BatchID: **162183**

Sample ID: **MB-162183** Client ID: Units: **mg/Kg** Prep Date: **06/01/2012** Run No: **222399**
SampleType: **MBLK** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162183** Analysis Date: **06/01/2012** Seq No: **4652503**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.100	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162183** Client ID: Units: **mg/Kg** Prep Date: **06/01/2012** Run No: **222399**
SampleType: **LCS** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162183** Analysis Date: **06/01/2012** Seq No: **4652504**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.4069	0.100	0.4	0	102	80	120	0	0	0	

Sample ID: **1205M81-001AMS** Client ID: Units: **mg/Kg-dry** Prep Date: **06/01/2012** Run No: **222399**
SampleType: **MS** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162183** Analysis Date: **06/01/2012** Seq No: **4652506**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.5548	0.121	0.4832	0.07833	98.6	70	130	0	0	0	

Sample ID: **1205M81-001AMSD** Client ID: Units: **mg/Kg-dry** Prep Date: **06/01/2012** Run No: **222399**
SampleType: **MSD** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162183** Analysis Date: **06/01/2012** Seq No: **4652507**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.5467	0.121	0.4842	0.07833	96.7	70	130	0.5548	1.46	30	

Qualifiers:

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

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

June 18, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1206111

Analytical Environmental Services, Inc. received 4 samples on June 1, 2012 4:00 pm for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/11-06/30/12.
-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

3785 PRESIDENTIAL PARKWAY • ATLANTA, GEORGIA 30340 • TEL: (770) 457-8177 • FAX: (770)457-8188

ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
AES TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1206111

Date: 6/1/12 Page 1 of 1

COMPANY: AMEC

ADDRESS: 356 Plaskrs Ave
Atlanta GA

PHONE: 404 817 0153

FAX: 404 817 0183

SAMPLED BY: Tyler Boyles

SIGNATURE:

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

		SAMPLED					ANALYSIS REQUESTED							
#	SAMPLE ID	DATE	TIME	Grab	Composite	Matrix (See codes)	VOCs	Tot'l RCRA Metals	Diss RCRA Metals	PAHs	PCBs	Pesticides	REMARKS	No # of Containers
						PRESERVATION (See codes)	HCl	HNO3	NA	NA	NA	NA		
1	MW-3	6/1/12	1100	x		GW	X	X	X	X	X	X		7
2	MW-5	6/1/12	1250	x		GW	X	X	X	X	X	X		7
3	MW-4	6/1/12	1435	x		GW	X	X	X	X	X	X		7
4	TRIP Blank						X							
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	6/1/12 1600	1:	6/1/12 4:00
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER ______

PROJECT INFORMATION

PROJECT NAME: 1071 Howell Mill

PROJECT #: 6121 12

SITE ADDRESS: 3071 Howell Mill Rd

SEND REPORT TO: Tyler Boyles

INVOICE TO:
(IF DIFFERENT FROM ABOVE)

QUOTE #: ______ PO#: ______

RECEIPT

Total # of Containers: 21

Turnaround Time Request
○ Standard 5 Business Days
○ 2 Business Day Rush
☑ Next Business Day Rush
○ Same Day Rush (auth req.)
○ Other ______

STATE PROGRAM (if any): ______
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES.
SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab ID: 1206111

Case Narrative

Per phone instructions from Tyler Boyles on 6/6/12 at 9:00 am., work order 1206111 should be revised to report to the Method Detection Limits (MDL).

Analytical Environmental Services, Inc **Date:** 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-001

Client Sample ID: MW-3
Collection Date: 6/1/2012 11:00:00 AM
Matrix: Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**				
1,1,1-Trichloroethane	BRL		0.40	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,1,2,2-Tetrachloroethane	BRL		0.18	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,1,2-Trichloroethane	BRL		0.38	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,1-Dichloroethane	BRL		0.19	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,1-Dichloroethene	BRL		0.79	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2,4-Trichlorobenzene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2-Dibromo-3-chloropropane	BRL		0.78	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2-Dibromoethane	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2-Dichlorobenzene	BRL		0.27	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2-Dichloroethane	BRL		0.22	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,2-Dichloropropane	BRL		0.29	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,3-Dichlorobenzene	BRL		0.17	5.0	ug/L	162199	1	06/04/2012 12:38	DB
1,4-Dichlorobenzene	BRL		0.20	5.0	ug/L	162199	1	06/04/2012 12:38	DB
2-Butanone	BRL		1.3	50	ug/L	162199	1	06/04/2012 12:38	DB
2-Hexanone	BRL		0.46	10	ug/L	162199	1	06/04/2012 12:38	DB
4-Methyl-2-pentanone	BRL		0.39	10	ug/L	162199	1	06/04/2012 12:38	DB
Acetone	BRL		2.0	50	ug/L	162199	1	06/04/2012 12:38	DB
Benzene	BRL		0.41	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Bromodichloromethane	3.9	J	0.20	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Bromoform	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Bromomethane	BRL		0.52	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Carbon disulfide	BRL		1.5	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Carbon tetrachloride	BRL		0.53	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Chlorobenzene	BRL		0.15	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Chloroethane	BRL		0.69	10	ug/L	162199	1	06/04/2012 12:38	DB
Chloroform	40		0.23	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Chloromethane	BRL		0.49	10	ug/L	162199	1	06/04/2012 12:38	DB
cis-1,2-Dichloroethene	2.5	J	0.31	5.0	ug/L	162199	1	06/04/2012 12:38	DB
cis-1,3-Dichloropropene	BRL		0.54	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Cyclohexane	BRL		0.25	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Dibromochloromethane	BRL		0.51	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Dichlorodifluoromethane	BRL		1.2	10	ug/L	162199	1	06/04/2012 12:38	DB
Ethylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Freon-113	BRL		0.77	10	ug/L	162199	1	06/04/2012 12:38	DB
Isopropylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 12:38	DB
m,p-Xylene	BRL		0.72	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Methyl acetate	BRL		0.62	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Methyl tert-butyl ether	BRL		0.35	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Methylcyclohexane	BRL		0.70	5.0	ug/L	162199	1	06/04/2012 12:38	DB

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-3
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 11:00:00 AM
Lab ID:	1206111-001	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**				
Methylene chloride	BRL		2.3	5.0	ug/L	162199	1	06/04/2012 12:38	DB
o-Xylene	BRL		0.42	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Styrene	BRL		0.64	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Tetrachloroethene	120		0.47	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Toluene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 12:38	DB
trans-1,2-Dichloroethene	BRL		0.47	5.0	ug/L	162199	1	06/04/2012 12:38	DB
trans-1,3-Dichloropropene	BRL		0.56	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Trichloroethene	3.4	J	0.38	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Trichlorofluoromethane	BRL		1.1	5.0	ug/L	162199	1	06/04/2012 12:38	DB
Vinyl chloride	BRL		0.69	2.0	ug/L	162199	1	06/04/2012 12:38	DB
Surr: 4-Bromofluorobenzene	81.3		0	67.4-123	%REC	162199	1	06/04/2012 12:38	DB
Surr: Dibromofluoromethane	102		0	75.5-128	%REC	162199	1	06/04/2012 12:38	DB
Surr: Toluene-d8	87.4		0	70-120	%REC	162199	1	06/04/2012 12:38	DB
POLYCHLORINATED BIPHENYLS SW8082A					**(SW3510C)**				
Aroclor 1016	BRL		0.089	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1221	BRL		0.20	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1232	BRL		0.14	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1242	BRL		0.15	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1248	BRL		0.091	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1254	BRL		0.100	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Aroclor 1260	BRL		0.13	0.50	ug/L	162225	1	06/05/2012 13:28	SN
Surr: Decachlorobiphenyl	69.2		0	15.5-128	%REC	162225	1	06/05/2012 13:28	SN
Surr: Tetrachloro-m-xylene	73.6		0	17.3-125	%REC	162225	1	06/05/2012 13:28	SN
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Naphthalene	BRL		2.0	10	ug/L	162230	1	06/04/2012 19:01	EI
Acenaphthylene	BRL		1.2	10	ug/L	162230	1	06/04/2012 19:01	EI
1-Methylnaphthalene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:01	EI
2-Methylnaphthalene	BRL		2.1	10	ug/L	162230	1	06/04/2012 19:01	EI
Acenaphthene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:01	EI
Fluorene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:01	EI
Phenanthrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:01	EI
Anthracene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:01	EI
Fluoranthene	BRL		1.7	10	ug/L	162230	1	06/04/2012 19:01	EI
Pyrene	BRL		1.4	10	ug/L	162230	1	06/04/2012 19:01	EI
Benz(a)anthracene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:01	EI
Chrysene	BRL		1.9	10	ug/L	162230	1	06/04/2012 19:01	EI
Benzo(b)fluoranthene	BRL		0.94	10	ug/L	162230	1	06/04/2012 19:01	EI

Qualifiers:

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

Analytical Environmental Services, Inc **Date:** 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-001

Client Sample ID: MW-3
Collection Date: 6/1/2012 11:00:00 AM
Matrix: Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Benzo(k)fluoranthene	BRL		2.5	10	ug/L	162230	1	06/04/2012 19:01	EI
Benzo(a)pyrene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:01	EI
Dibenz(a,h)anthracene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:01	EI
Benzo(g,h,i)perylene	BRL		1.8	10	ug/L	162230	1	06/04/2012 19:01	EI
Indeno(1,2,3-cd)pyrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:01	EI
Surr: Nitrobenzene-d5	67.4		0	30.3-122	%REC	162230	1	06/04/2012 19:01	EI
Surr: 2-Fluorobiphenyl	58.5		0	41-120	%REC	162230	1	06/04/2012 19:01	EI
Surr: 4-Terphenyl-d14	87.1		0	55.9-122	%REC	162230	1	06/04/2012 19:01	EI
METALS, DISSOLVED SW6010C					**(SW3005A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162291	1	06/05/2012 14:42	TA
Barium	0.0638		0.0019	0.0200	mg/L	162291	1	06/05/2012 14:42	TA
Cadmium	0.0005	J	0.0003	0.0050	mg/L	162291	1	06/05/2012 14:42	TA
Chromium	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:42	TA
Lead	BRL		0.0016	0.0100	mg/L	162291	1	06/05/2012 14:42	TA
Selenium	BRL		0.0044	0.0200	mg/L	162291	1	06/05/2012 14:42	TA
Silver	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:42	TA
Mercury, Total SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162220	1	06/04/2012 14:04	MW
Mercury, Dissolved SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162221	1	06/04/2012 14:26	MW
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
4,4′-DDD	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:02	KD
4,4′-DDE	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:02	KD
4,4′-DDT	BRL		0.0063	0.10	ug/L	162226	1	06/05/2012 13:02	KD
Aldrin	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:02	KD
alpha-BHC	BRL		0.0035	0.050	ug/L	162226	1	06/05/2012 13:02	KD
alpha-Chlordane	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:02	KD
beta-BHC	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:02	KD
delta-BHC	BRL		0.0041	0.050	ug/L	162226	1	06/05/2012 13:02	KD
Dieldrin	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:02	KD
Endosulfan I	BRL		0.0082	0.050	ug/L	162226	1	06/05/2012 13:02	KD
Endosulfan II	BRL		0.010	0.10	ug/L	162226	1	06/05/2012 13:02	KD
Endosulfan sulfate	BRL		0.0088	0.10	ug/L	162226	1	06/05/2012 13:02	KD
Endrin	BRL		0.0091	0.10	ug/L	162226	1	06/05/2012 13:02	KD
Endrin aldehyde	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:02	KD

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-3
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 11:00:00 AM
Lab ID:	1206111-001	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
Endrin ketone	BRL		0.025	0.10	ug/L	162226	1	06/05/2012 13:02	KD
gamma-BHC	BRL		0.0047	0.050	ug/L	162226	1	06/05/2012 13:02	KD
gamma-Chlordane	BRL		0.0085	0.050	ug/L	162226	1	06/05/2012 13:02	KD
Heptachlor	BRL		0.0097	0.050	ug/L	162226	1	06/05/2012 13:02	KD
Heptachlor epoxide	BRL		0.0044	0.050	ug/L	162226	1	06/05/2012 13:02	KD
Methoxychlor	BRL		0.039	0.50	ug/L	162226	1	06/05/2012 13:02	KD
Toxaphene	BRL		0.10	5.0	ug/L	162226	1	06/05/2012 13:02	KD
Surr: Decachlorobiphenyl	46.8		0	16.4-114	%REC	162226	1	06/05/2012 13:02	KD
Surr: Tetrachloro-m-xylene	46.7		0	18.4-120	%REC	162226	1	06/05/2012 13:02	KD
METALS, TOTAL SW6010C					**(SW3010A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162237	1	06/05/2012 13:57	TA
Barium	0.0704		0.0019	0.0200	mg/L	162237	1	06/05/2012 13:57	TA
Cadmium	BRL		0.0003	0.0050	mg/L	162237	1	06/05/2012 13:57	TA
Chromium	0.0011	J	0.0006	0.0100	mg/L	162237	1	06/05/2012 13:57	TA
Lead	BRL		0.0016	0.0100	mg/L	162237	1	06/05/2012 13:57	TA
Selenium	BRL		0.0044	0.0200	mg/L	162237	1	06/05/2012 13:57	TA
Silver	BRL		0.0006	0.0100	mg/L	162237	1	06/05/2012 13:57	TA

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-5
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 12:50:00 PM
Lab ID:	1206111-002	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**					
1,1,1-Trichloroethane	BRL		0.40	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,1,2,2-Tetrachloroethane	BRL		0.18	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,1,2-Trichloroethane	BRL		0.38	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,1-Dichloroethane	2.0	J	0.19	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,1-Dichloroethene	BRL		0.79	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2,4-Trichlorobenzene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2-Dibromo-3-chloropropane	BRL		0.78	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2-Dibromoethane	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2-Dichlorobenzene	BRL		0.27	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2-Dichloroethane	BRL		0.22	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,2-Dichloropropane	BRL		0.29	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,3-Dichlorobenzene	BRL		0.17	5.0	ug/L	162199	1	06/04/2012 13:07	DB
1,4-Dichlorobenzene	BRL		0.20	5.0	ug/L	162199	1	06/04/2012 13:07	DB
2-Butanone	BRL		1.3	50	ug/L	162199	1	06/04/2012 13:07	DB
2-Hexanone	BRL		0.46	10	ug/L	162199	1	06/04/2012 13:07	DB
4-Methyl-2-pentanone	BRL		0.39	10	ug/L	162199	1	06/04/2012 13:07	DB
Acetone	BRL		2.0	50	ug/L	162199	1	06/04/2012 13:07	DB
Benzene	BRL		0.41	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Bromodichloromethane	BRL		0.20	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Bromoform	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Bromomethane	BRL		0.52	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Carbon disulfide	BRL		1.5	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Carbon tetrachloride	BRL		0.53	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Chlorobenzene	BRL		0.15	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Chloroethane	1.4	J	0.69	10	ug/L	162199	1	06/04/2012 13:07	DB
Chloroform	BRL		0.23	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Chloromethane	BRL		0.49	10	ug/L	162199	1	06/04/2012 13:07	DB
cis-1,2-Dichloroethene	BRL		0.31	5.0	ug/L	162199	1	06/04/2012 13:07	DB
cis-1,3-Dichloropropene	BRL		0.54	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Cyclohexane	BRL		0.25	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Dibromochloromethane	BRL		0.51	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Dichlorodifluoromethane	BRL		1.2	10	ug/L	162199	1	06/04/2012 13:07	DB
Ethylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Freon-113	BRL		0.77	10	ug/L	162199	1	06/04/2012 13:07	DB
Isopropylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 13:07	DB
m,p-Xylene	BRL		0.72	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Methyl acetate	BRL		0.62	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Methyl tert-butyl ether	BRL		0.35	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Methylcyclohexane	BRL		0.70	5.0	ug/L	162199	1	06/04/2012 13:07	DB

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-5
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 12:50:00 PM
Lab ID:	1206111-002	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**				
Methylene chloride	BRL		2.3	5.0	ug/L	162199	1	06/04/2012 13:07	DB
o-Xylene	BRL		0.42	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Styrene	BRL		0.64	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Tetrachloroethene	1.1	J	0.47	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Toluene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 13:07	DB
trans-1,2-Dichloroethene	BRL		0.47	5.0	ug/L	162199	1	06/04/2012 13:07	DB
trans-1,3-Dichloropropene	BRL		0.56	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Trichloroethene	BRL		0.38	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Trichlorofluoromethane	BRL		1.1	5.0	ug/L	162199	1	06/04/2012 13:07	DB
Vinyl chloride	BRL		0.69	2.0	ug/L	162199	1	06/04/2012 13:07	DB
Surr: 4-Bromofluorobenzene	89.4		0	67.4-123	%REC	162199	1	06/04/2012 13:07	DB
Surr: Dibromofluoromethane	102		0	75.5-128	%REC	162199	1	06/04/2012 13:07	DB
Surr: Toluene-d8	88.4		0	70-120	%REC	162199	1	06/04/2012 13:07	DB
POLYCHLORINATED BIPHENYLS SW8082A					**(SW3510C)**				
Aroclor 1016	BRL		0.089	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1221	BRL		0.20	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1232	BRL		0.14	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1242	BRL		0.15	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1248	BRL		0.091	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1254	BRL		0.100	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Aroclor 1260	BRL		0.13	0.50	ug/L	162225	1	06/05/2012 13:58	SN
Surr: Decachlorobiphenyl	74.7		0	15.5-128	%REC	162225	1	06/05/2012 13:58	SN
Surr: Tetrachloro-m-xylene	45.9		0	17.3-125	%REC	162225	1	06/05/2012 13:58	SN
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Naphthalene	BRL		2.0	10	ug/L	162230	1	06/04/2012 19:26	EI
Acenaphthylene	BRL		1.2	10	ug/L	162230	1	06/04/2012 19:26	EI
1-Methylnaphthalene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:26	EI
2-Methylnaphthalene	BRL		2.1	10	ug/L	162230	1	06/04/2012 19:26	EI
Acenaphthene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:26	EI
Fluorene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:26	EI
Phenanthrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:26	EI
Anthracene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:26	EI
Fluoranthene	BRL		1.7	10	ug/L	162230	1	06/04/2012 19:26	EI
Pyrene	BRL		1.4	10	ug/L	162230	1	06/04/2012 19:26	EI
Benz(a)anthracene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:26	EI
Chrysene	BRL		1.9	10	ug/L	162230	1	06/04/2012 19:26	EI
Benzo(b)fluoranthene	BRL		0.94	10	ug/L	162230	1	06/04/2012 19:26	EI

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-5
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 12:50:00 PM
Lab ID:	1206111-002	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Benzo(k)fluoranthene	BRL		2.5	10	ug/L	162230	1	06/04/2012 19:26	EI
Benzo(a)pyrene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:26	EI
Dibenz(a,h)anthracene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:26	EI
Benzo(g,h,i)perylene	BRL		1.8	10	ug/L	162230	1	06/04/2012 19:26	EI
Indeno(1,2,3-cd)pyrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:26	EI
Surr: Nitrobenzene-d5	51.1		0	30.3-122	%REC	162230	1	06/04/2012 19:26	EI
Surr: 2-Fluorobiphenyl	51.6		0	41-120	%REC	162230	1	06/04/2012 19:26	EI
Surr: 4-Terphenyl-d14	91.7		0	55.9-122	%REC	162230	1	06/04/2012 19:26	EI
METALS, DISSOLVED SW6010C					**(SW3005A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162291	1	06/05/2012 14:46	TA
Barium	0.935		0.0019	0.0200	mg/L	162291	1	06/05/2012 14:46	TA
Cadmium	BRL		0.0003	0.0050	mg/L	162291	1	06/05/2012 14:46	TA
Chromium	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:46	TA
Lead	BRL		0.0016	0.0100	mg/L	162291	1	06/05/2012 14:46	TA
Selenium	BRL		0.0044	0.0200	mg/L	162291	1	06/05/2012 14:46	TA
Silver	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:46	TA
Mercury, Total SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162220	1	06/04/2012 14:10	MW
Mercury, Dissolved SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162221	1	06/04/2012 14:38	MW
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
4,4´-DDD	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:13	KD
4,4´-DDE	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:13	KD
4,4´-DDT	BRL		0.0063	0.10	ug/L	162226	1	06/05/2012 13:13	KD
Aldrin	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:13	KD
alpha-BHC	BRL		0.0035	0.050	ug/L	162226	1	06/05/2012 13:13	KD
alpha-Chlordane	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:13	KD
beta-BHC	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:13	KD
delta-BHC	BRL		0.0041	0.050	ug/L	162226	1	06/05/2012 13:13	KD
Dieldrin	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:13	KD
Endosulfan I	BRL		0.0082	0.050	ug/L	162226	1	06/05/2012 13:13	KD
Endosulfan II	BRL		0.010	0.10	ug/L	162226	1	06/05/2012 13:13	KD
Endosulfan sulfate	BRL		0.0088	0.10	ug/L	162226	1	06/05/2012 13:13	KD
Endrin	BRL		0.0091	0.10	ug/L	162226	1	06/05/2012 13:13	KD
Endrin aldehyde	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:13	KD

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

Analytical Environmental Services, Inc **Date:** 18-Jun-12

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-5
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 12:50:00 PM
Lab ID:	1206111-002	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
Endrin ketone	BRL		0.025	0.10	ug/L	162226	1	06/05/2012 13:13	KD
gamma-BHC	BRL		0.0047	0.050	ug/L	162226	1	06/05/2012 13:13	KD
gamma-Chlordane	BRL		0.0085	0.050	ug/L	162226	1	06/05/2012 13:13	KD
Heptachlor	BRL		0.0097	0.050	ug/L	162226	1	06/05/2012 13:13	KD
Heptachlor epoxide	BRL		0.0044	0.050	ug/L	162226	1	06/05/2012 13:13	KD
Methoxychlor	BRL		0.039	0.50	ug/L	162226	1	06/05/2012 13:13	KD
Toxaphene	BRL		0.10	5.0	ug/L	162226	1	06/05/2012 13:13	KD
Surr: Decachlorobiphenyl	48.2		0	16.4-114	%REC	162226	1	06/05/2012 13:13	KD
Surr: Tetrachloro-m-xylene	32.1		0	18.4-120	%REC	162226	1	06/05/2012 13:13	KD
METALS, TOTAL SW6010C					**(SW3010A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162237	1	06/05/2012 14:01	TA
Barium	1.01		0.0019	0.0200	mg/L	162237	1	06/05/2012 14:01	TA
Cadmium	BRL		0.0003	0.0050	mg/L	162237	1	06/05/2012 14:01	TA
Chromium	BRL		0.0006	0.0100	mg/L	162237	1	06/05/2012 14:01	TA
Lead	BRL		0.0016	0.0100	mg/L	162237	1	06/05/2012 14:01	TA
Selenium	BRL		0.0044	0.0200	mg/L	162237	1	06/05/2012 14:01	TA
Silver	BRL		0.0006	0.0100	mg/L	162237	1	06/05/2012 14:01	TA

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-003

Client Sample ID: MW-4
Collection Date: 6/1/2012 2:35:00 PM
Matrix: Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**				
1,1,1-Trichloroethane	6.2		0.40	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,1,2,2-Tetrachloroethane	BRL		0.18	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,1,2-Trichloroethane	BRL		0.38	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,1-Dichloroethane	14		0.19	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,1-Dichloroethene	2.1	J	0.79	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2,4-Trichlorobenzene	BRL		0.30	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2-Dibromo-3-chloropropane	BRL		0.78	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2-Dibromoethane	BRL		0.32	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2-Dichlorobenzene	BRL		0.27	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2-Dichloroethane	BRL		0.22	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,2-Dichloropropane	BRL		0.29	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,3-Dichlorobenzene	BRL		0.17	5.0	ug/L	162199	1	06/05/2012 11:21	SB
1,4-Dichlorobenzene	BRL		0.20	5.0	ug/L	162199	1	06/05/2012 11:21	SB
2-Butanone	BRL		1.3	50	ug/L	162199	1	06/05/2012 11:21	SB
2-Hexanone	BRL		0.46	10	ug/L	162199	1	06/05/2012 11:21	SB
4-Methyl-2-pentanone	BRL		0.39	10	ug/L	162199	1	06/05/2012 11:21	SB
Acetone	BRL		2.0	50	ug/L	162199	1	06/05/2012 11:21	SB
Benzene	BRL		0.41	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Bromodichloromethane	BRL		0.20	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Bromoform	BRL		0.32	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Bromomethane	BRL		0.52	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Carbon disulfide	BRL		1.5	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Carbon tetrachloride	BRL		0.53	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Chlorobenzene	BRL		0.15	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Chloroethane	BRL		0.69	10	ug/L	162199	1	06/05/2012 11:21	SB
Chloroform	14		0.23	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Chloromethane	BRL		0.49	10	ug/L	162199	1	06/05/2012 11:21	SB
cis-1,2-Dichloroethene	15		0.31	5.0	ug/L	162199	1	06/05/2012 11:21	SB
cis-1,3-Dichloropropene	BRL		0.54	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Cyclohexane	BRL		0.25	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Dibromochloromethane	BRL		0.51	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Dichlorodifluoromethane	BRL		1.2	10	ug/L	162199	1	06/05/2012 11:21	SB
Ethylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Freon-113	BRL		0.77	10	ug/L	162199	1	06/05/2012 11:21	SB
Isopropylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/05/2012 11:21	SB
m,p-Xylene	BRL		0.72	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Methyl acetate	BRL		0.62	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Methyl tert-butyl ether	BRL		0.35	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Methylcyclohexane	BRL		0.70	5.0	ug/L	162199	1	06/05/2012 11:21	SB

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

Analytical Environmental Services, Inc **Date:** 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-003

Client Sample ID: MW-4
Collection Date: 6/1/2012 2:35:00 PM
Matrix: Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**				
Methylene chloride	BRL		2.3	5.0	ug/L	162199	1	06/05/2012 11:21	SB
o-Xylene	BRL		0.42	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Styrene	BRL		0.64	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Tetrachloroethene	BRL		0.47	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Toluene	BRL		0.30	5.0	ug/L	162199	1	06/05/2012 11:21	SB
trans-1,2-Dichloroethene	BRL		0.47	5.0	ug/L	162199	1	06/05/2012 11:21	SB
trans-1,3-Dichloropropene	BRL		0.56	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Trichloroethene	4.3	J	0.38	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Trichlorofluoromethane	BRL		1.1	5.0	ug/L	162199	1	06/05/2012 11:21	SB
Vinyl chloride	BRL		0.69	2.0	ug/L	162199	1	06/05/2012 11:21	SB
Surr: 4-Bromofluorobenzene	92.7		0	67.4-123	%REC	162199	1	06/05/2012 11:21	SB
Surr: Dibromofluoromethane	115		0	75.5-128	%REC	162199	1	06/05/2012 11:21	SB
Surr: Toluene-d8	85.2		0	70-120	%REC	162199	1	06/05/2012 11:21	SB
POLYCHLORINATED BIPHENYLS SW8082A					**(SW3510C)**				
Aroclor 1016	BRL		0.089	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1221	BRL		0.20	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1232	BRL		0.14	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1242	BRL		0.15	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1248	BRL		0.091	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1254	BRL		0.100	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Aroclor 1260	BRL		0.13	0.50	ug/L	162225	1	06/05/2012 14:27	SN
Surr: Decachlorobiphenyl	36		0	15.5-128	%REC	162225	1	06/05/2012 14:27	SN
Surr: Tetrachloro-m-xylene	91.8		0	17.3-125	%REC	162225	1	06/05/2012 14:27	SN
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Naphthalene	BRL		2.0	10	ug/L	162230	1	06/04/2012 19:52	EI
Acenaphthylene	BRL		1.2	10	ug/L	162230	1	06/04/2012 19:52	EI
1-Methylnaphthalene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:52	EI
2-Methylnaphthalene	BRL		2.1	10	ug/L	162230	1	06/04/2012 19:52	EI
Acenaphthene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:52	EI
Fluorene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:52	EI
Phenanthrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:52	EI
Anthracene	BRL		1.6	10	ug/L	162230	1	06/04/2012 19:52	EI
Fluoranthene	BRL		1.7	10	ug/L	162230	1	06/04/2012 19:52	EI
Pyrene	BRL		1.4	10	ug/L	162230	1	06/04/2012 19:52	EI
Benz(a)anthracene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:52	EI
Chrysene	BRL		1.9	10	ug/L	162230	1	06/04/2012 19:52	EI
Benzo(b)fluoranthene	BRL		0.94	10	ug/L	162230	1	06/04/2012 19:52	EI

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-4
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 2:35:00 PM
Lab ID:	1206111-003	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
POLYAROMATIC HYDROCARBONS SW8270D					**(SW3535A)**				
Benzo(k)fluoranthene	BRL		2.5	10	ug/L	162230	1	06/04/2012 19:52	EI
Benzo(a)pyrene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:52	EI
Dibenz(a,h)anthracene	BRL		1.5	10	ug/L	162230	1	06/04/2012 19:52	EI
Benzo(g,h,i)perylene	BRL		1.8	10	ug/L	162230	1	06/04/2012 19:52	EI
Indeno(1,2,3-cd)pyrene	BRL		1.3	10	ug/L	162230	1	06/04/2012 19:52	EI
Surr: Nitrobenzene-d5	51.6		0	30.3-122	%REC	162230	1	06/04/2012 19:52	EI
Surr: 2-Fluorobiphenyl	54.1		0	41-120	%REC	162230	1	06/04/2012 19:52	EI
Surr: 4-Terphenyl-d14	87.5		0	55.9-122	%REC	162230	1	06/04/2012 19:52	EI
METALS, DISSOLVED SW6010C					**(SW3005A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162291	1	06/05/2012 14:53	TA
Barium	0.0605		0.0019	0.0200	mg/L	162291	1	06/05/2012 14:53	TA
Cadmium	BRL		0.0003	0.0050	mg/L	162291	1	06/05/2012 14:53	TA
Chromium	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:53	TA
Lead	BRL		0.0016	0.0100	mg/L	162291	1	06/05/2012 14:53	TA
Selenium	BRL		0.0044	0.0200	mg/L	162291	1	06/05/2012 14:53	TA
Silver	BRL		0.0006	0.0100	mg/L	162291	1	06/05/2012 14:53	TA
Mercury, Total SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162220	1	06/04/2012 14:12	MW
Mercury, Dissolved SW7470A					**(SW7470A)**				
Mercury	BRL		0.00007	0.00020	mg/L	162221	1	06/04/2012 14:40	MW
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
4,4´-DDD	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:25	KD
4,4´-DDE	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:25	KD
4,4´-DDT	BRL		0.0063	0.10	ug/L	162226	1	06/05/2012 13:25	KD
Aldrin	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:25	KD
alpha-BHC	BRL		0.0035	0.050	ug/L	162226	1	06/05/2012 13:25	KD
alpha-Chlordane	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:25	KD
beta-BHC	BRL		0.0060	0.050	ug/L	162226	1	06/05/2012 13:25	KD
delta-BHC	BRL		0.0041	0.050	ug/L	162226	1	06/05/2012 13:25	KD
Dieldrin	BRL		0.015	0.10	ug/L	162226	1	06/05/2012 13:25	KD
Endosulfan I	BRL		0.0082	0.050	ug/L	162226	1	06/05/2012 13:25	KD
Endosulfan II	BRL		0.010	0.10	ug/L	162226	1	06/05/2012 13:25	KD
Endosulfan sulfate	BRL		0.0088	0.10	ug/L	162226	1	06/05/2012 13:25	KD
Endrin	BRL		0.0091	0.10	ug/L	162226	1	06/05/2012 13:25	KD
Endrin aldehyde	BRL		0.012	0.10	ug/L	162226	1	06/05/2012 13:25	KD

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-4
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/1/2012 2:35:00 PM
Lab ID:	1206111-003	**Matrix:**	Groundwater

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
CHLORINATED PESTICIDES, TCL SW8081B					**(SW3510C)**				
Endrin ketone	BRL		0.025	0.10	ug/L	162226	1	06/05/2012 13:25	KD
gamma-BHC	BRL		0.0047	0.050	ug/L	162226	1	06/05/2012 13:25	KD
gamma-Chlordane	BRL		0.0085	0.050	ug/L	162226	1	06/05/2012 13:25	KD
Heptachlor	BRL		0.0097	0.050	ug/L	162226	1	06/05/2012 13:25	KD
Heptachlor epoxide	BRL		0.0044	0.050	ug/L	162226	1	06/05/2012 13:25	KD
Methoxychlor	BRL		0.039	0.50	ug/L	162226	1	06/05/2012 13:25	KD
Toxaphene	BRL		0.10	5.0	ug/L	162226	1	06/05/2012 13:25	KD
Surr: Decachlorobiphenyl	23.6		0	16.4-114	%REC	162226	1	06/05/2012 13:25	KD
Surr: Tetrachloro-m-xylene	60.8		0	18.4-120	%REC	162226	1	06/05/2012 13:25	KD
METALS, TOTAL SW6010C					**(SW3010A)**				
Arsenic	BRL		0.0016	0.0500	mg/L	162237	1	06/05/2012 14:05	TA
Barium	0.119		0.0019	0.0200	mg/L	162237	1	06/05/2012 14:05	TA
Cadmium	BRL		0.0003	0.0050	mg/L	162237	1	06/05/2012 14:05	TA
Chromium	0.0115		0.0006	0.0100	mg/L	162237	1	06/05/2012 14:05	TA
Lead	0.0178		0.0016	0.0100	mg/L	162237	1	06/05/2012 14:05	TA
Selenium	BRL		0.0044	0.0200	mg/L	162237	1	06/05/2012 14:05	TA
Silver	BRL		0.0006	0.0100	mg/L	162237	1	06/05/2012 14:05	TA

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-004

Client Sample ID: TRIP BLANK
Collection Date: 6/1/2012
Matrix: Aqueous

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**					
1,1,1-Trichloroethane	BRL		0.40	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,1,2,2-Tetrachloroethane	BRL		0.18	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,1,2-Trichloroethane	BRL		0.38	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,1-Dichloroethane	BRL		0.19	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,1-Dichloroethene	BRL		0.79	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2,4-Trichlorobenzene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2-Dibromo-3-chloropropane	BRL		0.78	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2-Dibromoethane	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2-Dichlorobenzene	BRL		0.27	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2-Dichloroethane	BRL		0.22	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,2-Dichloropropane	BRL		0.29	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,3-Dichlorobenzene	BRL		0.17	5.0	ug/L	162199	1	06/04/2012 12:09	DB
1,4-Dichlorobenzene	BRL		0.20	5.0	ug/L	162199	1	06/04/2012 12:09	DB
2-Butanone	BRL		1.3	50	ug/L	162199	1	06/04/2012 12:09	DB
2-Hexanone	BRL		0.46	10	ug/L	162199	1	06/04/2012 12:09	DB
4-Methyl-2-pentanone	BRL		0.39	10	ug/L	162199	1	06/04/2012 12:09	DB
Acetone	BRL		2.0	50	ug/L	162199	1	06/04/2012 12:09	DB
Benzene	BRL		0.41	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Bromodichloromethane	BRL		0.20	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Bromoform	BRL		0.32	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Bromomethane	BRL		0.52	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Carbon disulfide	BRL		1.5	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Carbon tetrachloride	BRL		0.53	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Chlorobenzene	BRL		0.15	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Chloroethane	BRL		0.69	10	ug/L	162199	1	06/04/2012 12:09	DB
Chloroform	BRL		0.23	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Chloromethane	BRL		0.49	10	ug/L	162199	1	06/04/2012 12:09	DB
cis-1,2-Dichloroethene	BRL		0.31	5.0	ug/L	162199	1	06/04/2012 12:09	DB
cis-1,3-Dichloropropene	BRL		0.54	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Cyclohexane	BRL		0.25	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Dibromochloromethane	BRL		0.51	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Dichlorodifluoromethane	BRL		1.2	10	ug/L	162199	1	06/04/2012 12:09	DB
Ethylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Freon-113	BRL		0.77	10	ug/L	162199	1	06/04/2012 12:09	DB
Isopropylbenzene	BRL		0.37	5.0	ug/L	162199	1	06/04/2012 12:09	DB
m,p-Xylene	BRL		0.72	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Methyl acetate	BRL		0.62	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Methyl tert-butyl ether	BRL		0.35	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Methylcyclohexane	BRL		0.70	5.0	ug/L	162199	1	06/04/2012 12:09	DB

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Lab ID: 1206111-004

Client Sample ID: TRIP BLANK
Collection Date: 6/1/2012
Matrix: Aqueous

Analyses	Result	Qual	MDL	Reporting Limit	Units	BatchID	DF	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**					
Methylene chloride	BRL		2.3	5.0	ug/L	162199	1	06/04/2012 12:09	DB
o-Xylene	BRL		0.42	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Styrene	BRL		0.64	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Tetrachloroethene	BRL		0.47	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Toluene	BRL		0.30	5.0	ug/L	162199	1	06/04/2012 12:09	DB
trans-1,2-Dichloroethene	BRL		0.47	5.0	ug/L	162199	1	06/04/2012 12:09	DB
trans-1,3-Dichloropropene	BRL		0.56	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Trichloroethene	BRL		0.38	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Trichlorofluoromethane	BRL		1.1	5.0	ug/L	162199	1	06/04/2012 12:09	DB
Vinyl chloride	BRL		0.69	2.0	ug/L	162199	1	06/04/2012 12:09	DB
Surr: 4-Bromofluorobenzene	83.7		0	67.4-123	%REC	162199	1	06/04/2012 12:09	DB
Surr: Dibromofluoromethane	98.5		0	75.5-128	%REC	162199	1	06/04/2012 12:09	DB
Surr: Toluene-d8	85		0	70-120	%REC	162199	1	06/04/2012 12:09	DB

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client AMEC

Work Order Number 1206111

Checklist completed by ______ 06/01/2012
Signature Date

Carrier name: FedEx __ UPS __ Courier __ Client ✓ US Mail __ Other ______

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ Not Present ✓

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Container/Temp Blank temperature in compliance? (4°C±2)* Yes ✓ No __

Cooler #1 4.5 Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted __ Yes ✓ No __

Water - pH acceptable upon receipt? Yes ✓ No __ Not Applicable __

Adjusted? ______ Checked by ______

Sample Condition: Good ✓ Other(Explain) ______

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Analytical Environmental Services, Inc **Date:** 18-Jun-12

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab Order: 1206111

Dates Report

Lab Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
1206111-001A	MW-3	6/1/2012 11:00:00AM	Groundwater	TCL VOLATILE ORGANICS		06/01/2012	06/04/2012
1206111-001B	MW-3	6/1/2012 11:00:00AM	Groundwater	TOTAL METALS BY ICP		06/04/2012	06/05/2012
1206111-001B	MW-3	6/1/2012 11:00:00AM	Groundwater	TOTAL MERCURY		06/04/2012	06/04/2012
1206111-001C	MW-3	6/1/2012 11:00:00AM	Groundwater	DISSOLVED METALS BY ICP		06/05/2012	06/05/2012
1206111-001C	MW-3	6/1/2012 11:00:00AM	Groundwater	MERCURY, DISSOLVED		06/04/2012	06/04/2012
1206111-001D	MW-3	6/1/2012 11:00:00AM	Groundwater	TCL-CHLORINATED PESTICIDES		06/05/2012	06/05/2012
1206111-001D	MW-3	6/1/2012 11:00:00AM	Groundwater	POLYCHLORINATED BIPHENYLS		06/05/2012	06/05/2012
1206111-001D	MW-3	6/1/2012 11:00:00AM	Groundwater	POLYNUCLEAR AROMATIC HYDROCARBONS		06/04/2012	06/04/2012
1206111-002A	MW-5	6/1/2012 12:50:00PM	Groundwater	TCL VOLATILE ORGANICS		06/01/2012	06/04/2012
1206111-002B	MW-5	6/1/2012 12:50:00PM	Groundwater	TOTAL METALS BY ICP		06/04/2012	06/05/2012
1206111-002B	MW-5	6/1/2012 12:50:00PM	Groundwater	TOTAL MERCURY		06/04/2012	06/04/2012
1206111-002C	MW-5	6/1/2012 12:50:00PM	Groundwater	DISSOLVED METALS BY ICP		06/05/2012	06/05/2012
1206111-002C	MW-5	6/1/2012 12:50:00PM	Groundwater	MERCURY, DISSOLVED		06/04/2012	06/04/2012
1206111-002D	MW-5	6/1/2012 12:50:00PM	Groundwater	TCL-CHLORINATED PESTICIDES		06/05/2012	06/05/2012
1206111-002D	MW-5	6/1/2012 12:50:00PM	Groundwater	POLYCHLORINATED BIPHENYLS		06/05/2012	06/05/2012
1206111-002D	MW-5	6/1/2012 12:50:00PM	Groundwater	POLYNUCLEAR AROMATIC HYDROCARBONS		06/04/2012	06/04/2012
1206111-003A	MW-4	6/1/2012 2:35:00PM	Groundwater	TCL VOLATILE ORGANICS		06/01/2012	06/05/2012
1206111-003B	MW-4	6/1/2012 2:35:00PM	Groundwater	TOTAL METALS BY ICP		06/04/2012	06/05/2012
1206111-003B	MW-4	6/1/2012 2:35:00PM	Groundwater	TOTAL MERCURY		06/04/2012	06/04/2012
1206111-003C	MW-4	6/1/2012 2:35:00PM	Groundwater	DISSOLVED METALS BY ICP		06/05/2012	06/05/2012
1206111-003C	MW-4	6/1/2012 2:35:00PM	Groundwater	MERCURY, DISSOLVED		06/04/2012	06/04/2012
1206111-003D	MW-4	6/1/2012 2:35:00PM	Groundwater	TCL-CHLORINATED PESTICIDES		06/05/2012	06/05/2012
1206111-003D	MW-4	6/1/2012 2:35:00PM	Groundwater	POLYCHLORINATED BIPHENYLS		06/05/2012	06/05/2012
1206111-003D	MW-4	6/1/2012 2:35:00PM	Groundwater	POLYNUCLEAR AROMATIC HYDROCARBONS		06/04/2012	06/04/2012
1206111-004A	TRIP BLANK	6/1/2012 12:00:00AM	Aqueous	TCL VOLATILE ORGANICS		06/01/2012	06/04/2012

Analytical Environmental Services, Inc

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162199

Sample ID: **MB-162199** Client ID: Units: **ug/L** Prep Date: **06/01/2012** Run No: **222386**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **162199** Analysis Date: **06/01/2012** Seq No: **4651977**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2,2-Tetrachloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2,4-Trichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromo-3-chloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromoethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,3-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,4-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
2-Butanone	BRL	50	0	0	0	0	0	0	0	0	
2-Hexanone	BRL	10	0	0	0	0	0	0	0	0	
4-Methyl-2-pentanone	BRL	10	0	0	0	0	0	0	0	0	
Acetone	BRL	50	0	0	0	0	0	0	0	0	
Benzene	BRL	5.0	0	0	0	0	0	0	0	0	
Bromodichloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Bromoform	BRL	5.0	0	0	0	0	0	0	0	0	
Bromomethane	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon disulfide	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon tetrachloride	BRL	5.0	0	0	0	0	0	0	0	0	
Chlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Chloroethane	BRL	10	0	0	0	0	0	0	0	0	
Chloroform	BRL	5.0	0	0	0	0	0	0	0	0	
Chloromethane	BRL	10	0	0	0	0	0	0	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162199**

Sample ID: **MB-162199** Client ID: Units: **ug/L** Prep Date: **06/01/2012** Run No: **222386**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **162199** Analysis Date: **06/01/2012** Seq No: **4651977**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
cis-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
cis-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Cyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Dibromochloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Dichlorodifluoromethane	BRL	10	0	0	0	0	0	0	0	0	
Ethylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Freon-113	BRL	10	0	0	0	0	0	0	0	0	
Isopropylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
m,p-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl acetate	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl tert-butyl ether	BRL	5.0	0	0	0	0	0	0	0	0	
Methylcyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Methylene chloride	BRL	5.0	0	0	0	0	0	0	0	0	
o-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Styrene	BRL	5.0	0	0	0	0	0	0	0	0	
Tetrachloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Toluene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichlorofluoromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Vinyl chloride	BRL	2.0	0	0	0	0	0	0	0	0	
Surr: 4-Bromofluorobenzene	39.27	0	50	0	78.5	67.4	123	0	0	0	
Surr: Dibromofluoromethane	49.92	0	50	0	99.8	75.5	128	0	0	0	
Surr: Toluene-d8	44.24	0	50	0	88.5	70	120	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162199**

Sample ID: **LCS-162199** Client ID: Units: **ug/L** Prep Date: **06/01/2012** Run No: **222386**
SampleType: **LCS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **162199** Analysis Date: **06/01/2012** Seq No: **4651979**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	51.80	5.0	50	0	104	60	140	0	0	0	
Benzene	50.82	5.0	50	0	102	70	130	0	0	0	
Chlorobenzene	51.18	5.0	50	0	102	70	130	0	0	0	
Toluene	51.28	5.0	50	0	103	70	130	0	0	0	
Trichloroethene	51.92	5.0	50	0	104	70	130	0	0	0	
Surr: 4-Bromofluorobenzene	53.02	0	50	0	106	67.4	123	0	0	0	
Surr: Dibromofluoromethane	47.01	0	50	0	94	75.5	128	0	0	0	
Surr: Toluene-d8	46.41	0	50	0	92.8	70	120	0	0	0	

Sample ID: **1205N82-012AMS** Client ID: Units: **ug/L** Prep Date: **06/01/2012** Run No: **222386**
SampleType: **MS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **162199** Analysis Date: **06/01/2012** Seq No: **4651981**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	2661	250	2500	0	106	50.1	179	0	0	0	
Benzene	2555	250	2500	0	102	61.2	150	0	0	0	
Chlorobenzene	2585	250	2500	0	103	72.1	140	0	0	0	
Toluene	2542	250	2500	0	102	58.7	154	0	0	0	
Trichloroethene	2724	250	2500	194.5	101	68.3	149	0	0	0	
Surr: 4-Bromofluorobenzene	2512	0	2500	0	100	67.4	123	0	0	0	
Surr: Dibromofluoromethane	2288	0	2500	0	91.5	75.5	128	0	0	0	
Surr: Toluene-d8	2316	0	2500	0	92.6	70	120	0	0	0	

Sample ID: **1205N82-012AMSD** Client ID: Units: **ug/L** Prep Date: **06/01/2012** Run No: **222386**
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **162199** Analysis Date: **06/01/2012** Seq No: **4651983**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	3004	250	2500	0	120	50.1	179	2661	12.1	23.3	
Benzene	2637	250	2500	0	105	61.2	150	2555	3.16	19	

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

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162199**

Sample ID: **1205N82-012AMSD** Client ID:
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B**
Units: **ug/L**
BatchID: **162199**
Prep Date: **06/01/2012**
Analysis Date: **06/01/2012**
Run No: **222386**
Seq No: **4651983**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Chlorobenzene	2723	250	2500	0	109	72.1	140	2585	5.2	21.5	
Toluene	2642	250	2500	0	106	58.7	154	2542	3.88	20	
Trichloroethene	2956	250	2500	194.5	110	68.3	149	2724	8.13	17.7	
Surr: 4-Bromofluorobenzene	2489	0	2500	0	99.6	67.4	123	2512	0	0	
Surr: Dibromofluoromethane	2284	0	2500	0	91.4	75.5	128	2288	0	0	
Surr: Toluene-d8	2294	0	2500	0	91.7	70	120	2316	0	0	

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

Analytical Environmental Services, Inc

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162220**

Sample ID: **MB-162220** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222502**
SampleType: **MBLK** TestCode: **Mercury, Total SW7470A** BatchID: **162220** Analysis Date: **06/04/2012** Seq No: **4654647**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.00020	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162220** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222502**
SampleType: **LCS** TestCode: **Mercury, Total SW7470A** BatchID: **162220** Analysis Date: **06/04/2012** Seq No: **4654648**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005013	0.00020	0.005	0	100	85	115	0	0	0	

Sample ID: **1205O57-003AMS** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222502**
SampleType: **MS** TestCode: **Mercury, Total SW7470A** BatchID: **162220** Analysis Date: **06/04/2012** Seq No: **4654650**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.004833	0.00020	0.005	0	96.7	70	130	0	0	0	

Sample ID: **1205O57-003AMSD** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222502**
SampleType: **MSD** TestCode: **Mercury, Total SW7470A** BatchID: **162220** Analysis Date: **06/04/2012** Seq No: **4654651**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.004927	0.00020	0.005	0	98.5	70	130	0.004833	1.93	20	

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

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162221**

Sample ID: **MB-162221** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222511**
SampleType: **MBLK** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162221** Analysis Date: **06/04/2012** Seq No: **4654793**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.00020	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162221** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222511**
SampleType: **LCS** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162221** Analysis Date: **06/04/2012** Seq No: **4654795**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005242	0.00020	0.005	0	105	85	115	0	0	0	

Sample ID: **1206111-001CMS** Client ID: **MW-3** Units: **mg/L** Prep Date: **06/04/2012** Run No: **222511**
SampleType: **MS** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162221** Analysis Date: **06/04/2012** Seq No: **4654797**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005208	0.00020	0.005	0	104	70	130	0	0	0	

Sample ID: **1206111-001CMSD** Client ID: **MW-3** Units: **mg/L** Prep Date: **06/04/2012** Run No: **222511**
SampleType: **MSD** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162221** Analysis Date: **06/04/2012** Seq No: **4654800**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005164	0.00020	0.005	0	103	70	130	0.005208	0.855	20	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162225**

Sample ID: **MB-162225** Client ID: Units: **ug/L** Prep Date: **06/05/2012** Run No: **222596**
SampleType: **MBLK** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **162225** Analysis Date: **06/05/2012** Seq No: **4656343**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1221	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1232	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1242	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1248	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1254	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1260	BRL	0.50	0	0	0	0	0	0	0	0	
Surr: Decachlorobiphenyl	0.4817	0	0.5	0	96.3	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.4780	0	0.5	0	95.6	17.3	125	0	0	0	

Sample ID: **LCS-162225** Client ID: Units: **ug/L** Prep Date: **06/05/2012** Run No: **222596**
SampleType: **LCS** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **162225** Analysis Date: **06/05/2012** Seq No: **4656344**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	4.865	0.50	5	0	97.3	56.3	135	0	0	0	
Aroclor 1260	5.319	0.50	5	0	106	62.6	135	0	0	0	
Surr: Decachlorobiphenyl	0.4840	0	0.5	0	96.8	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.4611	0	0.5	0	92.2	17.3	125	0	0	0	

Sample ID: **1206111-002DMS** Client ID: **MW-5** Units: **ug/L** Prep Date: **06/05/2012** Run No: **222596**
SampleType: **MS** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **162225** Analysis Date: **06/05/2012** Seq No: **4656355**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	4.048	0.50	5	0	81	33.8	140	0	0	0	
Aroclor 1260	5.193	0.50	5	0	104	33.3	140	0	0	0	
Surr: Decachlorobiphenyl	0.4452	0	0.5	0	89	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.1824	0	0.5	0	36.5	17.3	125	0	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162225**

Sample ID: **1206111-002DMSD** Client ID: **MW-5** Units: **ug/L** Prep Date: **06/05/2012** Run No: **222596**
SampleType: **MSD** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **162225** Analysis Date: **06/05/2012** Seq No: **4656357**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	4.951	0.50	5	0	99	33.8	140	4.048	20.1	19.2	R
Aroclor 1260	5.293	0.50	5	0	106	33.3	140	5.193	1.9	19.4	
Surr: Decachlorobiphenyl	0.4379	0	0.5	0	87.6	15.5	128	0.4452	0	0	
Surr: Tetrachloro-m-xylene	0.4424	0	0.5	0	88.5	17.3	125	0.1824	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162226

Sample ID: **MB-162226** Client ID: Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **MBLK** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4655859**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4´-DDD	BRL	0.10	0	0	0	0	0	0	0	0	
4,4´-DDE	BRL	0.10	0	0	0	0	0	0	0	0	
4,4´-DDT	BRL	0.10	0	0	0	0	0	0	0	0	
Aldrin	BRL	0.050	0	0	0	0	0	0	0	0	
alpha-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
alpha-Chlordane	BRL	0.050	0	0	0	0	0	0	0	0	
beta-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
delta-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
Dieldrin	BRL	0.10	0	0	0	0	0	0	0	0	
Endosulfan I	BRL	0.050	0	0	0	0	0	0	0	0	
Endosulfan II	BRL	0.10	0	0	0	0	0	0	0	0	
Endosulfan sulfate	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin aldehyde	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin ketone	BRL	0.10	0	0	0	0	0	0	0	0	
gamma-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
gamma-Chlordane	BRL	0.050	0	0	0	0	0	0	0	0	
Heptachlor	BRL	0.050	0	0	0	0	0	0	0	0	
Heptachlor epoxide	BRL	0.050	0	0	0	0	0	0	0	0	
Methoxychlor	BRL	0.50	0	0	0	0	0	0	0	0	
Toxaphene	BRL	5.0	0	0	0	0	0	0	0	0	
Surr: Decachlorobiphenyl	0.3570	0	0.5	0	71.4	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.3153	0	0.5	0	63.1	18.4	120	0	0	0	

Sample ID: **LCS-162226** Client ID: Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **LCS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4656057**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162226**

Sample ID: **LCS-162226** Client ID: Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **LCS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4656057**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4′-DDT	0.9004	0.10	1	0	90	53.1	133	0	0	0	
Aldrin	0.8575	0.050	1	0	85.7	42.4	114	0	0	0	
Dieldrin	0.9291	0.10	1	0	92.9	54.1	132	0	0	0	
Endrin	0.7773	0.10	1	0	77.7	53.7	136	0	0	0	
gamma-BHC	0.9368	0.050	1	0	93.7	44	133	0	0	0	
Heptachlor	0.8496	0.050	1	0	85	41.1	124	0	0	0	
Surr: Decachlorobiphenyl	0.3435	0	0.5	0	68.7	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.3573	0	0.5	0	71.5	18.4	120	0	0	0	

Sample ID: **1206111-001DMS** Client ID: **MW-3** Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **MS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4655891**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4′-DDT	0.9244	0.10	1	0	92.4	26.6	137	0	0	0	
Aldrin	0.7295	0.050	1	0	72.9	26.1	117	0	0	0	
Dieldrin	0.8403	0.10	1	0	84	38.5	135	0	0	0	
Endrin	0.8095	0.10	1	0	81	48.9	138	0	0	0	
gamma-BHC	0.7808	0.050	1	0	78.1	36.8	137	0	0	0	
Heptachlor	0.7408	0.050	1	0	74.1	33.2	123	0	0	0	
Surr: Decachlorobiphenyl	0.2586	0	0.5	0	51.7	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.2258	0	0.5	0	45.2	18.4	120	0	0	0	

Sample ID: **1206111-001DMSD** Client ID: **MW-3** Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **MSD** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4655895**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4′-DDT	0.8760	0.10	1	0	87.6	26.6	137	0.9244	5.37	37.8	
Aldrin	0.7936	0.050	1	0	79.4	26.1	117	0.7295	8.42	38.3	

Qualifiers:

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

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162226

Sample ID: **1206111-001DMSD** Client ID: **MW-3** Units: **ug/L** Prep Date: **06/05/2012** Run No: **222571**
SampleType: **MSD** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **162226** Analysis Date: **06/05/2012** Seq No: **4655895**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Dieldrin	0.8184	0.10	1	0	81.8	38.5	135	0.8403	2.64	25.2	
Endrin	0.7832	0.10	1	0	78.3	48.9	138	0.8095	3.3	28	
gamma-BHC	0.8429	0.050	1	0	84.3	36.8	137	0.7808	7.65	36.5	
Heptachlor	0.8174	0.050	1	0	81.7	33.2	123	0.7408	9.84	40.2	
Surr: Decachlorobiphenyl	0.2342	0	0.5	0	46.8	16.4	114	0.2586	0	0	
Surr: Tetrachloro-m-xylene	0.3350	0	0.5	0	67	18.4	120	0.2258	0	0	

Analytical Environmental Services, Inc

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162230

Sample ID: **MB-162230** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222505**
SampleType: **MBLK** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/04/2012** Seq No: **4654704**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	BRL	10	0	0	0	0	0	0	0	0	
2-Methylnaphthalene	BRL	10	0	0	0	0	0	0	0	0	
Acenaphthene	BRL	10	0	0	0	0	0	0	0	0	
Acenaphthylene	BRL	10	0	0	0	0	0	0	0	0	
Anthracene	BRL	10	0	0	0	0	0	0	0	0	
Benz(a)anthracene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(a)pyrene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(b)fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(g,h,i)perylene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(k)fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Chrysene	BRL	10	0	0	0	0	0	0	0	0	
Dibenz(a,h)anthracene	BRL	10	0	0	0	0	0	0	0	0	
Fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Fluorene	BRL	10	0	0	0	0	0	0	0	0	
Indeno(1,2,3-cd)pyrene	BRL	10	0	0	0	0	0	0	0	0	
Naphthalene	BRL	10	0	0	0	0	0	0	0	0	
Phenanthrene	BRL	10	0	0	0	0	0	0	0	0	
Pyrene	BRL	10	0	0	0	0	0	0	0	0	
Surr: 2-Fluorobiphenyl	36.73	0	50	0	73.5	41	120	0	0	0	
Surr: 4-Terphenyl-d14	48.84	0	50	0	97.7	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	35.82	0	50	0	71.6	30.3	122	0	0	0	

Sample ID: **LCS-162230** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222505**
SampleType: **LCS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/04/2012** Seq No: **4654708**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	36.01	10	50	0	72	53	120	0	0	0	
2-Methylnaphthalene	36.09	10	50	0	72.2	51.4	120	0	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162230**

Sample ID: **LCS-162230** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222505**
SampleType: **LCS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/04/2012** Seq No: **4654708**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Acenaphthene	34.79	10	50	0	69.6	49.2	120	0	0	0	
Acenaphthylene	40.69	10	50	0	81.4	55.3	118	0	0	0	
Anthracene	41.09	10	50	0	82.2	56.6	120	0	0	0	
Benz(a)anthracene	41.24	10	50	0	82.5	52.1	120	0	0	0	
Benzo(a)pyrene	40.99	10	50	0	82	57.4	120	0	0	0	
Benzo(b)fluoranthene	40.64	10	50	0	81.3	50.8	120	0	0	0	
Benzo(g,h,i)perylene	39.85	10	50	0	79.7	55	120	0	0	0	
Benzo(k)fluoranthene	41.94	10	50	0	83.9	52.7	120	0	0	0	
Chrysene	41.39	10	50	0	82.8	51.1	120	0	0	0	
Dibenz(a,h)anthracene	39.96	10	50	0	79.9	57.4	120	0	0	0	
Fluoranthene	43.76	10	50	0	87.5	60.3	115	0	0	0	
Fluorene	37.04	10	50	0	74.1	50.9	120	0	0	0	
Indeno(1,2,3-cd)pyrene	39.50	10	50	0	79	54.8	120	0	0	0	
Naphthalene	35.47	10	50	0	70.9	51.6	120	0	0	0	
Phenanthrene	41.58	10	50	0	83.2	55	120	0	0	0	
Pyrene	42.09	10	50	0	84.2	54.1	120	0	0	0	
Surr: 2-Fluorobiphenyl	40.66	0	50	0	81.3	41	120	0	0	0	
Surr: 4-Terphenyl-d14	53.81	0	50	0	108	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	36.70	0	50	0	73.4	30.3	122	0	0	0	

Sample ID: **1206136-004BMS** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222505**
SampleType: **MS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/04/2012** Seq No: **4655269**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	25.37	10	50	0	50.7	40.3	120	0	0	0	
2-Methylnaphthalene	24.45	10	50	0	48.9	40	120	0	0	0	
Acenaphthene	26.95	10	50	0	53.9	41.2	120	0	0	0	
Acenaphthylene	31.02	10	50	0	62	43.6	117	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162230**

Sample ID: **1206136-004BMS** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222505**
SampleType: **MS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/04/2012** Seq No: **4655269**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Anthracene	35.70	10	50	0	71.4	45.7	120	0	0	0	
Benz(a)anthracene	37.00	10	50	0	74	47.3	120	0	0	0	
Benzo(a)pyrene	35.80	10	50	0	71.6	47.9	120	0	0	0	
Benzo(b)fluoranthene	37.54	10	50	0	75.1	46.8	120	0	0	0	
Benzo(g,h,i)perylene	35.97	10	50	0	71.9	47.7	120	0	0	0	
Benzo(k)fluoranthene	35.28	10	50	0	70.6	47.6	120	0	0	0	
Chrysene	36.86	10	50	0	73.7	50.1	120	0	0	0	
Dibenz(a,h)anthracene	35.16	10	50	0	70.3	48.4	120	0	0	0	
Fluoranthene	39.34	10	50	0	78.7	50.7	121	0	0	0	
Fluorene	30.01	10	50	0	60	45.3	120	0	0	0	
Indeno(1,2,3-cd)pyrene	35.60	10	50	0	71.2	50.3	120	0	0	0	
Naphthalene	22.38	10	50	0	44.8	33.9	120	0	0	0	
Phenanthrene	35.13	10	50	0	70.3	50.5	120	0	0	0	
Pyrene	39.05	10	50	0	78.1	56.6	118	0	0	0	
Surr: 2-Fluorobiphenyl	25.08	0	50	0	50.2	41	120	0	0	0	
Surr: 4-Terphenyl-d14	43.01	0	50	0	86	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	21.14	0	50	0	42.3	30.3	122	0	0	0	

Sample ID: **1206136-004BMSD** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222575**
SampleType: **MSD** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/05/2012** Seq No: **4655960**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	26.85	10	50	0	53.7	40.3	120	25.37	5.67	36.8	
2-Methylnaphthalene	24.92	10	50	0	49.8	40	120	24.45	1.9	34.9	
Acenaphthene	25.87	10	50	0	51.7	41.2	120	26.95	4.09	29.6	
Acenaphthylene	30.60	10	50	0	61.2	43.6	117	31.02	1.36	31	
Anthracene	34.16	10	50	0	68.3	45.7	120	35.70	4.41	23.2	
Benz(a)anthracene	37.16	10	50	0	74.3	47.3	120	37.00	0.431	23.5	

Qualifiers:

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

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162230

Sample ID: **1206136-004BMSD** Client ID: Units: **ug/L** Prep Date: **06/04/2012** Run No: **222575**
SampleType: **MSD** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **162230** Analysis Date: **06/05/2012** Seq No: **4655960**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Benzo(a)pyrene	36.64	10	50	0	73.3	47.9	120	35.80	2.32	24.8	
Benzo(b)fluoranthene	37.13	10	50	0	74.3	46.8	120	37.54	1.1	25.1	
Benzo(g,h,i)perylene	37.40	10	50	0	74.8	47.7	120	35.97	3.9	21.9	
Benzo(k)fluoranthene	36.76	10	50	0	73.5	47.6	120	35.28	4.11	22.5	
Chrysene	36.31	10	50	0	72.6	50.1	120	36.86	1.5	23.3	
Dibenz(a,h)anthracene	38.05	10	50	0	76.1	48.4	120	35.16	7.9	23.7	
Fluoranthene	40.94	10	50	0	81.9	50.7	121	39.34	3.99	23.5	
Fluorene	29.62	10	50	0	59.2	45.3	120	30.01	1.31	27.3	
Indeno(1,2,3-cd)pyrene	37.47	10	50	0	74.9	50.3	120	35.60	5.12	23.7	
Naphthalene	22.39	10	50	0	44.8	33.9	120	22.38	0.045	39.2	
Phenanthrene	35.79	10	50	0	71.6	50.5	120	35.13	1.86	24.1	
Pyrene	40.00	10	50	0	80	56.6	118	39.05	2.4	20.2	
Surr: 2-Fluorobiphenyl	24.34	0	50	0	48.7	41	120	25.08	0	0	
Surr: 4-Terphenyl-d14	44.44	0	50	0	88.9	55.9	122	43.01	0	0	
Surr: Nitrobenzene-d5	22.66	0	50	0	45.3	30.3	122	21.14	0	0	

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

Analytical Environmental Services, Inc

Date: 18-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162237**

Sample ID: **MB-162237** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222561**
SampleType: **MBLK** TestCode: **METALS, TOTAL SW6010C** BatchID: **162237** Analysis Date: **06/05/2012** Seq No: **4655874**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	0.0500	0	0	0	0	0	0	0	0	
Barium	BRL	0.0200	0	0	0	0	0	0	0	0	
Cadmium	0.000429	0.0050	0	0	0	0	0	0	0	0	J
Chromium	BRL	0.0100	0	0	0	0	0	0	0	0	
Lead	BRL	0.0100	0	0	0	0	0	0	0	0	
Selenium	BRL	0.0200	0	0	0	0	0	0	0	0	
Silver	BRL	0.0100	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162237** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222561**
SampleType: **LCS** TestCode: **METALS, TOTAL SW6010C** BatchID: **162237** Analysis Date: **06/05/2012** Seq No: **4655873**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.041	0.0500	1	0	104	80	120	0	0	0	
Barium	1.047	0.0200	1	0	105	80	120	0	0	0	
Cadmium	1.045	0.0050	1	0.0004294	104	80	120	0	0	0	
Chromium	1.044	0.0100	1	0	104	80	120	0	0	0	
Lead	1.024	0.0100	1	0	102	80	120	0	0	0	
Selenium	1.033	0.0200	1	0	103	80	120	0	0	0	
Silver	0.1019	0.0100	0.1	0	102	80	120	0	0	0	

Sample ID: **1206005-001BMS** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222561**
SampleType: **MS** TestCode: **METALS, TOTAL SW6010C** BatchID: **162237** Analysis Date: **06/05/2012** Seq No: **4655876**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.048	0.0500	1	0	105	75	125	0	0	0	
Barium	1.058	0.0200	1	0.006445	105	75	125	0	0	0	
Cadmium	1.052	0.0050	1	0	105	75	125	0	0	0	
Chromium	1.053	0.0100	1	0	105	75	125	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162237

Sample ID: **1206005-001BMS** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222561**
SampleType: **MS** TestCode: **METALS, TOTAL SW6010C** BatchID: **162237** Analysis Date: **06/05/2012** Seq No: **4655876**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	1.024	0.0100	1	0	102	75	125	0	0	0	
Selenium	1.034	0.0200	1	0	103	75	125	0	0	0	
Silver	0.1024	0.0100	0.1	0	102	75	125	0	0	0	

Sample ID: **1206005-001BMSD** Client ID: Units: **mg/L** Prep Date: **06/04/2012** Run No: **222561**
SampleType: **MSD** TestCode: **METALS, TOTAL SW6010C** BatchID: **162237** Analysis Date: **06/05/2012** Seq No: **4655878**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.047	0.0500	1	0	105	75	125	1.048	0.157	20	
Barium	1.056	0.0200	1	0.006445	105	75	125	1.058	0.219	20	
Cadmium	1.048	0.0050	1	0	105	75	125	1.052	0.365	20	
Chromium	1.049	0.0100	1	0	105	75	125	1.053	0.348	20	
Lead	1.024	0.0100	1	0	102	75	125	1.024	0.03	20	
Selenium	1.040	0.0200	1	0	104	75	125	1.034	0.563	20	
Silver	0.1031	0.0100	0.1	0	103	75	125	0.1024	0.707	20	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: **162291**

Sample ID: **MB-162291** Client ID: Units: **mg/L** Prep Date: **06/05/2012** Run No: **222566**
SampleType: **MBLK** TestCode: **METALS, DISSOLVED** **SW6010C** BatchID: **162291** Analysis Date: **06/05/2012** Seq No: **4655939**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	0.0500	0	0	0	0	0	0	0	0	
Barium	BRL	0.0200	0	0	0	0	0	0	0	0	
Cadmium	0.000456	0.0050	0	0	0	0	0	0	0	0	J
Chromium	BRL	0.0100	0	0	0	0	0	0	0	0	
Lead	BRL	0.0100	0	0	0	0	0	0	0	0	
Selenium	BRL	0.0200	0	0	0	0	0	0	0	0	
Silver	BRL	0.0100	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162291** Client ID: Units: **mg/L** Prep Date: **06/05/2012** Run No: **222566**
SampleType: **LCS** TestCode: **METALS, DISSOLVED** **SW6010C** BatchID: **162291** Analysis Date: **06/05/2012** Seq No: **4655938**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.011	0.0500	1	0	101	80	120	0	0	0	
Barium	1.012	0.0200	1	0	101	80	120	0	0	0	
Cadmium	1.030	0.0050	1	0.0004558	103	80	120	0	0	0	
Chromium	0.9721	0.0100	1	0	97.2	80	120	0	0	0	
Lead	0.9929	0.0100	1	0	99.3	80	120	0	0	0	
Selenium	1.016	0.0200	1	0	102	80	120	0	0	0	
Silver	0.09882	0.0100	0.1	0	98.8	80	120	0	0	0	

Sample ID: **1206015-001AMS** Client ID: Units: **mg/L** Prep Date: **06/05/2012** Run No: **222566**
SampleType: **MS** TestCode: **METALS, DISSOLVED** **SW6010C** BatchID: **162291** Analysis Date: **06/05/2012** Seq No: **4655942**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.012	0.0500	1	0	101	75	125	0	0	0	
Barium	1.066	0.0200	1	0.06113	101	75	125	0	0	0	
Cadmium	1.024	0.0050	1	0	102	75	125	0	0	0	
Chromium	0.9736	0.0100	1	0	97.4	75	125	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206111

ANALYTICAL QC SUMMARY REPORT

BatchID: 162291

Sample ID: **1206015-001AMS** Client ID: Units: **mg/L** Prep Date: **06/05/2012** Run No: **222566**
SampleType: **MS** TestCode: **METALS, DISSOLVED** **SW6010C** BatchID: **162291** Analysis Date: **06/05/2012** Seq No: **4655942**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	0.9910	0.0100	1	0	99.1	75	125	0	0	0	
Selenium	1.019	0.0200	1	0	102	75	125	0	0	0	
Silver	0.09805	0.0100	0.1	0.0006513	97.4	75	125	0	0	0	

Sample ID: **1206015-001AMSD** Client ID: Units: **mg/L** Prep Date: **06/05/2012** Run No: **222566**
SampleType: **MSD** TestCode: **METALS, DISSOLVED** **SW6010C** BatchID: **162291** Analysis Date: **06/05/2012** Seq No: **4655944**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	1.006	0.0500	1	0	101	75	125	1.012	0.606	20	
Barium	1.059	0.0200	1	0.06113	99.8	75	125	1.066	0.737	20	
Cadmium	1.013	0.0050	1	0	101	75	125	1.024	1.04	20	
Chromium	0.9623	0.0100	1	0	96.2	75	125	0.9736	1.17	20	
Lead	0.9811	0.0100	1	0	98.1	75	125	0.9910	1	20	
Selenium	1.014	0.0200	1	0	101	75	125	1.019	0.499	20	
Silver	0.09723	0.0100	0.1	0.0006513	96.6	75	125	0.09805	0.832	20	

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

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

June 15, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1206540

Analytical Environmental Services, Inc. received 1 samples on 6/7/2012 2:50:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES' certifications are as follows:

-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/11-06/30/12.

-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

AES ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1206540

Date: 6/7/12 Page 1 of 1

COMPANY: AMEC

ADDRESS: 396 Plasters Ave
Atlanta GA

PHONE: 404 817 0153

FAX: 404 8170183

SAMPLED BY: Tyler Boyles

SIGNATURE:

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	ANALYSIS REQUESTED: Total RCRA Metals	Diss RCRA Metals												REMARKS	No # of Containers
							PRESERVATION (See codes): HNO3	NA													
1	MW-4	6/7/12	1310	X		GW	X	X													2
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	6/7/12 1450	1:	6/7/12 2:50
2:		2:	
3:		3:	

PROJECT INFORMATION

PROJECT NAME: 1071 Howell Mill

PROJECT #: 6121 120125

SITE ADDRESS: 1071 Howell Mill Rd

SEND REPORT TO: Tyler Boyles

INVOICE TO:
(IF DIFFERENT FROM ABOVE)

QUOTE #: PO#:

RECEIPT

Total # of Containers 2

Turnaround Time Request
- ○ Standard 5 Business Days
- ○ 2 Business Day Rush
- ☑ Next Business Day Rush
- ○ Same Day Rush (auth req.)
- ○ Other

STATE PROGRAM (if any):

E-mail? Y / N; Fax? Y / N

DATA PACKAGE: I II III IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES. SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab ID: 1206540

Case Narrative

Metals Analysis by Method 7470A_W_D:

Matrix spike and matrix spike duplicate analyses were not performed with Batch 162439 due to insufficient sample volume.

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-4
Project Name:	1071 Howell Mill Road	**Collection Date:**	6/7/2012 1:10:00 PM
Lab ID:	1206540-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
Total Metals by ICP/MS SW6020A					**(SW3005A)**			
Arsenic	BRL	5.00		ug/L	162409	1	06/08/2012 14:02	JY
Barium	62.4	10.0		ug/L	162409	1	06/08/2012 14:02	JY
Cadmium	BRL	0.700		ug/L	162409	1	06/08/2012 14:02	JY
Chromium	BRL	5.00		ug/L	162409	1	06/08/2012 14:02	JY
Lead	1.19	1.00		ug/L	162409	1	06/08/2012 14:02	JY
Selenium	BRL	5.00		ug/L	162409	1	06/08/2012 14:02	JY
Silver	BRL	1.00		ug/L	162409	1	06/08/2012 14:02	JY
Mercury, Total SW7470A					**(SW7470A)**			
Mercury	BRL	0.00020		mg/L	162440	1	06/08/2012 16:01	LD
Mercury, Dissolved SW7470A					**(SW7470A)**			
Mercury	BRL	0.00020		mg/L	162439	1	06/08/2012 15:40	LD
Dissolved Metals by ICP/MS SW6020A					**(SW3005A)**			
Arsenic	BRL	5.00		ug/L	162437	1	06/08/2012 09:18	JY
Barium	53.9	10.0		ug/L	162437	1	06/08/2012 09:18	JY
Cadmium	BRL	0.700		ug/L	162437	1	06/08/2012 09:18	JY
Chromium	BRL	5.00		ug/L	162437	1	06/08/2012 09:18	JY
Lead	BRL	1.00		ug/L	162437	1	06/08/2012 09:18	JY
Selenium	BRL	5.00		ug/L	162437	1	06/08/2012 09:18	JY
Silver	BRL	1.00		ug/L	162437	1	06/08/2012 09:18	JY

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client Amec

Work Order Number 1206540

Checklist completed by PT 6/7/12
Signature Date

Carrier name: FedEx __ UPS __ Courier __ [✓ Client] US Mail __ Other ______

Shipping container/cooler in good condition? [✓ Yes] No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ [✓ Not Present]

Custody seals intact on sample bottles? Yes __ No __ [✓ Not Present]

Container/Temp Blank temperature in compliance? (4°C±2)* [✓ Yes] No __

Cooler #1 3.5°C Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? [✓ Yes] No __

Chain of custody signed when relinquished and received? [✓ Yes] No __

Chain of custody agrees with sample labels? [✓ Yes] No __

Samples in proper container/bottle? [✓ Yes] No __

Sample containers intact? [✓ Yes] No __

Sufficient sample volume for indicated test? [✓ Yes] No __

All samples received within holding time? [✓ Yes] No __

Was TAT marked on the COC? [✓ Yes] No __

Proceed with Standard TAT as per project history? Yes __ No __ [✓ Not Applicable]

Water - VOA vials have zero headspace? [✓ No VOA vials submitted] Yes __ No __

Water - pH acceptable upon receipt? [✓ Yes] No __ Not Applicable __

Adjusted? ____________ Checked by PT

Sample Condition: [✓ Good] Other(Explain) ______________________

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No __

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Analytical Environmental Services, Inc

Date: 15-Jun-12

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab Order: 1206540

Dates Report

Lab Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
1206540-001A	MW-4	6/7/2012 1:10:00PM	Groundwater	Total Metals by ICP/MS		06/07/2012	06/08/2012
1206540-001A	MW-4	6/7/2012 1:10:00PM	Groundwater	TOTAL MERCURY		06/08/2012	06/08/2012
1206540-001B	MW-4	6/7/2012 1:10:00PM	Groundwater	Dissolved Metals by ICP/MS		06/08/2012	06/08/2012
1206540-001B	MW-4	6/7/2012 1:10:00PM	Groundwater	MERCURY, DISSOLVED		06/08/2012	06/08/2012

Date: 15-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: 162409

Sample ID: **MB-162409** Client ID: Units: **ug/L** Prep Date: **06/07/2012** Run No: **222849**
SampleType: **MBLK** TestCode: **Total Metals by ICP/MS SW6020A** BatchID: **162409** Analysis Date: **06/08/2012** Seq No: **4662051**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0	0	
Barium	BRL	10.0	0	0	0	0	0	0	0	0	
Cadmium	BRL	0.700	0	0	0	0	0	0	0	0	
Chromium	BRL	5.00	0	0	0	0	0	0	0	0	
Lead	BRL	1.00	0	0	0	0	0	0	0	0	
Selenium	BRL	5.00	0	0	0	0	0	0	0	0	
Silver	BRL	1.00	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162409** Client ID: Units: **ug/L** Prep Date: **06/07/2012** Run No: **222849**
SampleType: **LCS** TestCode: **Total Metals by ICP/MS SW6020A** BatchID: **162409** Analysis Date: **06/08/2012** Seq No: **4662049**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	99.40	5.00	100	0	99.4	80	120	0	0	0	
Barium	100.1	10.0	100	0	100	80	120	0	0	0	
Cadmium	102.0	0.700	100	0	102	80	120	0	0	0	
Chromium	99.40	5.00	100	0	99.4	80	120	0	0	0	
Lead	100.4	1.00	100	0	100	80	120	0	0	0	
Selenium	101.0	5.00	100	0	101	80	120	0	0	0	
Silver	9.848	1.00	10	0.03200	98.2	80	120	0	0	0	

Sample ID: **1206318-002AMS** Client ID: Units: **ug/L** Prep Date: **06/07/2012** Run No: **222849**
SampleType: **MS** TestCode: **Total Metals by ICP/MS SW6020A** BatchID: **162409** Analysis Date: **06/08/2012** Seq No: **4662058**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	98.58	5.00	100	0	98.6	75	125	0	0	0	
Barium	120.4	10.0	100	21.71	98.7	75	125	0	0	0	
Cadmium	101.1	0.700	100	0.1250	101	75	125	0	0	0	
Chromium	99.12	5.00	100	0.7390	98.4	75	125	0	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: **162409**

Sample ID: **1206318-002AMS** Client ID: Units: **ug/L** Prep Date: **06/07/2012** Run No: **222849**
SampleType: **MS** TestCode: **Total Metals by ICP/MS SW6020A** BatchID: **162409** Analysis Date: **06/08/2012** Seq No: **4662058**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	99.32	1.00	100	0	99.3	75	125	0	0	0	
Selenium	100.2	5.00	100	0	100	75	125	0	0	0	
Silver	9.680	1.00	10	0	96.8	75	125	0	0	0	

Sample ID: **1206318-002AMSD** Client ID: Units: **ug/L** Prep Date: **06/07/2012** Run No: **222849**
SampleType: **MSD** TestCode: **Total Metals by ICP/MS SW6020A** BatchID: **162409** Analysis Date: **06/08/2012** Seq No: **4662061**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	98.58	5.00	100	0	98.6	75	125	98.58	0	20	
Barium	121.0	10.0	100	21.71	99.3	75	125	120.4	0.497	20	
Cadmium	101.2	0.700	100	0.1250	101	75	125	101.1	0.099	20	
Chromium	99.47	5.00	100	0.7390	98.7	75	125	99.12	0.352	20	
Lead	99.32	1.00	100	0	99.3	75	125	99.32	0	20	
Selenium	100.3	5.00	100	0	100	75	125	100.2	0.1	20	
Silver	9.745	1.00	10	0	97.4	75	125	9.680	0.669	20	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: 162437

Sample ID: **MB-162437** Client ID: Units: **ug/L** Prep Date: **06/08/2012** Run No: **222797**
SampleType: **MBLK** TestCode: **Dissolved Metals by ICP/MS SW6020A** BatchID: **162437** Analysis Date: **06/08/2012** Seq No: **4661050**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0	0	
Barium	BRL	10.0	0	0	0	0	0	0	0	0	
Cadmium	BRL	0.700	0	0	0	0	0	0	0	0	
Chromium	BRL	5.00	0	0	0	0	0	0	0	0	
Lead	BRL	1.00	0	0	0	0	0	0	0	0	
Selenium	BRL	5.00	0	0	0	0	0	0	0	0	
Silver	BRL	1.00	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162437** Client ID: Units: **ug/L** Prep Date: **06/08/2012** Run No: **222797**
SampleType: **LCS** TestCode: **Dissolved Metals by ICP/MS SW6020A** BatchID: **162437** Analysis Date: **06/08/2012** Seq No: **4661049**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	101.7	5.00	100	0	102	80	120	0	0	0	
Barium	95.87	10.0	100	0	95.9	80	120	0	0	0	
Cadmium	98.71	0.700	100	0	98.7	80	120	0	0	0	
Chromium	99.48	5.00	100	0	99.5	80	120	0	0	0	
Lead	97.08	1.00	100	0	97.1	80	120	0	0	0	
Selenium	101.0	5.00	100	0	101	80	120	0	0	0	
Silver	9.827	1.00	10	0.02300	98	80	120	0	0	0	

Sample ID: **1206540-001BMS** Client ID: **MW-4** Units: **ug/L** Prep Date: **06/08/2012** Run No: **222797**
SampleType: **MS** TestCode: **Dissolved Metals by ICP/MS SW6020A** BatchID: **162437** Analysis Date: **06/08/2012** Seq No: **4661052**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	100.4	5.00	100	0	100	75	125	0	0	0	
Barium	147.6	10.0	100	53.93	93.7	75	125	0	0	0	
Cadmium	96.59	0.700	100	0.07200	96.5	75	125	0	0	0	
Chromium	95.85	5.00	100	0.6130	95.2	75	125	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: **162437**

Sample ID: **1206540-001BMS** Client ID: **MW-4** Units: **ug/L** Prep Date: **06/08/2012** Run No: **222797**
SampleType: **MS** TestCode: **Dissolved Metals by ICP/MS SW6020A** BatchID: **162437** Analysis Date: **06/08/2012** Seq No: **4661052**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	95.46	1.00	100	0	95.5	75	125	0	0	0	
Selenium	103.1	5.00	100	1.868	101	75	125	0	0	0	
Silver	9.434	1.00	10	0.01800	94.2	75	125	0	0	0	

Sample ID: **1206540-001BMSD** Client ID: **MW-4** Units: **ug/L** Prep Date: **06/08/2012** Run No: **222797**
SampleType: **MSD** TestCode: **Dissolved Metals by ICP/MS SW6020A** BatchID: **162437** Analysis Date: **06/08/2012** Seq No: **4661053**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	99.05	5.00	100	0	99	75	125	100.4	1.35	20	
Barium	147.4	10.0	100	53.93	93.5	75	125	147.6	0.136	20	
Cadmium	95.37	0.700	100	0.07200	95.3	75	125	96.59	1.27	20	
Chromium	94.34	5.00	100	0.6130	93.7	75	125	95.85	1.59	20	
Lead	94.18	1.00	100	0	94.2	75	125	95.46	1.35	20	
Selenium	101.7	5.00	100	1.868	99.8	75	125	103.1	1.37	20	
Silver	9.278	1.00	10	0.01800	92.6	75	125	9.434	1.67	20	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: **162439**

Sample ID: **MB-162439** Client ID: Units: **mg/L** Prep Date: **06/08/2012** Run No: **222840**
SampleType: **MBLK** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162439** Analysis Date: **06/08/2012** Seq No: **4661800**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.00020	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162439** Client ID: Units: **mg/L** Prep Date: **06/08/2012** Run No: **222840**
SampleType: **LCS** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162439** Analysis Date: **06/08/2012** Seq No: **4661815**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.004979	0.00020	0.005	0	99.6	85	115	0	0	0	

Sample ID: **LCSD-162439** Client ID: Units: **mg/L** Prep Date: **06/08/2012** Run No: **222840**
SampleType: **LCSD** TestCode: **Mercury, Dissolved SW7470A** BatchID: **162439** Analysis Date: **06/08/2012** Seq No: **4661816**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005154	0.00020	0.005	0	103	85	115	0.004979	3.46	20	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206540

ANALYTICAL QC SUMMARY REPORT

BatchID: **162440**

Sample ID: **MB-162440** Client ID: Units: **mg/L** Prep Date: **06/08/2012** Run No: **222855**
SampleType: **MBLK** TestCode: **Mercury, Total SW7470A** BatchID: **162440** Analysis Date: **06/08/2012** Seq No: **4662126**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.00020	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162440** Client ID: Units: **mg/L** Prep Date: **06/08/2012** Run No: **222855**
SampleType: **LCS** TestCode: **Mercury, Total SW7470A** BatchID: **162440** Analysis Date: **06/08/2012** Seq No: **4662131**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005162	0.00020	0.005	0	103	85	115	0	0	0	

Sample ID: **1206540-001AMS** Client ID: **MW-4** Units: **mg/L** Prep Date: **06/08/2012** Run No: **222855**
SampleType: **MS** TestCode: **Mercury, Total SW7470A** BatchID: **162440** Analysis Date: **06/08/2012** Seq No: **4662139**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005315	0.00020	0.005	0	106	70	130	0	0	0	

Sample ID: **1206540-001AMSD** Client ID: **MW-4** Units: **mg/L** Prep Date: **06/08/2012** Run No: **222855**
SampleType: **MSD** TestCode: **Mercury, Total SW7470A** BatchID: **162440** Analysis Date: **06/08/2012** Seq No: **4662143**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.005146	0.00020	0.005	0	103	70	130	0.005315	3.23	20	

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

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

June 14, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1206541

Analytical Environmental Services, Inc. received 1 samples on 6/7/2012 2:50:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES' certifications are as follows:

-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/11-06/30/12.

-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
AES TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1206541

Date: 6/7/12 Page 1 of 1

COMPANY: Amec

ADDRESS: 596 Plaster Ave
Atlanta GA

PHONE: 404 817 0153

FAX: 404 817 0183

SAMPLED BY: Tyler Boyle

SIGNATURE:

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	ANALYSIS REQUESTED: RCRA Metals PRESERVATION (See codes): NA	REMARKS	No # of Containers
1	SS- NE Slope	6/6/12	1506	X		SO	X		1
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									

Visit our website **www.aesatlanta.com** to check on the status of your results, place bottle orders, etc.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	6/7/12 1450	1:	6/7/12 2:50
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER

PROJECT INFORMATION

PROJECT NAME:

PROJECT #:

SITE ADDRESS:

SEND REPORT TO:

INVOICE TO:
(IF DIFFERENT FROM ABOVE)

QUOTE #: PO#:

RECEIPT

Total # of Containers: 1

Turnaround Time Request
☒ Standard 5 Business Days
○ 2 Business Day Rush
○ Next Business Day Rush
○ Same Day Rush (auth req.)
○ Other

STATE PROGRAM (if any):
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES. SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc **Date:** 14-Jun-12

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab ID: 1206541

Case Narrative

The project name was taken from sample container.

Analytical Environmental Services, Inc **Date:** 14-Jun-12

Client:	AMEC E&I, Inc.		**Client Sample ID:**	SS-NE SLOPE
Project Name:	1071 Howell Mill Road		**Collection Date:**	6/6/2012 3:06:00 PM
Lab ID:	1206541-001		**Matrix:**	Soil

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TOTAL MERCURY SW7471B				**(SW7471B)**				
Mercury	0.399	0.132		mg/Kg-dry	162556	1	06/12/2012 13:42	LD
METALS, TOTAL SW6010C				**(SW3050B)**				
Arsenic	BRL	6.53		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Barium	90.0	6.53		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Cadmium	BRL	3.27		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Chromium	30.4	3.27		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Lead	373	6.53		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Selenium	BRL	6.53		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
Silver	BRL	3.27		mg/Kg-dry	162506	1	06/11/2012 22:22	TA
PERCENT MOISTURE D2216								
Percent Moisture	24.2	0		wt%	R223144	1	06/13/2012 11:00	AS

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client Amec

Work Order Number 1206541

Checklist completed by ____________ 6/7/12
Signature Date

Carrier name: FedEx __ UPS __ Courier __ [✓ Client] __ US Mail __ Other ________

Shipping container/cooler in good condition? [✓ Yes] __ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ [✓ Not Present] __

Custody seals intact on sample bottles? Yes __ No __ [✓ Not Present] __

Container/Temp Blank temperature in compliance? (4°C±2)* [✓ Yes] __ No __

Cooler #1 3.5°C Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? [✓ Yes] __ No __

Chain of custody signed when relinquished and received? [✓ Yes] __ No __

Chain of custody agrees with sample labels? [✓ Yes] __ No __

Samples in proper container/bottle? [✓ Yes] __ No __

Sample containers intact? [✓ Yes] __ No __

Sufficient sample volume for indicated test? [✓ Yes] __ No __

All samples received within holding time? [✓ Yes] __ No __

Was TAT marked on the COC? [✓ Yes] __ No __

Proceed with Standard TAT as per project history? Yes __ No __ [✓ Not Applicable] __

Water - VOA vials have zero headspace? [✓ No VOA vials submitted] __ Yes __ No __

Water - pH acceptable upon receipt? Yes __ No __ [✓ Not Applicable] __

Adjusted? ____________ Checked by ____________

Sample Condition: [✓ Good] __ Other(Explain) ______________________

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ [✓ No] __

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Analytical Environmental Services, Inc

Date: 14-Jun-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206541

ANALYTICAL QC SUMMARY REPORT

BatchID: **162506**

Sample ID: **MB-162506** Client ID: Units: **mg/Kg** Prep Date: **06/11/2012** Run No: **222999**
SampleType: **MBLK** TestCode: **METALS, TOTAL SW6010C** BatchID: **162506** Analysis Date: **06/11/2012** Seq No: **4665295**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0	0	
Barium	BRL	5.00	0	0	0	0	0	0	0	0	
Cadmium	BRL	2.50	0	0	0	0	0	0	0	0	
Chromium	BRL	2.50	0	0	0	0	0	0	0	0	
Lead	BRL	5.00	0	0	0	0	0	0	0	0	
Selenium	BRL	5.00	0	0	0	0	0	0	0	0	
Silver	BRL	2.50	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162506** Client ID: Units: **mg/Kg** Prep Date: **06/11/2012** Run No: **222999**
SampleType: **LCS** TestCode: **METALS, TOTAL SW6010C** BatchID: **162506** Analysis Date: **06/11/2012** Seq No: **4665294**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	47.25	5.00	50	0.2483	94	80	120	0	0	0	
Barium	46.32	5.00	50	0.8107	91	80	120	0	0	0	
Cadmium	46.39	2.50	50	0	92.8	80	120	0	0	0	
Chromium	48.00	2.50	50	0.06731	95.9	80	120	0	0	0	
Lead	46.42	5.00	50	0.1214	92.6	80	120	0	0	0	
Selenium	47.17	5.00	50	0.2438	93.8	80	120	0	0	0	
Silver	4.588	2.50	5	0	91.8	80	120	0	0	0	

Sample ID: **1206541-001AMS** Client ID: **SS-NE SLOPE** Units: **mg/Kg-dry** Prep Date: **06/11/2012** Run No: **222999**
SampleType: **MS** TestCode: **METALS, TOTAL SW6010C** BatchID: **162506** Analysis Date: **06/11/2012** Seq No: **4665297**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	63.32	6.54	65.39	5.435	88.5	75	125	0	0	0	
Barium	161.5	6.54	65.39	89.96	109	75	125	0	0	0	
Cadmium	59.60	3.27	65.39	2.121	87.9	75	125	0	0	0	
Chromium	92.12	3.27	65.39	30.35	94.5	75	125	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206541

ANALYTICAL QC SUMMARY REPORT

BatchID: **162506**

Sample ID: **1206541-001AMS** Client ID: **SS-NE SLOPE** Units: **mg/Kg-dry** Prep Date: **06/11/2012** Run No: **222999**
SampleType: **MS** TestCode: **METALS, TOTAL** **SW6010C** BatchID: **162506** Analysis Date: **06/11/2012** Seq No: **4665297**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Lead	484.7	6.54	65.39	372.6	172	75	125	0	0	0	S
Selenium	56.56	6.54	65.39	0	86.5	75	125	0	0	0	
Silver	6.422	3.27	6.539	0.7789	86.3	75	125	0	0	0	

Sample ID: **1206541-001AMSD** Client ID: **SS-NE SLOPE** Units: **mg/Kg-dry** Prep Date: **06/11/2012** Run No: **222999**
SampleType: **MSD** TestCode: **METALS, TOTAL** **SW6010C** BatchID: **162506** Analysis Date: **06/11/2012** Seq No: **4665298**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Arsenic	64.69	6.57	65.72	5.435	90.2	75	125	63.32	2.14	20	
Barium	152.6	6.57	65.72	89.96	95.4	75	125	161.5	5.63	20	
Cadmium	60.70	3.29	65.72	2.121	89.1	75	125	59.60	1.83	20	
Chromium	92.94	3.29	65.72	30.35	95.2	75	125	92.12	0.881	20	
Lead	459.5	6.57	65.72	372.6	132	75	125	484.7	5.34	20	S
Selenium	58.22	6.57	65.72	0	88.6	75	125	56.56	2.89	20	
Silver	6.657	3.29	6.572	0.7789	89.4	75	125	6.422	3.6	20	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1206541

ANALYTICAL QC SUMMARY REPORT

BatchID: **162556**

Sample ID: **MB-162556** Client ID: Units: **mg/Kg** Prep Date: **06/12/2012** Run No: **223022**
SampleType: **MBLK** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162556** Analysis Date: **06/12/2012** Seq No: **4665527**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	BRL	0.100	0	0	0	0	0	0	0	0	

Sample ID: **LCS-162556** Client ID: Units: **mg/Kg** Prep Date: **06/12/2012** Run No: **223022**
SampleType: **LCS** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162556** Analysis Date: **06/12/2012** Seq No: **4665532**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.4219	0.100	0.4	0	105	80	120	0	0	0	

Sample ID: **1206685-001DMS** Client ID: Units: **mg/Kg-dry** Prep Date: **06/12/2012** Run No: **223022**
SampleType: **MS** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162556** Analysis Date: **06/12/2012** Seq No: **4665537**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.5077	0.111	0.4459	0.05498	102	70	130	0	0	0	

Sample ID: **1206685-001DMSD** Client ID: Units: **mg/Kg-dry** Prep Date: **06/12/2012** Run No: **223022**
SampleType: **MSD** TestCode: **TOTAL MERCURY SW7471B** BatchID: **162556** Analysis Date: **06/12/2012** Seq No: **4665540**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Mercury	0.5160	0.111	0.4459	0.05498	103	70	130	0.5077	1.61	30	

Qualifiers:

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

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

July 13, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1207165

Analytical Environmental Services, Inc. received 2 samples on July 3, 2012 4:42 pm for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/12-06/30/13.
-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

AES ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1207165
Date: 7/3/12 Page 1 of 1

COMPANY: AMEc
ADDRESS: 396 Plasters Ave Atlanta GA
PHONE: 404 817 0153
FAX: 404 817 0183
SAMPLED BY: Tyler Boyles
SIGNATURE:

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

ANALYSIS REQUESTED

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	PCBs	PAHs	Pesticides	VOCs	REMARKS	No # of Containers
						PRESERVATION (See codes)	NA	NA	NA	HCl		
1	MW-1R	7/3/12	1600	X		GW	X	X	X	X		8
2	TRIP Blank									X		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	7/3/12 1642	1:	7/3/12 4:42
2:		2:	
3:		3:	

PROJECT INFORMATION

PROJECT NAME: 1071 Howell Mill
PROJECT #: 6124 12-0151
SITE ADDRESS: 1071 Howell Mill
SEND REPORT TO: Tyler Boyles & Chuck Ferry
INVOICE TO: (IF DIFFERENT FROM ABOVE)
QUOTE #: PO#:

RECEIPT
Total # of Containers: 8

Turnaround Time Request
- ● Standard 5 Business Days
- ○ 2 Business Day Rush
- ○ Next Business Day Rush
- ○ Same Day Rush **(auth req.)**
- ○ Other

STATE PROGRAM (if any):
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT VIA:
IN VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES.
SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water
PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc

Date: 13-Jul-12

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-1R
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/3/2012 4:00:00 PM
Lab ID:	1207165-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B					**(SW5030B)**			
1,1,1-Trichloroethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,1,2-Trichloroethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,1-Dichloroethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,1-Dichloroethene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2-Dibromoethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2-Dichloroethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,2-Dichloropropane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,3-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
1,4-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
2-Butanone	BRL	50		ug/L	163604	1	07/07/2012 04:29	NP
2-Hexanone	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
4-Methyl-2-pentanone	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
Acetone	BRL	50		ug/L	163604	1	07/07/2012 04:29	NP
Benzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Bromodichloromethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Bromoform	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Bromomethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Carbon disulfide	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Carbon tetrachloride	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Chlorobenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Chloroethane	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
Chloroform	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Chloromethane	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
cis-1,2-Dichloroethene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
cis-1,3-Dichloropropene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Cyclohexane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Dibromochloromethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Dichlorodifluoromethane	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
Ethylbenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Freon-113	BRL	10		ug/L	163604	1	07/07/2012 04:29	NP
Isopropylbenzene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
m,p-Xylene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Methyl acetate	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Methyl tert-butyl ether	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Methylcyclohexane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Methylene chloride	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
o-Xylene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-1R
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/3/2012 4:00:00 PM
Lab ID:	1207165-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Tetrachloroethene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Toluene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
trans-1,2-Dichloroethene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
trans-1,3-Dichloropropene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Trichloroethene	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Trichlorofluoromethane	BRL	5.0		ug/L	163604	1	07/07/2012 04:29	NP
Vinyl chloride	BRL	2.0		ug/L	163604	1	07/07/2012 04:29	NP
Surr: 4-Bromofluorobenzene	89.4	67.4-123		%REC	163604	1	07/07/2012 04:29	NP
Surr: Dibromofluoromethane	89.2	75.5-128		%REC	163604	1	07/07/2012 04:29	NP
Surr: Toluene-d8	92.1	70-120		%REC	163604	1	07/07/2012 04:29	NP
POLYCHLORINATED BIPHENYLS SW8082A				**(SW3510C)**				
Aroclor 1016	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1221	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1232	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1242	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1248	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1254	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Aroclor 1260	BRL	0.50		ug/L	163357	1	07/05/2012 17:10	SN
Surr: Decachlorobiphenyl	32.9	15.5-128		%REC	163357	1	07/05/2012 17:10	SN
Surr: Tetrachloro-m-xylene	51	17.3-125		%REC	163357	1	07/05/2012 17:10	SN
POLYAROMATIC HYDROCARBONS SW8270D				**(SW3535A)**				
Naphthalene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Acenaphthylene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
1-Methylnaphthalene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
2-Methylnaphthalene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Acenaphthene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Fluorene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Phenanthrene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Anthracene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Fluoranthene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Pyrene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Benz(a)anthracene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Chrysene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Benzo(b)fluoranthene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Benzo(k)fluoranthene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Benzo(a)pyrene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Dibenz(a,h)anthracene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Benzo(g,h,i)perylene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI

Qualifiers:

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-1R
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/3/2012 4:00:00 PM
Lab ID:	1207165-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
POLYAROMATIC HYDROCARBONS SW8270D				**(SW3535A)**				
Indeno(1,2,3-cd)pyrene	BRL	10		ug/L	163638	1	07/11/2012 15:14	EI
Surr: Nitrobenzene-d5	59.5	30.3-122		%REC	163638	1	07/11/2012 15:14	EI
Surr: 2-Fluorobiphenyl	56.5	41-120		%REC	163638	1	07/11/2012 15:14	EI
Surr: 4-Terphenyl-d14	70.6	55.9-122		%REC	163638	1	07/11/2012 15:14	EI
CHLORINATED PESTICIDES, TCL SW8081B				**(SW3510C)**				
4,4´-DDD	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
4,4´-DDE	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
4,4´-DDT	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Aldrin	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
alpha-BHC	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
alpha-Chlordane	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
beta-BHC	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
delta-BHC	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
Dieldrin	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Endosulfan I	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
Endosulfan II	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Endosulfan sulfate	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Endrin	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Endrin aldehyde	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
Endrin ketone	BRL	0.10		ug/L	163463	1	07/05/2012 20:35	KD
gamma-BHC	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
gamma-Chlordane	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
Heptachlor	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
Heptachlor epoxide	BRL	0.050		ug/L	163463	1	07/05/2012 20:35	KD
Methoxychlor	BRL	0.50		ug/L	163463	1	07/05/2012 20:35	KD
Toxaphene	BRL	5.0		ug/L	163463	1	07/05/2012 20:35	KD
Surr: Decachlorobiphenyl	24.9	16.4-114		%REC	163463	1	07/05/2012 20:35	KD
Surr: Tetrachloro-m-xylene	46.5	18.4-120		%REC	163463	1	07/05/2012 20:35	KD

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

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Analytical Environmental Services, Inc **Date:** 13-Jul-12

Client:	AMEC E&I, Inc.	**Client Sample ID:**	TRIP BLANK
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/3/2012
Lab ID:	1207165-002	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,1,2-Trichloroethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,1-Dichloroethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,1-Dichloroethene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2-Dibromoethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2-Dichloroethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,2-Dichloropropane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,3-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
1,4-Dichlorobenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
2-Butanone	BRL	50		ug/L	163604	1	07/06/2012 19:52	NP
2-Hexanone	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
4-Methyl-2-pentanone	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
Acetone	BRL	50		ug/L	163604	1	07/06/2012 19:52	NP
Benzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Bromodichloromethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Bromoform	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Bromomethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Carbon disulfide	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Carbon tetrachloride	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Chlorobenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Chloroethane	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
Chloroform	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Chloromethane	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
cis-1,2-Dichloroethene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
cis-1,3-Dichloropropene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Cyclohexane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Dibromochloromethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Dichlorodifluoromethane	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
Ethylbenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Freon-113	BRL	10		ug/L	163604	1	07/06/2012 19:52	NP
Isopropylbenzene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
m,p-Xylene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Methyl acetate	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Methyl tert-butyl ether	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Methylcyclohexane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Methylene chloride	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
o-Xylene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP

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

Client:	AMEC E&I, Inc.	**Client Sample ID:**	TRIP BLANK
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/3/2012
Lab ID:	1207165-002	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Tetrachloroethene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Toluene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
trans-1,2-Dichloroethene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
trans-1,3-Dichloropropene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Trichloroethene	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Trichlorofluoromethane	BRL	5.0		ug/L	163604	1	07/06/2012 19:52	NP
Vinyl chloride	BRL	2.0		ug/L	163604	1	07/06/2012 19:52	NP
Surr: 4-Bromofluorobenzene	80.3	67.4-123		%REC	163604	1	07/06/2012 19:52	NP
Surr: Dibromofluoromethane	110	75.5-128		%REC	163604	1	07/06/2012 19:52	NP
Surr: Toluene-d8	91.1	70-120		%REC	163604	1	07/06/2012 19:52	NP

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client AMEC

Work Order Number 1207165

Checklist completed by ______ 07/03/2012
Signature Date

Carrier name: FedEx __ UPS __ Courier __ [✓ Client] US Mail __ Other ______

Shipping container/cooler in good condition? [✓ Yes] No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ [✓ Not Present]

Custody seals intact on sample bottles? Yes __ No __ [✓ Not Present]

Container/Temp Blank temperature in compliance? (4°C±2)* [✓ Yes] No __

Cooler #1 3.7 Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? [✓ Yes] No __

Chain of custody signed when relinquished and received? [✓ Yes] No __

Chain of custody agrees with sample labels? [✓ Yes] No __

Samples in proper container/bottle? [✓ Yes] No __

Sample containers intact? [✓ Yes] No __

Sufficient sample volume for indicated test? [✓ Yes] No __

All samples received within holding time? [✓ Yes] No __

Was TAT marked on the COC? [✓ Yes] No __

Proceed with Standard TAT as per project history? Yes __ No __ [✓ Not Applicable]

Water - VOA vials have zero headspace? No VOA vials submitted __ [✓ Yes] No __

Water - pH acceptable upon receipt? [✓ Yes] No __ Not Applicable __

Adjusted? ______ Checked by ______

Sample Condition: [✓ Good] Other(Explain) ______

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ [✓ No]

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab Order: 1207165

Dates Report

Lab Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
1207165-001A	MW-1R	7/3/2012 4:00:00PM	Groundwater	TCL VOLATILE ORGANICS		07/06/2012	07/07/2012
1207165-001B	MW-1R	7/3/2012 4:00:00PM	Groundwater	TCL-CHLORINATED PESTICIDES		07/05/2012	07/05/2012
1207165-001B	MW-1R	7/3/2012 4:00:00PM	Groundwater	POLYCHLORINATED BIPHENYLS		07/05/2012	07/05/2012
1207165-001B	MW-1R	7/3/2012 4:00:00PM	Groundwater	POLYNUCLEAR AROMATIC HYDROCARBONS		07/09/2012	07/11/2012
1207165-002A	TRIP BLANK	7/3/2012 12:00:00AM	Aqueous	TCL VOLATILE ORGANICS		07/06/2012	07/06/2012

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: 163357

Sample ID: **MB-163357** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224506**
SampleType: **MBLK** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **163357** Analysis Date: **07/05/2012** Seq No: **4697237**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1221	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1232	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1242	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1248	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1254	BRL	0.50	0	0	0	0	0	0	0	0	
Aroclor 1260	BRL	0.50	0	0	0	0	0	0	0	0	
Surr: Decachlorobiphenyl	0.4614	0	0.5	0	92.3	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.4582	0	0.5	0	91.6	17.3	125	0	0	0	

Sample ID: **LCS-163357** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224506**
SampleType: **LCS** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **163357** Analysis Date: **07/05/2012** Seq No: **4697244**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	3.863	0.50	5	0	77.3	56.3	135	0	0	0	
Aroclor 1260	4.063	0.50	5	0	81.3	62.6	135	0	0	0	
Surr: Decachlorobiphenyl	0.4625	0	0.5	0	92.5	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.4253	0	0.5	0	85.1	17.3	125	0	0	0	

Sample ID: **1206P02-001AMS** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224506**
SampleType: **MS** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **163357** Analysis Date: **07/05/2012** Seq No: **4697275**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	4.566	0.50	5	0	91.3	33.8	140	0	0	0	
Aroclor 1260	4.561	0.50	5	0	91.2	33.3	140	0	0	0	
Surr: Decachlorobiphenyl	0.4288	0	0.5	0	85.8	15.5	128	0	0	0	
Surr: Tetrachloro-m-xylene	0.4445	0	0.5	0	88.9	17.3	125	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163357**

Sample ID: **1206P02-001AMSD** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224506**
SampleType: **MSD** TestCode: **POLYCHLORINATED BIPHENYLS SW8082A** BatchID: **163357** Analysis Date: **07/05/2012** Seq No: **4697278**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Aroclor 1016	4.215	0.50	5	0	84.3	33.8	140	4.566	7.99	19.2	
Aroclor 1260	4.289	0.50	5	0	85.8	33.3	140	4.561	6.15	19.4	
Surr: Decachlorobiphenyl	0.4122	0	0.5	0	82.4	15.5	128	0.4288	0	0	
Surr: Tetrachloro-m-xylene	0.4208	0	0.5	0	84.2	17.3	125	0.4445	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163463**

Sample ID: **MB-163463** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **MBLK** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699831**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4´-DDD	BRL	0.10	0	0	0	0	0	0	0	0	
4,4´-DDE	BRL	0.10	0	0	0	0	0	0	0	0	
4,4´-DDT	BRL	0.10	0	0	0	0	0	0	0	0	
Aldrin	BRL	0.050	0	0	0	0	0	0	0	0	
alpha-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
alpha-Chlordane	BRL	0.050	0	0	0	0	0	0	0	0	
beta-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
delta-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
Dieldrin	BRL	0.10	0	0	0	0	0	0	0	0	
Endosulfan I	BRL	0.050	0	0	0	0	0	0	0	0	
Endosulfan II	BRL	0.10	0	0	0	0	0	0	0	0	
Endosulfan sulfate	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin aldehyde	BRL	0.10	0	0	0	0	0	0	0	0	
Endrin ketone	BRL	0.10	0	0	0	0	0	0	0	0	
gamma-BHC	BRL	0.050	0	0	0	0	0	0	0	0	
gamma-Chlordane	BRL	0.050	0	0	0	0	0	0	0	0	
Heptachlor	BRL	0.050	0	0	0	0	0	0	0	0	
Heptachlor epoxide	BRL	0.050	0	0	0	0	0	0	0	0	
Methoxychlor	BRL	0.50	0	0	0	0	0	0	0	0	
Toxaphene	BRL	5.0	0	0	0	0	0	0	0	0	
Surr: Decachlorobiphenyl	0.3304	0	0.5	0	66.1	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.3695	0	0.5	0	73.9	18.4	120	0	0	0	

Sample ID: **LCS-163463** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **LCS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699834**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: 163463

Sample ID: **LCS-163463** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **LCS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699834**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4´-DDT	0.8382	0.10	1	0	83.8	53.1	133	0	0	0	
Aldrin	0.7280	0.050	1	0	72.8	42.4	114	0	0	0	
Dieldrin	0.8426	0.10	1	0	84.3	54.1	132	0	0	0	
Endrin	0.8465	0.10	1	0	84.7	53.7	136	0	0	0	
gamma-BHC	0.8101	0.050	1	0	81	44	133	0	0	0	
Heptachlor	0.7568	0.050	1	0	75.7	41.1	124	0	0	0	
Surr: Decachlorobiphenyl	0.3647	0	0.5	0	72.9	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.3582	0	0.5	0	71.6	18.4	120	0	0	0	

Sample ID: **1206O99-018FMS** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **MS** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699850**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4´-DDT	0.8480	0.10	1	0	84.8	26.6	137	0	0	0	
Aldrin	0.7017	0.050	1	0	70.2	26.1	117	0	0	0	
Dieldrin	0.8415	0.10	1	0	84.1	38.5	135	0	0	0	
Endrin	0.8481	0.10	1	0	84.8	48.9	138	0	0	0	
gamma-BHC	0.7546	0.050	1	0	75.5	36.8	137	0	0	0	
Heptachlor	0.7102	0.050	1	0	71	33.2	123	0	0	0	
Surr: Decachlorobiphenyl	0.3242	0	0.5	0	64.8	16.4	114	0	0	0	
Surr: Tetrachloro-m-xylene	0.2862	0	0.5	0	57.2	18.4	120	0	0	0	

Sample ID: **1206O99-018FMSD** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **MSD** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699859**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
4,4´-DDT	0.8207	0.10	1	0	82.1	26.6	137	0.8480	3.27	37.8	
Aldrin	0.6659	0.050	1	0	66.6	26.1	117	0.7017	5.24	38.3	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163463**

Sample ID: **1206O99-018FMSD** Client ID: Units: **ug/L** Prep Date: **07/05/2012** Run No: **224596**
SampleType: **MSD** TestCode: **CHLORINATED PESTICIDES, TCL SW8081B** BatchID: **163463** Analysis Date: **07/05/2012** Seq No: **4699859**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Dieldrin	0.8253	0.10	1	0	82.5	38.5	135	0.8415	1.94	25.2	
Endrin	0.8224	0.10	1	0	82.2	48.9	138	0.8481	3.08	28	
gamma-BHC	0.7591	0.050	1	0	75.9	36.8	137	0.7546	0.596	36.5	
Heptachlor	0.6964	0.050	1	0	69.6	33.2	123	0.7102	1.96	40.2	
Surr: Decachlorobiphenyl	0.3418	0	0.5	0	68.4	16.4	114	0.3242	0	0	
Surr: Tetrachloro-m-xylene	0.2931	0	0.5	0	58.6	18.4	120	0.2862	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163604**

Sample ID: **MB-163604** Client ID: Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700505**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2,2-Tetrachloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1,2-Trichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,1-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2,4-Trichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromo-3-chloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dibromoethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloroethane	BRL	5.0	0	0	0	0	0	0	0	0	
1,2-Dichloropropane	BRL	5.0	0	0	0	0	0	0	0	0	
1,3-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
1,4-Dichlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
2-Butanone	BRL	50	0	0	0	0	0	0	0	0	
2-Hexanone	BRL	10	0	0	0	0	0	0	0	0	
4-Methyl-2-pentanone	BRL	10	0	0	0	0	0	0	0	0	
Acetone	BRL	50	0	0	0	0	0	0	0	0	
Benzene	BRL	5.0	0	0	0	0	0	0	0	0	
Bromodichloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Bromoform	BRL	5.0	0	0	0	0	0	0	0	0	
Bromomethane	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon disulfide	BRL	5.0	0	0	0	0	0	0	0	0	
Carbon tetrachloride	BRL	5.0	0	0	0	0	0	0	0	0	
Chlorobenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Chloroethane	BRL	10	0	0	0	0	0	0	0	0	
Chloroform	BRL	5.0	0	0	0	0	0	0	0	0	
Chloromethane	BRL	10	0	0	0	0	0	0	0	0	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163604**

Sample ID: **MB-163604** Client ID: Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700505**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
cis-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
cis-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Cyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Dibromochloromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Dichlorodifluoromethane	BRL	10	0	0	0	0	0	0	0	0	
Ethylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
Freon-113	BRL	10	0	0	0	0	0	0	0	0	
Isopropylbenzene	BRL	5.0	0	0	0	0	0	0	0	0	
m,p-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl acetate	BRL	5.0	0	0	0	0	0	0	0	0	
Methyl tert-butyl ether	BRL	5.0	0	0	0	0	0	0	0	0	
Methylcyclohexane	BRL	5.0	0	0	0	0	0	0	0	0	
Methylene chloride	BRL	5.0	0	0	0	0	0	0	0	0	
o-Xylene	BRL	5.0	0	0	0	0	0	0	0	0	
Styrene	BRL	5.0	0	0	0	0	0	0	0	0	
Tetrachloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Toluene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,2-Dichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
trans-1,3-Dichloropropene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichloroethene	BRL	5.0	0	0	0	0	0	0	0	0	
Trichlorofluoromethane	BRL	5.0	0	0	0	0	0	0	0	0	
Vinyl chloride	BRL	2.0	0	0	0	0	0	0	0	0	
Surr: 4-Bromofluorobenzene	42.33	0	50	0	84.7	67.4	123	0	0	0	
Surr: Dibromofluoromethane	52.15	0	50	0	104	75.5	128	0	0	0	
Surr: Toluene-d8	48.33	0	50	0	96.7	70	120	0	0	0	

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

Date: 16-Jul-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163604**

Sample ID: **LCS-163604** Client ID: Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **LCS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700501**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	59.36	5.0	50	0	119	60	140	0	0	0	
Benzene	58.77	5.0	50	0	118	70	130	0	0	0	
Chlorobenzene	50.42	5.0	50	0	101	70	130	0	0	0	
Toluene	58.36	5.0	50	0	117	70	130	0	0	0	
Trichloroethene	47.25	5.0	50	0	94.5	70	130	0	0	0	
Surr: 4-Bromofluorobenzene	54.26	0	50	0	109	67.4	123	0	0	0	
Surr: Dibromofluoromethane	50.17	0	50	0	100	75.5	128	0	0	0	
Surr: Toluene-d8	48.92	0	50	0	97.8	70	120	0	0	0	

Sample ID: **1207165-001AMS** Client ID: **MW-1R** Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **MS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700502**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	592.1	50	500	0	118	50.1	179	0	0	0	
Benzene	577.6	50	500	0	116	61.2	150	0	0	0	
Chlorobenzene	485.1	50	500	0	97	72.1	140	0	0	0	
Toluene	570.7	50	500	0	114	58.7	154	0	0	0	
Trichloroethene	478.2	50	500	0	95.6	68.3	149	0	0	0	
Surr: 4-Bromofluorobenzene	542.5	0	500	0	108	67.4	123	0	0	0	
Surr: Dibromofluoromethane	497.1	0	500	0	99.4	75.5	128	0	0	0	
Surr: Toluene-d8	489.8	0	500	0	98	70	120	0	0	0	

Sample ID: **1207165-001AMSD** Client ID: **MW-1R** Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700503**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	552.8	50	500	0	111	50.1	179	592.1	6.87	23.3	
Benzene	603.8	50	500	0	121	61.2	150	577.6	4.44	19	

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163604**

Sample ID: **1207165-001AMSD** Client ID: **MW-1R** Units: **ug/L** Prep Date: **07/06/2012** Run No: **224628**
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **163604** Analysis Date: **07/06/2012** Seq No: **4700503**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Chlorobenzene	493.7	50	500	0	98.7	72.1	140	485.1	1.76	21.5	
Toluene	580.8	50	500	0	116	58.7	154	570.7	1.75	20	
Trichloroethene	475.5	50	500	0	95.1	68.3	149	478.2	0.566	17.7	
Surr: 4-Bromofluorobenzene	552.8	0	500	0	111	67.4	123	542.5	0	0	
Surr: Dibromofluoromethane	493.0	0	500	0	98.6	75.5	128	497.1	0	0	
Surr: Toluene-d8	508.2	0	500	0	102	70	120	489.8	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: 163638

Sample ID: **MB-163638** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224773**
SampleType: **MBLK** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/10/2012** Seq No: **4704123**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	BRL	10	0	0	0	0	0	0	0	0	
2-Methylnaphthalene	BRL	10	0	0	0	0	0	0	0	0	
Acenaphthene	BRL	10	0	0	0	0	0	0	0	0	
Acenaphthylene	BRL	10	0	0	0	0	0	0	0	0	
Anthracene	BRL	10	0	0	0	0	0	0	0	0	
Benz(a)anthracene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(a)pyrene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(b)fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(g,h,i)perylene	BRL	10	0	0	0	0	0	0	0	0	
Benzo(k)fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Chrysene	BRL	10	0	0	0	0	0	0	0	0	
Dibenz(a,h)anthracene	BRL	10	0	0	0	0	0	0	0	0	
Fluoranthene	BRL	10	0	0	0	0	0	0	0	0	
Fluorene	BRL	10	0	0	0	0	0	0	0	0	
Indeno(1,2,3-cd)pyrene	BRL	10	0	0	0	0	0	0	0	0	
Naphthalene	BRL	10	0	0	0	0	0	0	0	0	
Phenanthrene	BRL	10	0	0	0	0	0	0	0	0	
Pyrene	BRL	10	0	0	0	0	0	0	0	0	
Surr: 2-Fluorobiphenyl	30.79	0	50	0	61.6	41	120	0	0	0	
Surr: 4-Terphenyl-d14	37.16	0	50	0	74.3	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	33.07	0	50	0	66.1	30.3	122	0	0	0	

Sample ID: **LCS-163638** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224773**
SampleType: **LCS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/10/2012** Seq No: **4704138**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	32.67	10	50	0	65.3	53	120	0	0	0	
2-Methylnaphthalene	31.43	10	50	0	62.9	51.4	120	0	0	0	

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: 163638

Sample ID: **LCS-163638** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224773**
SampleType: **LCS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/10/2012** Seq No: **4704138**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Acenaphthene	30.10	10	50	0	60.2	49.2	120	0	0	0	
Acenaphthylene	35.72	10	50	0	71.4	55.3	118	0	0	0	
Anthracene	33.21	10	50	0	66.4	56.6	120	0	0	0	
Benz(a)anthracene	35.41	10	50	0	70.8	52.1	120	0	0	0	
Benzo(a)pyrene	33.25	10	50	0	66.5	57.4	120	0	0	0	
Benzo(b)fluoranthene	36.13	10	50	0	72.3	50.8	120	0	0	0	
Benzo(g,h,i)perylene	31.72	10	50	0	63.4	55	120	0	0	0	
Benzo(k)fluoranthene	31.36	10	50	0	62.7	52.7	120	0	0	0	
Chrysene	31.97	10	50	0	63.9	51.1	120	0	0	0	
Dibenz(a,h)anthracene	34.85	10	50	0	69.7	57.4	120	0	0	0	
Fluoranthene	32.51	10	50	0	65	60.3	115	0	0	0	
Fluorene	32.04	10	50	0	64.1	50.9	120	0	0	0	
Indeno(1,2,3-cd)pyrene	34.90	10	50	0	69.8	54.8	120	0	0	0	
Naphthalene	31.21	10	50	0	62.4	51.6	120	0	0	0	
Phenanthrene	33.23	10	50	0	66.5	55	120	0	0	0	
Pyrene	33.50	10	50	0	67	54.1	120	0	0	0	
Surr: 2-Fluorobiphenyl	34.47	0	50	0	68.9	41	120	0	0	0	
Surr: 4-Terphenyl-d14	43.14	0	50	0	86.3	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	34.57	0	50	0	69.1	30.3	122	0	0	0	

Sample ID: **1207202-002BMS** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224838**
SampleType: **MS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/11/2012** Seq No: **4706732**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	67.51	10	50	8.490	118	40.3	120	0	0	0	
2-Methylnaphthalene	99.95	10	50	13.75	172	40	120	0	0	0	S
Acenaphthene	24.08	10	50	0	48.2	41.2	120	0	0	0	
Acenaphthylene	27.07	10	50	0	54.1	43.6	117	0	0	0	

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

Analytical Environmental Services, Inc

Date: 16-Jul-12

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163638**

Sample ID: **1207202-002BMS** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224838**
SampleType: **MS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/11/2012** Seq No: **4706732**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Anthracene	33.62	10	50	0	67.2	45.7	120	0	0	0	
Benz(a)anthracene	30.94	10	50	0	61.9	47.3	120	0	0	0	
Benzo(a)pyrene	29.15	10	50	0	58.3	47.9	120	0	0	0	
Benzo(b)fluoranthene	30.91	10	50	0	61.8	46.8	120	0	0	0	
Benzo(g,h,i)perylene	31.40	10	50	0	62.8	47.7	120	0	0	0	
Benzo(k)fluoranthene	27.59	10	50	0	55.2	47.6	120	0	0	0	
Chrysene	29.47	10	50	0	58.9	50.1	120	0	0	0	
Dibenz(a,h)anthracene	33.20	10	50	0	66.4	48.4	120	0	0	0	
Fluoranthene	34.98	10	50	0	70	50.7	121	0	0	0	
Fluorene	24.30	10	50	0	48.6	45.3	120	0	0	0	
Indeno(1,2,3-cd)pyrene	31.58	10	50	0	63.2	50.3	120	0	0	0	
Phenanthrene	32.69	10	50	0	65.4	50.5	120	0	0	0	
Pyrene	28.84	10	50	0	57.7	56.6	118	0	0	0	
Surr: 2-Fluorobiphenyl	25.64	0	50	0	51.3	41	120	0	0	0	
Surr: 4-Terphenyl-d14	39.19	0	50	0	78.4	55.9	122	0	0	0	
Surr: Nitrobenzene-d5	27.50	0	50	0	55	30.3	122	0	0	0	

Sample ID: **1207202-002BMS** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224838**
SampleType: **MS** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/11/2012** Seq No: **4707123**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Naphthalene	334.0	50	50	47.65	573	33.9	120	0	0	0	S

Sample ID: **1207202-002BMSD** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224838**
SampleType: **MSD** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/11/2012** Seq No: **4706733**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1-Methylnaphthalene	69.58	10	50	8.490	122	40.3	120	67.51	3.02	36.8	S

Qualifiers:

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

Client: AMEC E&I, Inc.
Project Name: 1071 Howell Mill Road
Workorder: 1207165

ANALYTICAL QC SUMMARY REPORT

BatchID: **163638**

Sample ID: **1207202-002BMSD** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224838**
SampleType: **MSD** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/11/2012** Seq No: **4706733**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
2-Methylnaphthalene	100.4	10	50	13.75	173	40	120	99.95	0.429	34.9	S
Acenaphthene	23.96	10	50	0	47.9	41.2	120	24.08	0.5	29.6	
Acenaphthylene	26.45	10	50	0	52.9	43.6	117	27.07	2.32	31	
Anthracene	33.57	10	50	0	67.1	45.7	120	33.62	0.149	23.2	
Benz(a)anthracene	29.13	10	50	0	58.3	47.3	120	30.94	6.03	23.5	
Benzo(a)pyrene	28.49	10	50	0	57	47.9	120	29.15	2.29	24.8	
Benzo(b)fluoranthene	29.19	10	50	0	58.4	46.8	120	30.91	5.72	25.1	
Benzo(g,h,i)perylene	29.00	10	50	0	58	47.7	120	31.40	7.95	21.9	
Benzo(k)fluoranthene	27.14	10	50	0	54.3	47.6	120	27.59	1.64	22.5	
Chrysene	28.26	10	50	0	56.5	50.1	120	29.47	4.19	23.3	
Dibenz(a,h)anthracene	31.88	10	50	0	63.8	48.4	120	33.20	4.06	23.7	
Fluoranthene	34.46	10	50	0	68.9	50.7	121	34.98	1.5	23.5	
Fluorene	23.89	10	50	0	47.8	45.3	120	24.30	1.7	27.3	
Indeno(1,2,3-cd)pyrene	30.65	10	50	0	61.3	50.3	120	31.58	2.99	23.7	
Phenanthrene	32.38	10	50	0	64.8	50.5	120	32.69	0.953	24.1	
Pyrene	27.87	10	50	0	55.7	56.6	118	28.84	3.42	20.2	S
Surr: 2-Fluorobiphenyl	24.79	0	50	0	49.6	41	120	25.64	0	0	
Surr: 4-Terphenyl-d14	37.05	0	50	0	74.1	55.9	122	39.19	0	0	
Surr: Nitrobenzene-d5	22.90	0	50	0	45.8	30.3	122	27.50	0	0	

Sample ID: **1207202-002BMSD** Client ID: Units: **ug/L** Prep Date: **07/09/2012** Run No: **224969**
SampleType: **MSD** TestCode: **POLYAROMATIC HYDROCARBONS SW8270D** BatchID: **163638** Analysis Date: **07/12/2012** Seq No: **4708431**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Naphthalene	335.0	50	50	258.4	153	33.9	120	334.0	0.314	39.2	S

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

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

July 11, 2012

Tyler Boyles
AMEC E&I, Inc.
396 Plasters Ave
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: 1071 Howell Mill Road

Dear Tyler Boyles: Order No: 1207228

Analytical Environmental Services, Inc. received 1 samples on July 5, 2012 2:30 pm for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.

AES' certifications are as follows:

-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/12-06/30/13.

-AIHA Certification ID #100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) effective until 09/01/13.

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

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

Kathryn E. Waters

Kathryn Waters
Project Manager

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC

3785 Presidential Parkway, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1207228

Date: 7/5/12 Page 1 of 1

COMPANY: AMEc

ADDRESS: 3?C Plaska Ave
Atlanta GA

PHONE: 404 817 0153

FAX: 404 817 0183

SAMPLED BY: Tyler Boyle

SIGNATURE:

Visit our website www.aesatlanta.com to check on the status of your results, place bottle orders, etc.

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	ANALYSIS REQUESTED: Tot'l RCRA Mets	Diss RCRA Mets												REMARKS	No # of Containers
							PRESERVATION (See codes): Hno3	NA													
1	Mw-1R	7/5/12	1315	X		Gw	X	X													2
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	7/5/12 1425	1:	7/5/12 2:30
2:		2:	
3:		3:	

PROJECT INFORMATION

PROJECT NAME: 1071 Howell Mill
PROJECT #: 6121 120175
SITE ADDRESS: 1071 Howell Mill
SEND REPORT TO: Tyler Boyle & Chuck Ferry
INVOICE TO: (IF DIFFERENT FROM ABOVE)
QUOTE #: PO#:

RECEIPT

Total # of Containers: 2

Turnaround Time Request
- ● Standard 5 Business Days
- ○ 2 Business Day Rush
- ○ Next Business Day Rush
- ○ Same Day Rush **(auth req.)**
- ○ Other ______

STATE PROGRAM (if any): ______
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER ______

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES. SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Client:	AMEC E&I, Inc.	**Client Sample ID:**	MW-1R
Project Name:	1071 Howell Mill Road	**Collection Date:**	7/5/2012 1:15:00 PM
Lab ID:	1207228-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
Total Metals by ICP/MS SW6020A				**(SW3005A)**				
Arsenic	BRL	5.00		ug/L	163666	1	07/11/2012 12:39	JY
Barium	98.7	10.0		ug/L	163666	1	07/11/2012 12:39	JY
Cadmium	BRL	0.700		ug/L	163666	1	07/11/2012 12:39	JY
Chromium	BRL	5.00		ug/L	163666	1	07/11/2012 12:39	JY
Lead	1.67	1.00		ug/L	163666	1	07/11/2012 12:39	JY
Selenium	BRL	5.00		ug/L	163666	1	07/11/2012 12:39	JY
Silver	BRL	1.00		ug/L	163666	1	07/11/2012 12:39	JY
Mercury, Total SW7470A				**(SW7470A)**				
Mercury	BRL	0.00020		mg/L	163593	1	07/09/2012 18:43	LD
Mercury, Dissolved SW7470A				**(SW7470A)**				
Mercury	BRL	0.00020		mg/L	163661	1	07/10/2012 16:18	LD
Dissolved Metals by ICP/MS SW6020A				**(SW3005A)**				
Arsenic	BRL	5.00		ug/L	163469	1	07/06/2012 14:40	JY
Barium	99.5	10.0		ug/L	163469	1	07/06/2012 14:40	JY
Cadmium	BRL	0.700		ug/L	163469	1	07/06/2012 14:40	JY
Chromium	BRL	5.00		ug/L	163469	1	07/06/2012 14:40	JY
Lead	BRL	1.00		ug/L	163469	1	07/06/2012 14:40	JY
Selenium	BRL	5.00		ug/L	163469	1	07/06/2012 14:40	JY
Silver	BRL	1.00		ug/L	163469	1	07/06/2012 14:40	JY

Qualifiers:

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

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client AMEC Work Order Number 1207228

Checklist completed by ___ Signature 07/05/2012 Date

Carrier name: FedEx ___ UPS ___ Courier ___ Client ✓ US Mail ___ Other ___

Shipping container/cooler in good condition? Yes ✓ No ___ Not Present ___

Custody seals intact on shipping container/cooler? Yes ___ No ___ Not Present ✓

Custody seals intact on sample bottles? Yes ___ No ___ Not Present ✓

Container/Temp Blank temperature in compliance? (4°C±2)* Yes ✓ No ___

Cooler #1 3.0 Cooler #2 ___ Cooler #3 ___ Cooler #4 ___ Cooler#5 ___ Cooler #6 ___

Chain of custody present? Yes ✓ No ___

Chain of custody signed when relinquished and received? Yes ✓ No ___

Chain of custody agrees with sample labels? Yes ✓ No ___

Samples in proper container/bottle? Yes ✓ No ___

Sample containers intact? Yes ✓ No ___

Sufficient sample volume for indicated test? Yes ✓ No ___

All samples received within holding time? Yes ✓ No ___

Was TAT marked on the COC? Yes ✓ No ___

Proceed with Standard TAT as per project history? Yes ___ No ___ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted ✓ Yes ___ No ___

Water - pH acceptable upon receipt? Yes ✓ No ___ Not Applicable ___

Adjusted? ___ Checked by Dn

Sample Condition: Good ✓ Other(Explain) ___

(For diffusive samples or AIHA lead) Is a known blank included? Yes ___ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\L\Quality Assurance\Checklists Procedures Sign-Off Templates\Checklists\Sample Receipt Checklists\Sample_Cooler_Receipt_Checklist

Analytical Environmental Services, Inc **Date:** 11-Jul-12

Client: AMEC E&I, Inc.
Project: 1071 Howell Mill Road
Lab Order: 1207228

Dates Report

Lab Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date	Analysis Date
1207228-001A	MW-1R	7/5/2012 1:15:00PM	Groundwater	Total Metals by ICP/MS		07/10/2012	07/11/2012
1207228-001A	MW-1R	7/5/2012 1:15:00PM	Groundwater	TOTAL MERCURY		07/09/2012	07/09/2012
1207228-001B	MW-1R	7/5/2012 1:15:00PM	Groundwater	Dissolved Metals by ICP/MS		07/06/2012	07/06/2012
1207228-001B	MW-1R	7/5/2012 1:15:00PM	Groundwater	MERCURY, DISSOLVED		07/10/2012	07/10/2012

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Total Metals by ICP/MS SW6020A

Sample ID: **MB-163666** SampType: **MBLK** Batch ID: **163666** Units: **ug/L** Prep Date: **7/10/2012** RunNo: **224856**
Client ID: TestCode: **Total Metals by ICP/MS SW6020A** Analysis Date: **7/11/2012** SeqNo: **4706045**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0		
Barium	BRL	10.0	0	0	0	0	0	0	0		
Cadmium	BRL	0.700	0	0	0	0	0	0	0		
Chromium	BRL	5.00	0	0	0	0	0	0	0		
Lead	BRL	1.00	0	0	0	0	0	0	0		
Selenium	BRL	5.00	0	0	0	0	0	0	0		
Silver	BRL	1.00	0	0	0	0	0	0	0		

Sample ID: **LCS-163666** SampType: **LCS** Batch ID: **163666** Units: **ug/L** Prep Date: **7/10/2012** RunNo: **224856**
Client ID: TestCode: **Total Metals by ICP/MS SW6020A** Analysis Date: **7/11/2012** SeqNo: **4706044**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	90.29	5.00	100	0	90.3	80	120	0	0		
Barium	91.03	10.0	100	0	91	80	120	0	0		
Cadmium	90.99	0.700	100	0.057	90.9	80	120	0	0		
Chromium	89.58	5.00	100	0	89.6	80	120	0	0		
Lead	90.48	1.00	100	0	90.5	80	120	0	0		
Selenium	93.71	5.00	100	0	93.7	80	120	0	0		
Silver	9.112	1.00	10	0.023	90.9	80	120	0	0		

Sample ID: **1207228-001AMS** SampType: **MS** Batch ID: **163666** Units: **ug/L** Prep Date: **7/10/2012** RunNo: **224856**
Client ID: **MW-1R** TestCode: **Total Metals by ICP/MS SW6020A** Analysis Date: **7/11/2012** SeqNo: **4706047**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	89.23	5.00	100	0.464	88.8	75	125	0	0		
Barium	192.8	10.0	100	98.66	94.1	75	125	0	0		

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

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Total Metals by ICP/MS SW6020A

Sample ID: **1207228-001AMS** SampType: **MS** Batch ID: **163666** Units: **ug/L** Prep Date: **7/10/2012** RunNo: **224856**
Client ID: **MW-1R** TestCode: **Total Metals by ICP/MS SW6020A** Analysis Date: **7/11/2012** SeqNo: **4706047**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	94.27	0.700	100	0.37	93.9	75	125	0	0		
Chromium	90.27	5.00	100	0.395	89.9	75	125	0	0		
Lead	95.94	1.00	100	1.673	94.3	75	125	0	0		
Selenium	91.94	5.00	100	1.612	90.3	75	125	0	0		
Silver	9.079	1.00	10	0	90.8	75	125	0	0		

Sample ID: **1207228-001AMSD** SampType: **MSD** Batch ID: **163666** Units: **ug/L** Prep Date: **7/10/2012** RunNo: **224856**
Client ID: **MW-1R** TestCode: **Total Metals by ICP/MS SW6020A** Analysis Date: **7/11/2012** SeqNo: **4706048**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	90.79	5.00	100	0.464	90.3	75	125	89.23	1.73	20	
Barium	191.8	10.0	100	98.66	93.1	75	125	192.8	0.520	20	
Cadmium	95.2	0.700	100	0.37	94.8	75	125	94.27	0.982	20	
Chromium	90.9	5.00	100	0.395	90.5	75	125	90.27	0.695	20	
Lead	96.32	1.00	100	1.673	94.6	75	125	95.94	0.395	20	
Selenium	93.99	5.00	100	1.612	92.4	75	125	91.94	2.21	20	
Silver	9.047	1.00	10	0	90.5	75	125	9.079	0.353	20	

Qualifiers:

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

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Dissolved Metals by ICP/MS SW6020A

Sample ID: **MB-163469** SampType: **MBLK** Batch ID: **163469** Units: **ug/L** Prep Date: **7/5/2012** RunNo: **224550**
Client ID: TestCode: **Dissolved Metals by ICP/MS SW6020A** Analysis Date: **7/5/2012** SeqNo: **4698646**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	5.00	0	0	0	0	0	0	0		
Barium	BRL	10.0	0	0	0	0	0	0	0		
Cadmium	BRL	0.700	0	0	0	0	0	0	0		
Chromium	BRL	5.00	0	0	0	0	0	0	0		
Lead	BRL	1.00	0	0	0	0	0	0	0		
Selenium	BRL	5.00	0	0	0	0	0	0	0		
Silver	BRL	1.00	0	0	0	0	0	0	0		

Sample ID: **LCS-163469** SampType: **LCS** Batch ID: **163469** Units: **ug/L** Prep Date: **7/5/2012** RunNo: **224550**
Client ID: TestCode: **Dissolved Metals by ICP/MS SW6020A** Analysis Date: **7/5/2012** SeqNo: **4698644**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	91.72	5.00	100	0	91.7	80	120	0	0		
Barium	92.97	10.0	100	0	93	80	120	0	0		
Cadmium	94.45	0.700	100	0	94.4	80	120	0	0		
Chromium	93.69	5.00	100	0	93.7	80	120	0	0		
Lead	93.39	1.00	100	0	93.4	80	120	0	0		
Selenium	96	5.00	100	0	96	80	120	0	0		
Silver	9.323	1.00	10	0.02	93	80	120	0	0		

Sample ID: **1206N78-001AMS** SampType: **MS** Batch ID: **163469** Units: **ug/L** Prep Date: **7/5/2012** RunNo: **224550**
Client ID: TestCode: **Dissolved Metals by ICP/MS SW6020A** Analysis Date: **7/5/2012** SeqNo: **4698656**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	113.5	5.00	100	10.5	103	75	125	0	0		
Barium	137.5	10.0	100	42.26	95.2	75	125	0	0		
Cadmium	95.48	0.700	100	0	95.5	75	125	0	0		
Chromium	94.59	5.00	100	1.352	93.2	75	125	0	0		

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

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Dissolved Metals by ICP/MS SW6020A

Sample ID: **1206N78-001AMS** SampType: **MS** Batch ID: **163469** Units: **ug/L** Prep Date: **7/5/2012** RunNo: **224550**
Client ID: TestCode: **Dissolved Metals by ICP/MS SW6020A** Analysis Date: **7/5/2012** SeqNo: **4698656**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	95.45	1.00	100	0	95.4	75	125	0	0		
Selenium	135.5	5.00	100	1.235	134	75	125	0	0		S
Silver	7.198	1.00	10	0	72	75	125	0	0		S

Sample ID: **1206N78-001AMSD** SampType: **MSD** Batch ID: **163469** Units: **ug/L** Prep Date: **7/5/2012** RunNo: **224550**
Client ID: TestCode: **Dissolved Metals by ICP/MS SW6020A** Analysis Date: **7/5/2012** SeqNo: **4698659**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	113.4	5.00	100	10.5	103	75	125	113.5	0.0881	20	
Barium	136.7	10.0	100	42.26	94.4	75	125	137.5	0.584	20	
Cadmium	95.19	0.700	100	0	95.2	75	125	95.48	0.304	20	
Chromium	94.03	5.00	100	1.352	92.7	75	125	94.59	0.594	20	
Lead	95.59	1.00	100	0	95.6	75	125	95.45	0.147	20	
Selenium	135.8	5.00	100	1.235	135	75	125	135.5	0.221	20	S
Silver	7.482	1.00	10	0	74.8	75	125	7.198	3.87	20	S

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

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Mercury, Dissolved SW7470A

Sample ID: **MB-163661** SampType: **MBLK** Batch ID: **163661** Units: **mg/L** Prep Date: **7/10/2012** RunNo: **224798**
Client ID: TestCode: **Mercury, Dissolved SW7470A** Analysis Date: **7/10/2012** SeqNo: **4704648**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	BRL	0.000200	0	0	0	0	0	0	0		

Sample ID: **LCS-163661** SampType: **LCS** Batch ID: **163661** Units: **mg/L** Prep Date: **7/10/2012** RunNo: **224798**
Client ID: TestCode: **Mercury, Dissolved SW7470A** Analysis Date: **7/10/2012** SeqNo: **4704651**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.005061	0.000200	0.005	0	101	85	115	0	0		

Sample ID: **1207228-001BMS** SampType: **MS** Batch ID: **163661** Units: **mg/L** Prep Date: **7/10/2012** RunNo: **224798**
Client ID: **MW-1R** TestCode: **Mercury, Dissolved SW7470A** Analysis Date: **7/10/2012** SeqNo: **4704658**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.005038	0.000200	0.005	0	101	70	130	0	0		

Sample ID: **1207228-001BMSD** SampType: **MSD** Batch ID: **163661** Units: **mg/L** Prep Date: **7/10/2012** RunNo: **224798**
Client ID: **MW-1R** TestCode: **Mercury, Dissolved SW7470A** Analysis Date: **7/10/2012** SeqNo: **4704661**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.005149	0.000200	0.005	0	103	70	130	0.005038	2.17	20	

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

CLIENT: AMEC E&I, Inc.
Work Order: 1207228
Project: 1071 Howell Mill Road

ANALYTICAL QC SUMMARY REPORT

TestCode: Mercury, Total SW7470A

Sample ID: **MB-163593** SampType: **MBLK** Batch ID: **163593** Units: **mg/L** Prep Date: **7/9/2012** RunNo: **224730**
Client ID: TestCode: **Mercury, Total SW7470A** Analysis Date: **7/9/2012** SeqNo: **4702893**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	BRL	0.000200	0	0	0	0	0	0	0		

Sample ID: **LCS-163593** SampType: **LCS** Batch ID: **163593** Units: **mg/L** Prep Date: **7/9/2012** RunNo: **224730**
Client ID: TestCode: **Mercury, Total SW7470A** Analysis Date: **7/9/2012** SeqNo: **4702897**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004584	0.000200	0.005	0	91.7	85	115	0	0		

Sample ID: **1207228-001AMS** SampType: **MS** Batch ID: **163593** Units: **mg/L** Prep Date: **7/9/2012** RunNo: **224730**
Client ID: **MW-1R** TestCode: **Mercury, Total SW7470A** Analysis Date: **7/9/2012** SeqNo: **4702916**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004653	0.000200	0.005	0	93.1	70	130	0	0		

Sample ID: **1207228-001AMSD** SampType: **MSD** Batch ID: **163593** Units: **mg/L** Prep Date: **7/9/2012** RunNo: **224730**
Client ID: **MW-1R** TestCode: **Mercury, Total SW7470A** Analysis Date: **7/9/2012** SeqNo: **4702920**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004649	0.000200	0.005	0	93	70	130	0.004653	0.0859	20	

Qualifiers:

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

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

AES

July 15, 2003

Brent Cortelloni
Environmental Management Associates, LLC
4488 Commerce Drive
Suite A
Buford, Georgia 30518

TEL: (770) 271-4628
FAX (770) 271-8944

RE: Sunlow

Order No.: 0307107

Dear Brent Cortelloni:

Analytical Environmental Servs, Inc. received 21 samples on 7/2/2003 5:50:00 PM for the analyses presented in the following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative. AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water, effective 07/02/02-06/30/04.
-AIHA Certification number 505 for analysis of Air, Paint Chips, Soil and Dust Wipes, effective until 10/01/03.

These results relate only to the items tested. This report may only be reproduced in full and contains 30 total pages (including cover letter).

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

Sincerely,

Allison Cantrell

Allison Cantrell
Project Manager

ANALYTICAL ENVIRONMENTAL SERVICES, INC.
3785 Presidential Pkwy., Atlanta, GA 30340-3704
TEL: (770) 457-8177 / TOLL FREE: (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 0307107
Date: ______ Page 1 of 2

COMPANY: EMA/OC
ADDRESS:
PHONE:
FAX:
SAMPLED BY: J. Schwaller
SIGNATURE:

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	ANALYSIS REQUESTED: Total Metals	REMARKS	No # of Containers
	BH-1 (10-15)	7/2/03		X		S		METALS:	1
	BH-1 (25-30)							BARIUM	1
	BH-2 (0-5)							CADMIUM	1
	BH-2 (10-15)							CHROMIUM	1
	BH-2 (15-20)							ARSENIC	1
	BH-3 (15-20)							LEAD	1
	BH-3 (35-40)								1
	BH-4 (15-20)							+ DATA	1
	BH-4 (25-30)							BY 7/10/03	1
	BH-5 (15-20)								1
	BH-5 (25-30)								1
	BH-6 (15-20)								1
	BH-6 (20-25)								1

PRESERVATION

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	7/2/03 1750	1:	5:50 pm 7-02-03
2:		2:	
3:		3:	

PROJECT INFORMATION
PROJECT NAME: SUNLOW
PROJECT #:
FAC ID#:
SITE ADDRESS:
PROJECT MANAGER:
INVOICE TO:
(IF DIFFERENT FROM ABOVE)

RECEIPT
Total # of Containers: 13

Turnaround Time Request
● Standard 3-5 Business Days
○ Same Day Rush (auth req.)
○ Next Business Day Rush
○ 2 Business Day Rush
○ Other ______

PROGRAM (see codes): ______

DATA PACKAGE: I II [✓ III] IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER ______

PO#:
QUOTE/CONTRACT #:

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) O = Other (specify)
PRESERVATIVE CODES: H = Hydrochloric acid + ice I = Ice only N = Nitric acid + ice S = Sulfuric acid + ice O = Other (specify) NA = None
PR(___ I: FI___ FLD(___ UST ___ T M: ___ NCU ___ UST ___ GA(FLCO

White ORIGI ellow AB; P y - Cl

ANALYTICAL ENVIRONMENTAL SERVICES, INC.
3785 Presidential Pkwy., Atlanta, GA 30340-3704
TEL: (770) 457-8177 / TOLL FREE: (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 0307107
Date: ________ Page 2 of 2

COMPANY: EMA/BC
ADDRESS:
PHONE:
FAX:
SAMPLED BY: J. SCHWALLER
SIGNATURE:

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	TOTAL METALS												REMARKS	No # of Containers
							PRESERVATION													
	BH-7 (10-15)	7/2/03		X		S													DATA BY	1
	BH-7 (15-20)																		THURS 7/10/03	1
	BH-7 (25-30)																			1
	BH-8 (15-20)																		METALS	1
	BH-8 (25-30)																		ARSENIC	1
	BH-9 (0-5)																		BARIUM	1
	BH-9 (15-20)																		CADMIUM	1
	BH-8 (5-10)	↓		↓		↓													CHROMIUM	
																			LEAD	

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	7/2/03 1750	1:	7-02-03 5:50
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER________

PO#:
QUOTE/CONTRACT #:

PROJECT INFORMATION
PROJECT NAME: SUNLOW
PROJECT #:
FAC ID#:
SITE ADDRESS:
PROJECT MANAGER: B. COSTELLO
INVOICE TO:
(IF DIFFERENT FROM ABOVE)

RECEIPT
Total # of Containers: 7

Turnaround Time Request 20
☒ Standard 3-5 Business Days
○ Same Day Rush (auth req.)
○ Next Business Day Rush
○ 2 Business Day Rush
○ Other ________

PROGRAM (see codes): ______

DATA PACKAGE: I II [✓ III] IV

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) O = Other (specify)
PRESERVATIVE CODES: H = Hydrochloric acid + ice I = Ice only N = Nitric acid + ice S = Sulfuric acid + ice O = Other (specify) NA = None
PR 4: FI____ FLDC____ UST ____ MS____ NCU ____ UST (____ GAC FLCO

White Copy - ORIGINAL; Yellow Copy - LAB; Pink Copy - CLIENT

Analytical Environmental Services, Inc.

Sample Receipt Checklist

Client EMA/BC

Work Order Number 0307107

Date and Time 7/2/03 5:50

Received by Nyerery

Checklist completed by Amel Hadzic 7/3/03
Signature Date

Reviewed by AOG 7/3/3
Initials Date

Carrier name: FedEx __ UPS __ Courier __ Client ✓ US Mall __ Other ____

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ Not Present ✓

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Container/Temp Blank temperature in compliance? Yes ✓ No __

Cooler #1 3.9c ON ICE Cooler #2 ____ Cooler #3 ____ Cooler #4 ____ Cooler#5 ____ Cooler #6 ____

Water - VOA vials have zero headspace? No VOA vials submitted ✓ Yes __ No __

Water - pH acceptable upon receipt? Yes ~~X~~ AG 7/3/3 No __ Not Applicable ✓

Adjusted? ____ Checked by ____

Any No and/or NA (not applicable) response must be detailed in the comments section below:

Client contacted ____ Date contacted: ____ Person contacted ____

Contacted by: ____ Regarding ____

Comments:

Corrective Action

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT: Environmental Management Associates, LL
Project: Sunlow
Lab Order: 0307107

CASE NARRATIVE

Metals Analysis by Method 6010B:

Matrix spike recovery for Pb on sample 0307107-001 was outside control limits due to insignificant spike amount as compared to sample concentration. LCS recovery was within control limits.

RPD values for chromium and lead on sample 0307107-001AMSD were outside advisory control limits due to suspected non-homogeneous sample matrix. All percent recoveries were within control limits except as described above.

RPD value for Pb on sample 0307107-015A was outside advisory control limits. The greater than expected variability was the result of values at or near the reporting limit.

Client requested TCLP Arsenic 7/10/03 on sample 0307107-015 "BH-7(15-20)" as standard turnaround time.

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-1(10-15)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-001A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.98		mg/Kg	1	7/7/2003 6:19:00 PM
Barium	137	4.98		mg/Kg	1	7/7/2003 6:19:00 PM
Cadmium	BRL	2.49		mg/Kg	1	7/7/2003 6:19:00 PM
Chromium	11.5	2.49		mg/Kg	1	7/7/2003 6:19:00 PM
Lead	479	4.98		mg/Kg	1	7/7/2003 6:19:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-1(25-30)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-002A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.03		mg/Kg	1	7/7/2003 6:33:00 PM
Barium	70.5	4.03		mg/Kg	1	7/7/2003 6:33:00 PM
Cadmium	BRL	2.01		mg/Kg	1	7/7/2003 6:33:00 PM
Chromium	8.75	2.01		mg/Kg	1	7/7/2003 6:33:00 PM
Lead	8.23	4.03		mg/Kg	1	7/7/2003 6:33:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-2(0-5)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-003A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	13.1	4.81		mg/Kg	1	7/7/2003 6:37:00 PM
Barium	155	4.81		mg/Kg	1	7/7/2003 6:37:00 PM
Cadmium	BRL	2.41		mg/Kg	1	7/7/2003 6:37:00 PM
Chromium	18.5	2.41		mg/Kg	1	7/7/2003 6:37:00 PM
Lead	136	4.81		mg/Kg	1	7/7/2003 6:37:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-2(10-15)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-004A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	11.8	3.66		mg/Kg	1	7/7/2003 6:42:00 PM
Barium	109	3.66		mg/Kg	1	7/7/2003 6:42:00 PM
Cadmium	BRL	1.83		mg/Kg	1	7/7/2003 6:42:00 PM
Chromium	37.4	1.83		mg/Kg	1	7/7/2003 6:42:00 PM
Lead	195	3.66		mg/Kg	1	7/7/2003 6:42:00 PM

Qualifiers:				
*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-2(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-005A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.36		mg/Kg	1	7/7/2003 6:46:00 PM
Barium	53.6	4.36		mg/Kg	1	7/7/2003 6:46:00 PM
Cadmium	BRL	2.18		mg/Kg	1	7/7/2003 6:46:00 PM
Chromium	4.27	2.18		mg/Kg	1	7/7/2003 6:46:00 PM
Lead	20.2	4.36		mg/Kg	1	7/7/2003 6:46:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-3(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-006A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.30		mg/Kg	1	7/7/2003 6:51:00 PM
Barium	60.4	4.30		mg/Kg	1	7/7/2003 6:51:00 PM
Cadmium	BRL	2.15		mg/Kg	1	7/7/2003 6:51:00 PM
Chromium	8.26	2.15		mg/Kg	1	7/7/2003 6:51:00 PM
Lead	26.2	4.30		mg/Kg	1	7/7/2003 6:51:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-3(35-40)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-007A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.15		mg/Kg	1	7/7/2003 7:06:00 PM
Barium	90.4	4.15		mg/Kg	1	7/7/2003 7:06:00 PM
Cadmium	BRL	2.08		mg/Kg	1	7/7/2003 7:06:00 PM
Chromium	9.45	2.08		mg/Kg	1	7/7/2003 7:06:00 PM
Lead	5.64	4.15		mg/Kg	1	7/7/2003 7:06:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-4(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-008A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.66		mg/Kg	1	7/7/2003 7:11:00 PM
Barium	86.2	3.66		mg/Kg	1	7/7/2003 7:11:00 PM
Cadmium	BRL	1.83		mg/Kg	1	7/7/2003 7:11:00 PM
Chromium	11.6	1.83		mg/Kg	1	7/7/2003 7:11:00 PM
Lead	32.9	3.66		mg/Kg	1	7/7/2003 7:11:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-4(25-30)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-009A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.86		mg/Kg	1	7/7/2003 7:15:00 PM
Barium	89.7	3.86		mg/Kg	1	7/7/2003 7:15:00 PM
Cadmium	BRL	1.93		mg/Kg	1	7/7/2003 7:15:00 PM
Chromium	8.51	1.93		mg/Kg	1	7/7/2003 7:15:00 PM
Lead	6.25	3.86		mg/Kg	1	7/7/2003 7:15:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-5(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-010A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	14.0	4.23		mg/Kg	1	7/7/2003 7:20:00 PM
Barium	229	4.23		mg/Kg	1	7/7/2003 7:20:00 PM
Cadmium	BRL	2.11		mg/Kg	1	7/7/2003 7:20:00 PM
Chromium	19.9	2.11		mg/Kg	1	7/7/2003 7:20:00 PM
Lead	1960	4.23		mg/Kg	1	7/7/2003 7:20:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-5(25-30)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-011A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.34		mg/Kg	1	7/7/2003 7:24:00 PM
Barium	47.6	4.34		mg/Kg	1	7/7/2003 7:24:00 PM
Cadmium	BRL	2.17		mg/Kg	1	7/7/2003 7:24:00 PM
Chromium	8.99	2.17		mg/Kg	1	7/7/2003 7:24:00 PM
Lead	13.2	4.34		mg/Kg	1	7/7/2003 7:24:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-6(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-012A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	19.3	4.51		mg/Kg	1	7/7/2003 7:29:00 PM
Barium	817	4.51		mg/Kg	1	7/7/2003 7:29:00 PM
Cadmium	4.14	2.25		mg/Kg	1	7/7/2003 7:29:00 PM
Chromium	23.6	2.25		mg/Kg	1	7/7/2003 7:29:00 PM
Lead	884	4.51		mg/Kg	1	7/7/2003 7:29:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-6(20-25)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-013A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.94		mg/Kg	1	7/7/2003 7:33:00 PM
Barium	76.3	3.94		mg/Kg	1	7/7/2003 7:33:00 PM
Cadmium	BRL	1.97		mg/Kg	1	7/7/2003 7:33:00 PM
Chromium	7.61	1.97		mg/Kg	1	7/7/2003 7:33:00 PM
Lead	11.8	3.94		mg/Kg	1	7/7/2003 7:33:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-7(10-15)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-014A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	46.4	4.80		mg/Kg	1	7/7/2003 7:38:00 PM
Barium	509	4.80		mg/Kg	1	7/7/2003 7:38:00 PM
Cadmium	4.70	2.40		mg/Kg	1	7/7/2003 7:38:00 PM
Chromium	29.6	2.40		mg/Kg	1	7/7/2003 7:38:00 PM
Lead	1160	4.80		mg/Kg	1	7/7/2003 7:38:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-7(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-015A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP		**SW1311/6010B**				Analyst: **CDW**
Arsenic	BRL	0.0500		mg/L	1	7/15/2003 12:31:00 PM
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	47.0	4.59		mg/Kg	1	7/7/2003 7:42:00 PM
Barium	509	4.59		mg/Kg	1	7/7/2003 7:42:00 PM
Cadmium	BRL	2.30		mg/Kg	1	7/7/2003 7:42:00 PM
Chromium	25.0	2.30		mg/Kg	1	7/7/2003 7:42:00 PM
Lead	1090	4.59		mg/Kg	1	7/7/2003 7:42:00 PM

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-7(25-30)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-016A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.85		mg/Kg	1	7/7/2003 7:47:00 PM
Barium	84.0	4.85		mg/Kg	1	7/7/2003 7:47:00 PM
Cadmium	BRL	2.43		mg/Kg	1	7/7/2003 7:47:00 PM
Chromium	10.3	2.43		mg/Kg	1	7/7/2003 7:47:00 PM
Lead	19.2	4.85		mg/Kg	1	7/7/2003 7:47:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-8(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-017A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.51		mg/Kg	1	7/7/2003 8:02:00 PM
Barium	311	4.51		mg/Kg	1	7/7/2003 8:02:00 PM
Cadmium	BRL	2.26		mg/Kg	1	7/7/2003 8:02:00 PM
Chromium	14.5	2.26		mg/Kg	1	7/7/2003 8:02:00 PM
Lead	314	4.51		mg/Kg	1	7/7/2003 8:02:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-8(25-30)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-018A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.84		mg/Kg	1	7/7/2003 8:07:00 PM
Barium	52.1	3.84		mg/Kg	1	7/7/2003 8:07:00 PM
Cadmium	BRL	1.92		mg/Kg	1	7/7/2003 8:07:00 PM
Chromium	22.6	1.92		mg/Kg	1	7/7/2003 8:07:00 PM
Lead	15.7	3.84		mg/Kg	1	7/7/2003 8:07:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Date: *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-9(0-5)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-019A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	4.67		mg/Kg	1	7/7/2003 8:11:00 PM
Barium	161	4.67		mg/Kg	1	7/7/2003 8:11:00 PM
Cadmium	BRL	2.34		mg/Kg	1	7/7/2003 8:11:00 PM
Chromium	15.6	2.34		mg/Kg	1	7/7/2003 8:11:00 PM
Lead	192	4.67		mg/Kg	1	7/7/2003 8:11:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-9(15-20)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-020A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.92		mg/Kg	1	7/7/2003 8:16:00 PM
Barium	57.0	3.92		mg/Kg	1	7/7/2003 8:16:00 PM
Cadmium	BRL	1.96		mg/Kg	1	7/7/2003 8:16:00 PM
Chromium	27.4	1.96		mg/Kg	1	7/7/2003 8:16:00 PM
Lead	9.86	3.92		mg/Kg	1	7/7/2003 8:16:00 PM

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *15-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-8(5-10)
Lab Order:	0307107	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0307107-021A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	3.11		mg/Kg	1	7/7/2003 3:20:00 PM
Barium	118	3.11		mg/Kg	1	7/7/2003 3:20:00 PM
Cadmium	BRL	1.56		mg/Kg	1	7/7/2003 3:20:00 PM
Chromium	30.8	1.56		mg/Kg	1	7/7/2003 3:20:00 PM
Lead	9.37	3.11		mg/Kg	1	7/7/2003 3:20:00 PM

Qualifiers:			
*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT: Environmental Management Associates, LL
Work Order: 0307107
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 1311_M

Sample ID **MB-35942** SampType: **MBLK** TestCode: **1311_M** Units: **mg/L** Prep Date: **7/14/2003** RunNo: **40371**
Client ID: Batch ID: **35942** TestNo: **SW1311/6010** Analysis Date: **7/15/2003** SeqNo: **729425**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.250									

Sample ID **LCS-35942** SampType: **LCS** TestCode: **1311_M** Units: **mg/L** Prep Date: **7/14/2003** RunNo: **40371**
Client ID: Batch ID: **35942** TestNo: **SW1311/6010** Analysis Date: **7/15/2003** SeqNo: **729424**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.205	0.250	5	0	104	85	115	0	0		*

Sample ID **0307107-015AMS** SampType: **MS** TestCode: **1311_M** Units: **mg/L** Prep Date: **7/14/2003** RunNo: **40371**
Client ID: **BH-7(15-20)** Batch ID: **35942** TestNo: **SW1311/6010** Analysis Date: **7/15/2003** SeqNo: **729430**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	5.303	0.250	5	0	106	50	150	0	0		*

Sample ID **0307107-015ADUP** SampType: **DUP** TestCode: **1311_M** Units: **mg/L** Prep Date: **7/14/2003** RunNo: **40371**
Client ID: **BH-7(15-20)** Batch ID: **35942** TestNo: **SW1311/6010** Analysis Date: **7/15/2003** SeqNo: **729429**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.250	0	0	0	0	0	0	0	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0307107
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_S

Sample ID **MB-35648** SampType: **MBLK** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35648** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722661**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	5.00									
Barium	BRL	5.00									
Cadmium	BRL	2.50									
Chromium	BRL	2.50									
Lead	BRL	5.00									

Sample ID **MB-35672** SampType: **MBLK** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35672** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722885**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	5.00									
Barium	BRL	5.00									
Cadmium	BRL	2.50									
Chromium	BRL	2.50									
Lead	BRL	5.00									

Sample ID **LCS-35648** SampType: **LCS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35648** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722660**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	47.02	5.00	50	0.3175	93.4	80	120	0	0		
Barium	48.63	5.00	50	0	97.3	80	120	0	0		
Cadmium	49.16	2.50	50	0.0255	98.3	80	120	0	0		
Chromium	49.24	2.50	50	0.113	98.2	80	120	0	0		
Lead	47.5	5.00	50	0.3465	94.3	80	120	0	0		

Sample ID **LCS-35672** SampType: **LCS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35672** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722883**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0307107
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_S

Sample ID **LCS-35672** SampType: **LCS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35672** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722883**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	48.3	5.00	50	0	96.6	80	120	0	0		
Barium	50	5.00	50	0	100	80	120	0	0		
Cadmium	50.75	2.50	50	0.013	101	80	120	0	0		
Chromium	51.13	2.50	50	0	102	80	120	0	0		
Lead	49.45	5.00	50	0.3205	98.3	80	120	0	0		

Sample ID **0307078-009AMS** SampType: **MS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35648** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722664**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	38.97	4.16	41.63	3.023	86.3	75	125	0	0		
Barium	52.9	4.16	41.63	16.75	86.8	75	125	0	0		
Cadmium	38.73	2.08	41.63	0.2321	92.5	75	125	0	0		
Chromium	50.83	2.08	41.63	13.1	90.6	75	125	0	0		
Lead	60.42	4.16	41.63	25.79	83.2	75	125	0	0		

Sample ID **0307107-001AMS** SampType: **MS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: **BH-1(10-15)** Batch ID: **35672** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	47.11	4.98	49.83	3.305	87.9	75	125	0	0		
Barium	194.9	4.98	49.83	137.1	116	75	125	0	0		
Cadmium	46.26	2.49	49.83	0.3262	92.2	75	125	0	0		
Chromium	56.67	2.49	49.83	11.46	90.7	75	125	0	0		
Lead	464.8	4.98	49.83	478.6	-27.7	75	125	0	0		S

Sample ID **0307078-009ADUP** SampType: **DUP** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35648** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722663**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0307107
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_S

Sample ID **0307078-009ADUP** SampType: **DUP** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: Batch ID: **35648** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722663**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	4.15	0	0	0	0	0	3.023	0	20	
Barium	17.47	4.15	0	0	0	0	0	16.75	4.22	20	
Cadmium	BRL	2.07	0	0	0	0	0	0.2321	0	20	
Chromium	12.67	2.07	0	0	0	0	0	13.1	3.32	20	
Lead	24.99	4.15	0	0	0	0	0	25.79	3.17	20	

Sample ID **0307107-001ADUP** SampType: **DUP** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **7/3/2003** RunNo: **40096**
Client ID: **BH-1(10-15)** Batch ID: **35672** TestNo: **SW6010B** Analysis Date: **7/7/2003** SeqNo: **722887**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	4.93	0	0	0	0	0	3.305	0	20	
Barium	144.6	4.93	0	0	0	0	0	137.1	5.36	20	
Cadmium	BRL	2.46	0	0	0	0	0	0.3262	0	20	
Chromium	8.957	2.46	0	0	0	0	0	11.46	24.5	20	R
Lead	3661	4.93	0	0	0	0	0	478.6	154	20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

AES

July 09, 2003

Brent Cortelloni
Environmental Management Associates, LLC
4488 Commerce Drive
Suite A
Buford, Georgia 30518

TEL: (770) 271-4628
FAX (770) 271-8944

RE: Sunlow

Order No.: 0307153

Dear Brent Cortelloni:

Analytical Environmental Servs, Inc. received 3 samples on 7/7/2003 1:25:00 PM for the analyses presented in the following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative. AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water, effective 07/01/02-06/30/04.
-AIHA Certification number 505 for analysis of Air, Paint Chips, Soil and Dust Wipes, effective until 03/01/03.

These results relate only to the items tested. This report may only be reproduced in full and contains 8 total pages (including cover letter).

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

Sincerely,

Allison Cantrell

Allison Cantrell
Project Manager

3785 PRESIDENTIAL PARKWAY • ATLANTA, GEORGIA 30340 • TEL: (770) 457-8177 • FAX: (770) 457-8188

ANALYTICAL ENVIRONMENTAL SERVICES, INC.
3785 Presidential Pkwy., Atlanta, GA 30340-0370
TEL: (770) 457-8177 / TOLL FREE: (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 0307153

Date: ______ Page 1 of 1

COMPANY: EMA/BC

ADDRESS:

PHONE:

FAX:

SAMPLED BY: B. Castellano / J. Schall

SIGNATURE:

ANALYSIS REQUESTED

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	Total metals	REMARKS	No # of Containers
	MW-1	7-2-03		X		GW	X		
	MW-2	↓		X		↓	X	*	
*	MW-2DIS	↓		X		↓	Archive after Filtering	Filter through 0.45μ and archive	
								Total metals:	
								Lead	
								Barium	
								Cadmium	
								Chromium	
								Arsenic	

PRESERVATION

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1:	7/9/03	1:	7/9/03 1:45
2:		2:	
3:		3:	

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
[✓ CLIENT] FedEx UPS MAIL COURIER
GREYHOUND OTHER______

PO#:

QUOTE/CONTRACT #:

PROJECT INFORMATION
PROJECT NAME: Sunlow
PROJECT #: 191
FAC ID#:
SITE ADDRESS:
PROJECT MANAGER: B CasTellani
INVOICE TO:
(IF DIFFERENT FROM ABOVE)

RECEIPT
Total # of Containers

Turnaround Time Request
○ Standard 3-5 Business Days
○ Same Day Rush (auth req.)
○ Next Business Day Rush
☒ 2 Business Day Rush
○ Other ______

PROGRAM (see codes): ______

DATA PACKAGE: I II [✓ III] IV

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) O = Other (specify)

PRESERVATIVE CODES: H = Hydrochloric acid + ice I = Ice only N = Nitric acid + ice S = Sulfuric acid + ice O = Other (specify) NA = None

PR M: F FLD UST ST M NCU UST T GA FLC

White Copy - ORIGINAL; Yellow Copy - LAB; Pink Copy - CLIENT

Analytical Environmental Services, Inc.

Sample Receipt Checklist

Client EMA | BC

Date and Time 7-7-03 1:25

Work Order Number 0307153

Received by Amel Hadzic

Checklist completed by Nyeem Oban 7-7-03
Signature Date

Reviewed by AOG 7/7/03
Initials Date

Carrier name: FedEx __ UPS __ Courier __ [✓ Client] US Mail __ Other ______

Shipping container/cooler in good condition?	[✓ Yes]	No __	Not Present __
Custody seals intact on shipping container/cooler?	Yes __	No __	[✓ Not Present]
Custody seals intact on sample bottles?	Yes __	No __	[✓ Not Present]
Chain of custody present?	[✓ Yes]	No __	
Chain of custody signed when relinquished and received?	[✓ Yes]	No __	
Chain of custody agrees with sample labels?	[✓ Yes]	No __	
Samples in proper container/bottle?	[✓ Yes]	No __	
Sample containers intact?	[✓ Yes]	No __	
Sufficient sample volume for indicated test?	[✓ Yes]	No __	
All samples received within holding time?	[✓ Yes]	No __	
Was TAT marked on the COC?	[✓ Yes]	No __	
Proceed with Standard TAT as per project history?	Yes __	No __	[✓ Not Applicable]
Container/Temp Blank temperature in compliance?	[✓ Yes]	No __	

Cooler #1 4.7°C Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Water - VOA vials have zero headspace? [✓ No VOA vials submitted] Yes __ No __

Water - pH acceptable upon receipt? [✓ Yes] No __ Not Applicable __

Adjusted? ____________ Checked by N.O

Any No and/or NA (not applicable) response must be detailed in the comments section below:

Client contacted ______________ Date contacted: ______________ Person contacted ______________

Contacted by: ______________ Regarding ______________

Comments:

Corrective Action

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	MW-1
Lab Order:	0307153	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/7/2003
Lab ID:	0307153-001A	**Matrix:**	GROUNDWATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	0.0500		mg/L	1	7/8/2003 5:18:00 PM
Barium	0.0530	0.0200		mg/L	1	7/8/2003 5:18:00 PM
Cadmium	BRL	0.0050		mg/L	1	7/8/2003 5:18:00 PM
Chromium	BRL	0.0100		mg/L	1	7/8/2003 5:18:00 PM
Lead	BRL	0.0100		mg/L	1	7/8/2003 5:18:00 PM

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *09-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	MW-2
Lab Order:	0307153	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/7/2003
Lab ID:	0307153-002A	**Matrix:**	GROUNDWATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, TOTAL		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	0.0500		mg/L	1	7/8/2003 5:32:00 PM
Barium	0.132	0.0200		mg/L	1	7/8/2003 5:32:00 PM
Cadmium	BRL	0.0050		mg/L	1	7/8/2003 5:32:00 PM
Chromium	BRL	0.0100		mg/L	1	7/8/2003 5:32:00 PM
Lead	0.0178	0.0100		mg/L	1	7/8/2003 5:32:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc. **Date:** *09-Jul-03*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	MW2-DIS
Lab Order:	0307153	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/7/2003
Lab ID:	0307153-003A	**Matrix:**	GROUNDWATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
METALS, DISSOLVED		**SW6010B**				Analyst: **CDW**
Arsenic	BRL	0.0500		mg/L	1	7/8/2003 5:36:00 PM
Barium	0.114	0.0200		mg/L	1	7/8/2003 5:36:00 PM
Cadmium	BRL	0.0050		mg/L	1	7/8/2003 5:36:00 PM
Chromium	BRL	0.0100		mg/L	1	7/8/2003 5:36:00 PM
Lead	BRL	0.0100		mg/L	1	7/8/2003 5:36:00 PM

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Servs, Inc.

Date: *09-Jul-03*

CLIENT: Environmental Management Associates, LL
Work Order: 0307153
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_W_T

Sample ID **MB-35745** SampType: **MBLK** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **7/8/2003** RunNo: **40126**
Client ID: Batch ID: **35745** TestNo: **SW6010B** Analysis Date: **7/8/2003** SeqNo: **724139**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.0500									
Barium	BRL	0.0200									
Cadmium	BRL	0.00500									
Chromium	BRL	0.0100									
Lead	BRL	0.0100									

Sample ID **LCS-35745** SampType: **LCS** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **7/8/2003** RunNo: **40126**
Client ID: Batch ID: **35745** TestNo: **SW6010B** Analysis Date: **7/8/2003** SeqNo: **724138**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.9653	0.0500	1	0	96.5	85	115	0	0		
Barium	0.9822	0.0200	1	0	98.2	85	115	0	0		
Cadmium	1.003	0.00500	1	0	100	85	115	0	0		
Chromium	1.003	0.0100	1	0	100	85	115	0	0		
Lead	0.9665	0.0100	1	0	96.6	85	115	0	0		

Sample ID **0307153-001AMS** SampType: **MS** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **7/8/2003** RunNo: **40126**
Client ID: **MW-1** Batch ID: **35745** TestNo: **SW6010B** Analysis Date: **7/8/2003** SeqNo: **724142**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.9476	0.0500	1	0	94.8	75	125	0	0		
Barium	0.9906	0.0200	1	0.05304	93.8	75	125	0	0		
Cadmium	1.015	0.00500	1	0	101	75	125	0	0		
Chromium	0.9859	0.0100	1	0.00231	98.4	75	125	0	0		
Lead	0.9691	0.0100	1	0.00381	96.5	75	125	0	0		

Qualifiers:	B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0307153
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_W_T

Sample ID **0307153-001ADUP** SampType: **DUP** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **7/8/2003** RunNo: **40126**
Client ID: **MW-1** Batch ID: **35745** TestNo: **SW6010B** Analysis Date: **7/8/2003** SeqNo: **724141**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.0500	0	0	0	0	0	0	0	20	
Barium	0.05286	0.0200	0	0	0	0	0	0.05304	0.340	20	
Cadmium	BRL	0.00500	0	0	0	0	0	0	0	20	
Chromium	BRL	0.0100	0	0	0	0	0	0.00231	0	20	
Lead	BRL	0.0100	0	0	0	0	0	0.00381	0	20	

Qualifiers:	B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

AES

November 20, 2006

Brent Cortelloni
Environmental Management Associates, LLC

5262 Belle Wood Court, Suite A
Buford, Georgia 30518
TEL: (770) 271-4628
FAX: (770) 271-8944

RE: Sunlow

Order No.: 0611182

Dear Brent Cortelloni:

Analytical Environmental Services, Inc. received 8 samples on 11/2/2006 2:44:00 PM for the analyses presented in the following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative. Sample results are not dry weight corrected, unless if Pmoist analysis are requested on the chain of custody or other project specific arrangements have been made.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water, effective 06/01/06-06/30/07.
-AIHA Certification number 505 for analysis of Industrial Hygiene samples (Organics, Inorganics), Paint Chips, Soil and Dust Wipes, effective until 02/01/07.

These results relate only to the items tested. This report may only be reproduced in full and contains 17 total pages (including cover letter).

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

Sincerely,

James Forrest

James Forrest
Project Manager
Revision: Analyses added at client's request.

AES ANALYTICAL ENVIRONMENTAL SERVICES, INC
3785 Presidential Parkway, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 0611182

Date: ________ Page ____ of ____

COMPANY: EMA / BC

ADDRESS:

PHONE:

FAX:

SAMPLED BY: B. Castellan

SIGNATURE: B.

#	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	Grab	Composite	Matrix (See codes)	Select Metals												REMARKS	No # of Containers
1	BH-1 (2.5-10)	7-2-03	—	X			X												Arsenic	
2	BH-3 (0-5)	↓	—	↓			X												Barium	
3	BH-5 (0-5)	↓	—	↓			X												Cadmium	
4	BH-6 (0-5)	↓	—	↓			X												Chromium	
5	BH-7 (5-10)	↓	—	↓			X												Lead	
6	BH-10 (3-5)	11-2-06	10:45	↓			X													
7	Dup.	↓	—	↓			X													
8	Rinsate						X													
9																				
10																				
11																				
12																				
13																				
14																				

ANALYSIS REQUESTED

PRESERVATION (See codes)

Visit our website **www.aesatlanta.com** to check on the status of your results, place bottle orders, etc.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1: B.	11-2-06/2:44	1:	11-2-6 1444
2:		2:	
3:		3:	

PROJECT INFORMATION

PROJECT NAME: Swalow

PROJECT #: 191

SITE ADDRESS:

SEND REPORT TO:

INVOICE TO:
(IF DIFFERENT FROM ABOVE)

QUOTE #: ________ PO#: ________

RECEIPT

Total # of Containers

Turnaround Time Request
- ☒ Standard 5 Business Days
- ○ 2 Business Day Rush
- ○ Next Business Day Rush
- ○ Same Day Rush (auth req.)
- ○ Other ________

STATE PROGRAM (if any): ________

E-mail? Y / N; Fax? Y / N

DATA PACKAGE: I II [✓ III] IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD

OUT / / VIA:

IN / / VIA:

[✓ CLIENT] FedEx UPS MAIL COURIER

GREYHOUND OTHER ________

SAMPLES RECEIVED AFTER 3PM OR SATURDAY ARE CONSIDERED AS RECEIVED ON THE NEXT BUSINESS DAY; IF NO TAT IS MARKED ON COC AES WILL PROCEED AS STANDARD TAT.
SAMPLES ARE DISPOSED OF 30 DAYS AFTER COMPLETION OF REPORT UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify)

PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client EMA / BC Work Order Number 0611182

Checklist completed by Akalu D. 11/02/06
Signature Date

Carrier name: FedEx __ UPS __ Courier __ [✓ Client] US Mail __ Other ______

Shipping container/cooler in good condition? [✓ Yes] No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ [✓ Not Present]

Custody seals intact on sample bottles? Yes __ No __ [✓ Not Present]

Container/Temp Blank temperature in compliance? (4°C±2)* [✓ Yes] No __

Cooler #1 3.9 °C Cooler #2 ______ Cooler #3 ______ Cooler #4 ______ Cooler#5 ______ Cooler #6 ______

Chain of custody present? [✓ Yes] No __

Chain of custody signed when relinquished and received? [✓ Yes] No __

Chain of custody agrees with sample labels? [✓ Yes] No ~~✓~~ AA 11-9-06

Samples in proper container/bottle? [✓ Yes] No __

Sample containers intact? [✓ Yes] No __

Sufficient sample volume for indicated test? [✓ Yes] No __

All samples received within holding time? Yes __ [✓ No]

Was TAT marked on the COC? [✓ Yes] No __

Proceed with Standard TAT as per project history? Yes __ No __ [✓ Not Applicable]

Water - VOA vials have zero headspace? [✓ No VOA vials submitted] Yes __ No __

Water - pH acceptable upon receipt? [✓ Yes] No __ Not Applicable __

Adjusted? __________ Checked by A. D.

Sample Condition: [✓ Good] Other(Explain) ____________________

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ [✓ No]

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\\Aes_server\I\Sample Receipt\Documents on C\my documents\IMPORTANT DOCUMENTS - EROL\Checklist.rtf

Analytical Environmental Services, Inc. **Date:** *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Project: Sunlow
Lab Order: 0611182

CASE NARRATIVE

Samples "BH-1", "BH-3", "BH-5", "BH-6", "BH-7", were received outside om method required holding time of 180 days. Proceed with analysis per Brent Cortelloni on 11/3/2006.

Metals Analysis by Method 6010B:

Matrix spike recoveries for barium and arsenic on sample 0611322-001A were outside control limits. LCS recovery was within control limits indicating possible matrix interference.

Matrix spike duplicate recovery for arsenic on sample 0611322-001A was outside control limits. LCS recovery was within control limits indicating possible matrix interference.

Analyze "BH-6 (0-5)" for SPLP Ba and "BH-1 (2.5-10)" for SPLP As at standard TAT per Brent Cortelloni on 11/15/2006. Brent is aware of holding times.

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Lab Order: 0611182
Project: Sunlow
Lab ID: 0611182-001A

Client Sample ID: BH-1 (2.5-10)
Tag Number:
Collection Date: 7/2/2003
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
ICP METALS, SPLP		SW1312/6010B		(SW3010A)			Analyst: LKW
Arsenic	BRL	0.0500		mg/L	77726	1	11/17/2006 12:27:12 P
METALS, TOTAL		SW6010B		(SW3050B)			Analyst: LKW
Arsenic	57.2	4.91	H	mg/Kg	77315	1	11/8/2006 12:43:32 P
Barium	778	4.91	H	mg/Kg	77315	1	11/7/2006 10:03:44 P
Cadmium	15.3	2.46	H	mg/Kg	77315	1	11/7/2006 10:03:44 P
Chromium	46.3	2.46	H	mg/Kg	77315	1	11/7/2006 10:03:44 P
Lead	6270	49.1	H	mg/Kg	77315	10	11/8/2006 12:56:57 P

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Lab Order: 0611182
Project: Sunlow
Lab ID: 0611182-002A

Client Sample ID: BH-3 (0-5)
Tag Number:
Collection Date: 7/2/2003
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B			(SW3050B)		Analyst: LKW
Arsenic	BRL	4.92	H	mg/Kg	77315	1	11/7/2006 10:05:48 P
Barium	154	4.92	H	mg/Kg	77315	1	11/7/2006 10:05:48 P
Cadmium	BRL	2.46	H	mg/Kg	77315	1	11/7/2006 10:05:48 P
Chromium	16.1	2.46	H	mg/Kg	77315	1	11/7/2006 10:05:48 P
Lead	24.7	4.92	H	mg/Kg	77315	1	11/7/2006 10:05:48 P

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Lab Order: 0611182
Project: Sunlow
Lab ID: 0611182-003A

Client Sample ID: BH-5 (0-5)
Tag Number:
Collection Date: 7/2/2003
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B		(SW3050B)			Analyst: LKW
Arsenic	18.7	4.85	H	mg/Kg	77315	1	11/8/2006 12:45:35 P
Barium	548	4.85	H	mg/Kg	77315	1	11/7/2006 10:07:52 P
Cadmium	BRL	2.43	H	mg/Kg	77315	1	11/7/2006 10:07:52 P
Chromium	33.0	2.43	H	mg/Kg	77315	1	11/7/2006 10:07:52 P
Lead	877	4.85	H	mg/Kg	77315	1	11/7/2006 10:07:52 P

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: 20-Nov-06

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	BH-6 (0-5)
Lab Order:	0611182	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	7/2/2003
Lab ID:	0611182-004A	**Matrix:**	SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
ICP METALS, SPLP		SW1312/6010B		(SW3010A)			Analyst: LKW
Barium	BRL	0.100		mg/L	77726	1	11/17/2006 12:31:11 F
METALS, TOTAL		SW6010B		(SW3050B)			Analyst: LKW
Arsenic	BRL	4.98	H	mg/Kg	77315	1	11/8/2006 12:47:38 P
Barium	2780	49.8	H	mg/Kg	77315	10	11/8/2006 12:59:56 P
Cadmium	BRL	2.49	H	mg/Kg	77315	1	11/7/2006 10:09:56 P
Chromium	41.9	2.49	H	mg/Kg	77315	1	11/7/2006 10:09:56 P
Lead	319	4.98	H	mg/Kg	77315	1	11/7/2006 10:09:56 P

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Lab Order: 0611182
Project: Sunlow
Lab ID: 0611182-005A

Client Sample ID: BH-7 (5-10)
Tag Number:
Collection Date: 7/2/2003
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B			(SW3050B)		Analyst: LKW
Arsenic	120	4.87	H	mg/Kg	77315	1	11/8/2006 12:49:43 P
Barium	481	4.87	H	mg/Kg	77315	1	11/7/2006 10:12:03 P
Cadmium	BRL	2.43	H	mg/Kg	77315	1	11/7/2006 10:12:03 P
Chromium	40.2	2.43	H	mg/Kg	77315	1	11/7/2006 10:12:03 P
Lead	1650	4.87	H	mg/Kg	77315	1	11/7/2006 10:12:03 P

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Lab Order: 0611182
Project: Sunlow
Lab ID: 0611182-006A

Client Sample ID: BH-10 (3-5)
Tag Number:
Collection Date: 11/2/2006 10:45:00 AM
Matrix: SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B		(SW3050B)			Analyst: LKW
Arsenic	44.5	4.81		mg/Kg	77315	1	11/8/2006 12:51:50 P
Barium	1540	48.1		mg/Kg	77315	10	11/8/2006 1:03:00 PM
Cadmium	BRL	2.41		mg/Kg	77315	1	11/7/2006 10:14:06 P
Chromium	32.5	2.41		mg/Kg	77315	1	11/7/2006 10:14:06 P
Lead	783	4.81		mg/Kg	77315	1	11/7/2006 10:14:06 P

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Analytical Environmental Services, Inc.

Date: *20-Nov-06*

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	DUP
Lab Order:	0611182	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	11/2/2006
Lab ID:	0611182-007A	**Matrix:**	SOLID

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B			(SW3050B)		Analyst: LKW
Arsenic	49.5	4.59		mg/Kg	77315	1	11/8/2006 12:53:56 P
Barium	1330	45.9		mg/Kg	77315	10	11/8/2006 1:12:50 PM
Cadmium	BRL	2.29		mg/Kg	77315	1	11/7/2006 10:16:12 P
Chromium	38.1	2.29		mg/Kg	77315	1	11/7/2006 10:16:12 P
Lead	1220	4.59		mg/Kg	77315	1	11/7/2006 10:16:12 P

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	BRL	Below Reporting Limit	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	N	Analyte not NELAC certified	P	NELAC analyte certification pending
	Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

CLIENT:	Environmental Management Associates, LL	**Client Sample ID:**	RINSATE
Lab Order:	0611182	**Tag Number:**	
Project:	Sunlow	**Collection Date:**	11/2/2006
Lab ID:	0611182-008A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	BatchID	DF	Date Analyzed
METALS, TOTAL		SW6010B		(SW3010A)			Analyst: BB
Arsenic	BRL	0.0500		mg/L	77338	1	11/9/2006 9:30:26 AM
Barium	BRL	0.0200		mg/L	77338	1	11/9/2006 9:30:26 AM
Cadmium	BRL	0.0050		mg/L	77338	1	11/9/2006 9:30:26 AM
Chromium	BRL	0.0100		mg/L	77338	1	11/9/2006 9:30:26 AM
Lead	BRL	0.0100		mg/L	77338	1	11/9/2006 9:30:26 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Analyte not NELAC certified	P	NELAC analyte certification pending
Rpt Limit	Reporting Limit	S	Spike Recovery outside accepted recovery limits

Date: *20-Nov-06*

CLIENT: Environmental Management Associates, LL
Work Order: 0611182
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 1312_M

Sample ID: **MB-77726** SampType: **MBLK** TestCode: **1312_M** Units: **mg/L** Prep Date: **11/17/2006** RunNo: **94334**
Client ID: Batch ID: **77726** TestNo: **SW1312/6010** Analysis Date: **11/17/2006** SeqNo: **1881226**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.0500									
Barium	BRL	0.100									

Sample ID: **LCS-77726** SampType: **LCS** TestCode: **1312_M** Units: **mg/L** Prep Date: **11/17/2006** RunNo: **94334**
Client ID: Batch ID: **77726** TestNo: **SW1312/6010** Analysis Date: **11/17/2006** SeqNo: **1881225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.081	0.0500	1	0.01218	107	85	115	0	0		
Barium	1.073	0.100	1	0	107	85	115	0	0		

Sample ID: **0611850-001AMS** SampType: **MS** TestCode: **1312_M** Units: **mg/L** Prep Date: **11/17/2006** RunNo: **94334**
Client ID: Batch ID: **77726** TestNo: **SW1312/6010** Analysis Date: **11/17/2006** SeqNo: **1881229**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.08	0.0500	1	0.01444	107	75	125	0	0		
Barium	1.075	0.100	1	0.0197	106	75	125	0	0		

Sample ID: **0611850-001AMSD** SampType: **MSD** TestCode: **1312_M** Units: **mg/L** Prep Date: **11/17/2006** RunNo: **94334**
Client ID: Batch ID: **77726** TestNo: **SW1312/6010** Analysis Date: **11/17/2006** SeqNo: **1881230**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.089	0.0500	1	0.01444	107	75	125	1.08	0.825	20	
Barium	1.076	0.100	1	0.0197	106	75	125	1.075	0.0477	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0611182
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_S

Sample ID: **MB-77315** SampType: **MBLK** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **11/7/2006** RunNo: **93754**
Client ID: Batch ID: **77315** TestNo: **SW6010B** Analysis Date: **11/7/2006** SeqNo: **1868282**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	5.00									
Barium	BRL	5.00									
Cadmium	BRL	2.50									
Chromium	BRL	2.50									
Lead	BRL	5.00									

Sample ID: **LCS-77315** SampType: **LCS** TestCode: **6010B_S** Units: **mg/Kg** Prep Date: **11/7/2006** RunNo: **93754**
Client ID: Batch ID: **77315** TestNo: **SW6010B** Analysis Date: **11/7/2006** SeqNo: **1868281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	49.37	5.00	50	0	98.7	80	120	0	0		
Barium	50.04	5.00	50	0	100	80	120	0	0		
Cadmium	47.9	2.50	50	0	95.8	80	120	0	0		
Chromium	51	2.50	50	0	102	80	120	0	0		
Lead	49.67	5.00	50	0	99.3	80	120	0	0		

Sample ID: **0611322-001AMS** SampType: **MS** TestCode: **6010B_S** Units: **mg/Kg-dry** Prep Date: **11/7/2006** RunNo: **93754**
Client ID: Batch ID: **77315** TestNo: **SW6010B** Analysis Date: **11/7/2006** SeqNo: **1868284**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	41.28	6.40	64.04	0	64.5	75	125	0	0		S
Barium	172.9	6.40	64.04	139	53	75	125	0	0		S
Cadmium	60.66	3.20	64.04	0	94.7	75	125	0	0		
Chromium	94.9	3.20	64.04	44.01	79.5	75	125	0	0		
Lead	70.29	6.40	64.04	14.16	87.6	75	125	0	0		

Sample ID: **0611322-001AMSD** SampType: **MSD** TestCode: **6010B_S** Units: **mg/Kg-dry** Prep Date: **11/7/2006** RunNo: **93754**
Client ID: Batch ID: **77315** TestNo: **SW6010B** Analysis Date: **11/7/2006** SeqNo: **1868285**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0611182
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_S

Sample ID: **0611322-001AMSD** SampType: **MSD** TestCode: **6010B_S** Units: **mg/Kg-dry** Prep Date: **11/7/2006** RunNo: **93754**
Client ID: Batch ID: **77315** TestNo: **SW6010B** Analysis Date: **11/7/2006** SeqNo: **1868285**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	44.07	6.44	64.44	0	68.4	75	125	41.28	6.54	20	S
Barium	188.2	6.44	64.44	139	76.5	75	125	172.9	8.47	20	
Cadmium	63.91	3.22	64.44	0	99.2	75	125	60.66	5.22	20	
Chromium	102.4	3.22	64.44	44.01	90.7	75	125	94.9	7.64	20	
Lead	74.58	6.44	64.44	14.16	93.8	75	125	70.29	5.93	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0611182
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_W_T

Sample ID: **MB-77338** SampType: **MBLK** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **11/7/2006** RunNo: **93818**
Client ID: Batch ID: **77338** TestNo: **SW6010B** Analysis Date: **11/9/2006** SeqNo: **1869689**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	BRL	0.0500									
Barium	BRL	0.0200									
Cadmium	BRL	0.00500									
Chromium	BRL	0.0100									
Lead	BRL	0.0100									

Sample ID: **LCS-77338** SampType: **LCS** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **11/7/2006** RunNo: **93818**
Client ID: Batch ID: **77338** TestNo: **SW6010B** Analysis Date: **11/9/2006** SeqNo: **1869901**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.077	0.0500	1	0	108	85	115	0	0		
Barium	1.084	0.0200	1	0	108	85	115	0	0		
Cadmium	1.083	0.00500	1	0	108	85	115	0	0		
Chromium	1.109	0.0100	1	0	111	85	115	0	0		
Lead	1.083	0.0100	1	0	108	85	115	0	0		

Sample ID: **0611174-001BMS** SampType: **MS** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **11/7/2006** RunNo: **93818**
Client ID: Batch ID: **77338** TestNo: **SW6010B** Analysis Date: **11/9/2006** SeqNo: **1869694**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.058	0.0500	1	0	106	75	125	0	0		
Barium	1.079	0.0200	1	0.08418	99.4	75	125	0	0		
Cadmium	1.056	0.00500	1	0	106	75	125	0	0		
Chromium	1.085	0.0100	1	0	109	75	125	0	0		
Lead	1.016	0.0100	1	0	102	75	125	0	0		

Sample ID: **0611174-001BMSD** SampType: **MSD** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **11/7/2006** RunNo: **93818**
Client ID: Batch ID: **77338** TestNo: **SW6010B** Analysis Date: **11/9/2006** SeqNo: **1869698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	BRL	Below Reporting Limit	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits	N	Analyte not NELAC certified
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits		

CLIENT: Environmental Management Associates, LL
Work Order: 0611182
Project: Sunlow

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010B_W_T

Sample ID: **0611174-001BMSD** SampType: **MSD** TestCode: **6010B_W_T** Units: **mg/L** Prep Date: **11/7/2006** RunNo: **93818**
Client ID: Batch ID: **77338** TestNo: **SW6010B** Analysis Date: **11/9/2006** SeqNo: **1869698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	1.073	0.0500	1	0	107	75	125	1.058	1.39	20	
Barium	1.115	0.0200	1	0.08418	103	75	125	1.079	3.36	20	
Cadmium	1.069	0.00500	1	0	107	75	125	1.056	1.19	20	
Chromium	1.112	0.0100	1	0	111	75	125	1.085	2.38	20	
Lead	1.042	0.0100	1	0	104	75	125	1.016	2.54	20	

Qualifiers:

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
BRL Below Reporting Limit
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits
E Value above quantitation range
N Analyte not NELAC certified

APPENDIX C

BORING LOGS / WELL CONSTRUCTION DIAGRAMS

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
0	**ASPHALT**	970
	FILL - Reddish brown to tan slightly micaceous fine sandy **SILT**.	
	PID = ND	
5		965
	Wood and brick debris at 9 feet. PID = ND	
10		960
	RESIDUAL - Red brown to tan slightly micaceous fine sandy **SILT**.	
	PID = ND	
15		955
	PID = ND	
20		950
	PID = ND	
25	∇	945
30		940
	Boring terminated at 34 feet.	
35		935
40		930
45		925

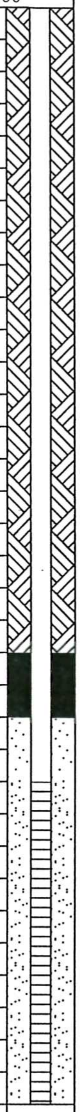
SAMPLES: IDENT | TYPE | N-COUNT: 1st 6" 2nd 6" 3rd 6"

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100



SOIL TEST BORING 1071 HOWELL MILL.GPJ AMEC.GDT 8/28/12

DRILLER: AMEC
EQUIPMENT: CME 750
METHOD: HSA
HOLE DIA.: 6.75 inches
REMARKS: Depth to groundwater measured on 8/28/12 at 25.5 feet.
ND = non detect at 0.1 ppm.

PREPARED BY: S. Foley CHECKED BY: C. Ferry

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

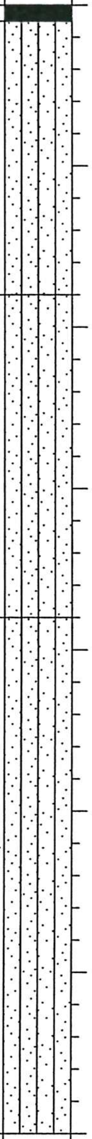
BORING NO.: MW-1R
PROJECT: 1071 Howell Mill
LOCATION: Atlanta, Georgia
DRILLED: July 3, 2012
PROJECT NO.: 6121-12-0124

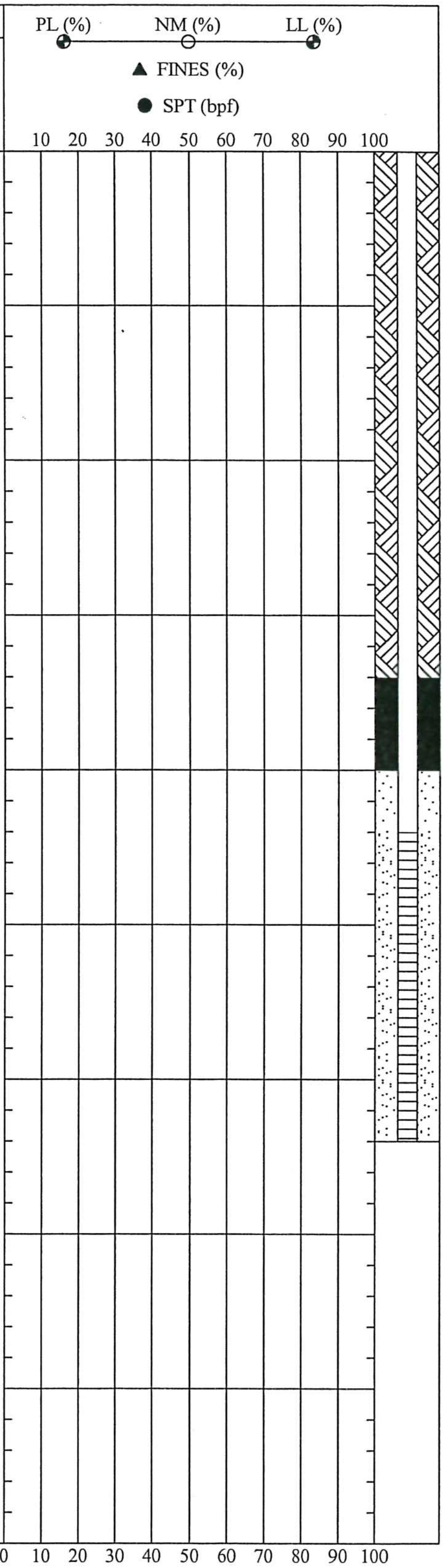
PAGE 1 **OF** 1

amec

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	**ASPHALT** and base.				
	FILL - Reddish brown to tan slightly micaceous fine sandy **SILT**. PID = ND				
	PID = ND				
5					
	PID = ND				
	RESIDUAL - Red brown to tan slightly micaceous fine sandy **SILT**.				
10	PID = 0.4 ppm				
	PID = ND				
	PID = ND				
15					
	PID = ND				
	PID = 0.8 ppm				
	Tan, pink and black slightly micaceous fine to medium sandy **SILT**.				
20	PID = ND				
	PID = ND				
	Wet. Geoprobe refusal at 24 feet.				
25					
	▽				
30					
35	Auger refusal at 35 feet.				
40					
45					





DRILLER: Atlas Geoprobe
EQUIPMENT: Power Probe 9100
METHOD: Direct Push/HSA
HOLE DIA.: 2/4.25 ID
REMARKS: Depth to groundwater measured on 8/25/12 at 26.13 feet.
ND = non detect at 0.1 ppm.

PREPARED BY: S. Foley CHECKED BY: C. Ferry

SOIL TEST BORING RECORD

BORING NO.: MW-3
PROJECT: 1071 Howell Mill
LOCATION: Atlanta, Georgia
DRILLED: May 31, 2012
PROJECT NO.: 6121-12-0124

PAGE 1 OF 1

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

amec

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

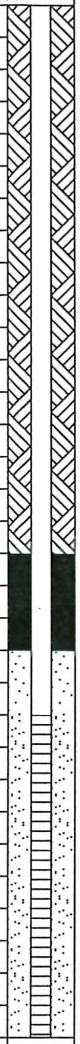
DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6"	2nd 6"	3rd 6"
0	**CONCRETE**							
	FILL - Red brown to orange brown slightly micaceous fine sandy **SILT** with some gravel and concrete debris. PID = ND PID = ND							
5	Red brown to black fine to coarse **SAND** and fine gravel with some brick fragments. PID = ND PID = ND							
10	PID = ND PID = ND							
15	Red brown fine to coarse **SAND** and fine gravel. PID = ND							
20	Dark brown silty fine to coarse **SAND** with some slag. PID = ND PID = ND PID = ND ▽							
25	RESIDUAL - Red brown to tan-gray clayey fine to medium **SAND**. PID = ND PID = ND PID = ND							
30	Geoprobe terminated at 32 feet.							
35	Auger refusal at 35 feet.							
40								
45								

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100



DRILLER: Atlas Geoprobe
EQUIPMENT: Power Probe 9100
METHOD: Direct Push/HSA
HOLE DIA.: 2/4.25 ID
REMARKS: Depth to groundwater measured on 8/28/12 at 24.84 feet.
ND = non detect at 0.1 ppm.

PREPARED BY: S. Foley CHECKED BY: C. Ferry

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

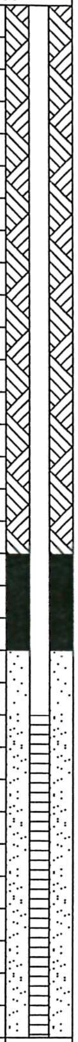
SOIL TEST BORING RECORD

BORING NO.: MW-4
PROJECT: 1071 Howell Mill
LOCATION: Atlanta, Georgia
DRILLED: May 31, 2012
PROJECT NO.: 6121-12-0124

PAGE 1 **OF** 1

amec

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: IDENT	TYPE	N-COUNT: 1st 6"	2nd 6"	3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
0	**CONCRETE**								
	FILL - Orange brown slightly micaceous fine to medium sandy **SILT**. PID = 0.1 ppm PID = ND								
5	PID = ND								
10	PID = ND								
	Gray **SAND** with gravel, concrete and brick debris. PID = ND								
15	Red brown slightly micaceous fine to medium sandy **SILT** with some black material. PID = ND PID = ND PID = ND								
	Crushed **BRICK** fragments. PID = ND								
20	Black sandy **GRAVEL** material. PID = 1.4 ppm								
25	Black fine **SAND** - (foundry sand). PID = 1.1 ppm ▽								
	Black medium to coarse **SAND** and gravel. Wet. PID = ND								
30	RESIDUAL - Tan to brown clayey micaceous fine sandy **SILT**. PID = ND Geoprobe terminated at 32 feet.								
35	Auger refusal at 35 feet.								
40									
45									



0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING 1071 HOWELL MILL.GPJ AMEC.GDT 8/28/12

DRILLER: Atlas Geoprobe
EQUIPMENT: Power Probe 9100
METHOD: Direct Push/HSA
HOLE DIA.: 2/4.25 ID
REMARKS: Depth to groundwater measured on 8/28/12 at 25.87 feet.
ND = non detect at 0.1 ppm.

PREPARED BY: S. Foley CHECKED BY: C. Ferry

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: MW-5
PROJECT: 1071 Howell Mill
LOCATION: Atlanta, Georgia
DRILLED: May 31, 2012
PROJECT NO.: 6121-12-0124

PAGE 1 **OF** 1

amec

Environmental Management Associates, LLC
5262 Belle Wood Court, Suite A
Buford, Georgia

Stratigraphic Log BH-1

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller

Well:
Elev.:

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION
0			▩	Concrete, gravel
2 4		SC	▨	SC - SAND/CLAY, sand,brown, fine grained, dry
6 8		FB	■	Black sand, gravel, brick - FILL
10 12 14 16		FB	■	some slag material, brown, black
18		CL/ML	▩	CL/ML - CLAY/SILT, trace sand, medium dense, moist, brown/orange
20 22 24 26		SC	▨	SAND, Well Graded, ML - SILT, tan-orange, fine grained, moist, striated saprolite
28		SC	▨	medium dense to dense, vestigial bedrock, pink granite, moist, saprolite
30 32 34				End of boring

Sample Number	Sample Method	Sample ID
1	MC	BH-1(2.5-10)
2	MC	
3	MC	BH-1(10-15)
4	MC	
5	MC	
6	MC	BH-1(25-30)

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Buford, Georgia

Stratigraphic Log BH-2

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID	Well: Elev.:
0				Wood, void				
2		FB		Rock fragments, silt, FILL	1	MC	BH-2(2-5)	
4								
6				ML/CL - SILT/CLAY, dense, plastic, brown/orange, moist				
8					2	MC		
10								
12					3	MC	BH-2(10-15)	
14								
16								
18		ML			4	MC	BH-2(15-20)	
20								
22					5	MC		
24								
26								
28					6	MC		
30		ML		blue/green SILT/CLAY End of boring				
32								
34								

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Buford, Georgia

Stratigraphic Log BH-3

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID
0			▦	Concrete, gravel			
2			▥	ML/CL - SILT/CLAY, trace sand, medium dense,fine grained, no structure, brown/orange, dry	1	MC	BH-3(2-5)
4							
6							
8		ML			2	MC	
10							
12					3	MC	
14							
16		FB	■	Black sand, concrete, FILL			
18		ML	▥	ML/CL - SILT/CLAY trace sand, medium dense, brown/orange, dry	4	MC	BH-3(15-20)
20			■	black sand, trace concrete, brick, wet			
22					5	MC	
24							
26		FB					
28					6	MC	
30							
32					7	MC	
34			▥	ML/CL - SILT/CLAY, some sand, dense, plastic, poor structure, brown/yellow, moist			
36		ML					
38					8	MC	BH-3(35-40)
40				End of boring, Refusal at 39.0 feet bgs			
42							
44							

Well:
Elev.:

Environmental Management Associates, LLC
5262 Belle Wood Court, Suite A
Buford, Georgia

Stratigraphic Log BH-4

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller

Well:
Elev.:

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID
0				Concrete, gravel			
2		ML		ML/CL - SILT/CLAY, trace sand, medium dense,fine grained, no structure, brown/orange, dry	1	MC	
					2	MC	
					3	MC	
14		FB		metal nail, concrete, FILL	4	MC	BH-4(15-20)
					5	MC	
24		ML		ML/CL - SILT/CLAY trace sand, medium dense, brown/orange, dry, wet at 25 feet bgs	6	MC	BH-4(25-30)
30				End of boring			

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Buford, Georgia

Stratigraphic Log BH-5

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller

Well:
Elev.:

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID
0				Concrete, gravel			
2		CL		CL - CLAY, some silt, dense,plastic, brown/orange, dry	1	MC	BH-5(2-5)
4				black sand, concrete, some clay, FILL			
6							
8					2	MC	
10							
12					3	MC	
14		FB					
16							
18					4	MC	BH-5(15-20)
20							
22					5	MC	
24							
26				CL - CLAY trace sand, dense, plastic brown/gray, moist			
28		CL			6	MC	BH-5(25-30)
30				End of boring			
32							
34							
36							
38							
40							
42							
44							

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Buford, Georgia

Stratigraphic Log BH-6

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started	: 7/2/03	Company Rep.	: John Schwaller
Date Completed	: 7/2/03	Northing Coord.	:
Hole Diameter	: 2-inches	Easting Coord.	:
Drilling Method	: Direct Push - Geoprobe	Survey By	:
Sampling Method	: Geoprobe - Macrocore	Logged By	: John Schwaller

Well:
Elev.:

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID
0				Concrete, gravel			
2				Brick, concrete, granite fragments, black sand, little to no recovery	1	MC	BH-6(2-5)
4							
6							
8					2	MC	
10		FB					
12					3	MC	
14							
16							
18					4	MC	BH-6(15-20)
20				ML/CL - SILT/CLAY, trace sand, dense, plastic poor structure, gray/green, moist			
22		ML			5	MC	BH-6(20-25)
24							
26				End of boring			
28							
30							
32							
34							
36							
38							
40							
42							
44							

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5262 Belle Wood Court, Suite A
Buford, Georgia

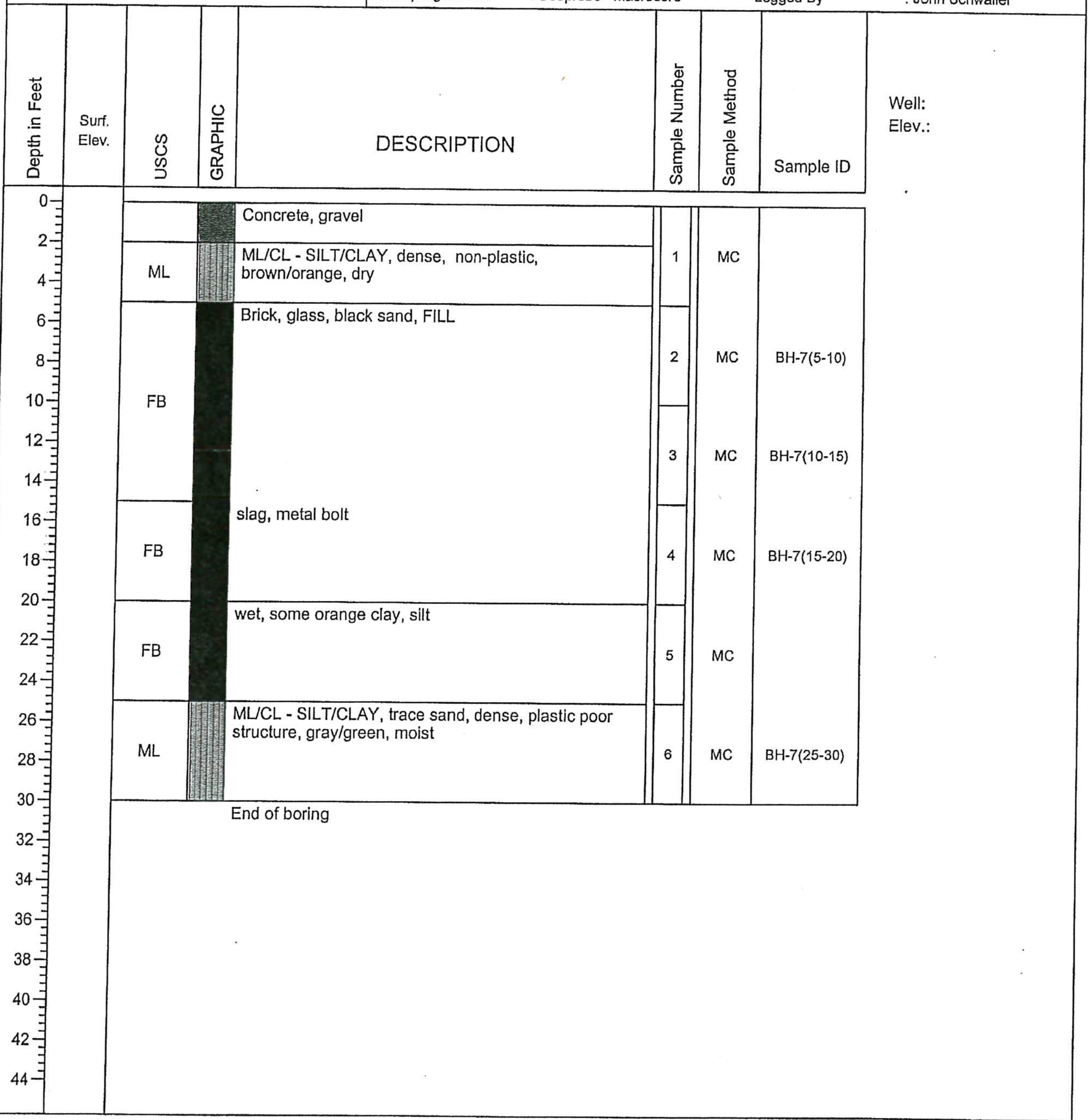
Stratigraphic Log BH-7

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started : 7/2/03
Date Completed : 7/2/03
Hole Diameter : 2-inches
Drilling Method : Direct Push - Geoprobe
Sampling Method : Geoprobe - Macrocore

Company Rep. : John Schwaller
Northing Coord. :
Easting Coord. :
Survey By :
Logged By : John Schwaller



USCS	DESCRIPTION	Sample Number	Sample Method	Sample ID
	Concrete, gravel	1	MC	
ML	ML/CL - SILT/CLAY, dense, non-plastic, brown/orange, dry			
FB	Brick, glass, black sand, FILL	2	MC	BH-7(5-10)
		3	MC	BH-7(10-15)
FB	slag, metal bolt	4	MC	BH-7(15-20)
FB	wet, some orange clay, silt	5	MC	
ML	ML/CL - SILT/CLAY, trace sand, dense, plastic poor structure, gray/green, moist	6	MC	BH-7(25-30)

End of boring

Well:
Elev.:

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Buford, Georgia

Stratigraphic & Instrumentation Log MW-2 (BH-8)

(Page 1 of 1)

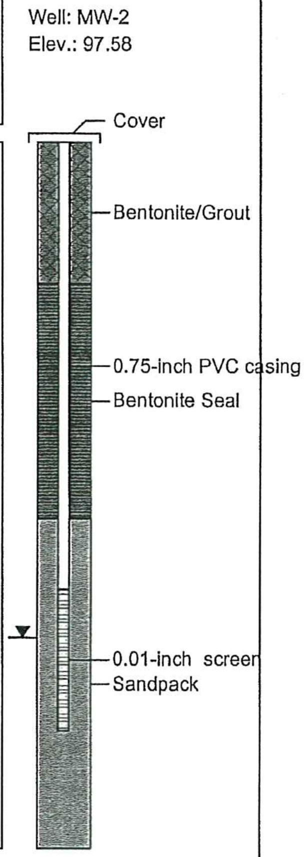
Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started	: 7/2/03	Company Rep.	: John Schwaller
Date Completed	: 7/2/03	Northing Coord.	:
Hole Diameter	: 2-inches	Easting Coord.	:
Drilling Method	: Direct Push - Geoprobe	Survey By	:
Sampling Method	: Geoprobe - Macrocore	Logged By	: John Schwaller

Depth in Feet	Surf. Elev. 97.71
0	97
2	95
4	93
6	91
8	89
10	87
12	85
14	83
16	81
18	79
20	77
22	75
24	73
26	71
28	69
30	67
32	65
34	63
36	61
38	59
40	57
42	55
44	

USCS	DESCRIPTION
	Concrete, gravel
ML	ML/CL - SILT/CLAY, some sand, dense, plastic, orange, dry
FB	wood, gravel, sand, brick, FILL
CL	CL - Clay, soft, plastic, orange/brown, moist
	End of boring

Sample Number	Sample Method	Sample ID
1	MC	
2	MC	BH-8(5-10)
3	MC	
4	MC	BH-8(15-20)
5	MC	
6	MC	BH-8(25-30)



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Buford, Georgia

Stratigraphic & Instrumentation Log MW-1 (BH-9)

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started	: 7/2/03	Company Rep.	: John Schwaller
Date Completed	: 7/2/03	Northing Coord.	:
Hole Diameter	: 2-inches	Easting Coord.	:
Drilling Method	: Direct Push - Geoprobe	Survey By	:
Sampling Method	: Geoprobe - Macrocore	Logged By	: John Schwaller

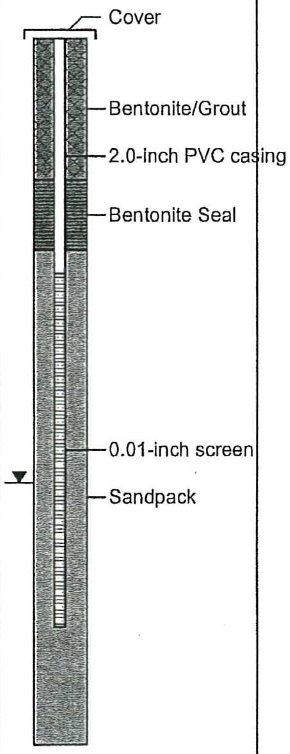
Depth in Feet: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44

Surf. Elev. 97.71: 97, 95, 93, 91, 89, 87, 85, 83, 81, 79, 77, 75, 73, 71, 69, 67, 65, 63, 61, 59, 57, 55

USCS	GRAPHIC	DESCRIPTION
GW		Gravel
GW		gravel, sand, FILL
FB		slag
ML		ML - SILT, soft, plastic, orange/brown, dry
ML		sewage odor, silt, structure
CL		CL/SC - CLAY/SAND with clay, dense, fine-medium, structured, pink-white saprolite, moist
		End of boring

Sample Number	Sample Method	Sample ID
1	MC	BH-9(2-5)
2	MC	
3	MC	
4	MC	BH-9(15-20)
5	MC	
6	MC	

Well: MW-1
Elev.: 100.00



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Buford, Georgia

Stratigraphic Log BH-10

(Page 1 of 1)

Sunlow, Inc.
Atlanta, GA
Project # 191

Date Started	: 11/2/06	Company Rep.	: John Schwaller
Date Completed	: 11/2/06	Northing Coord.	:
Hole Diameter	: 3-inches	Easting Coord.	:
Drilling Method	: Stainless Steel Hand Auger	Survey By	:
Sampling Method	: Stainless Steel Hand Auger	Logged By	: John Schwaller

Well:
Elev.:

Depth in Feet	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Sample Number	Sample Method	Sample ID
0							
2		FB	■	Asphalt, gravel	1	MC	BH-10(3-5)
4		FB	■	Sand, slag, FILL			
6				End of boring			
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							
34							
36							
38							
40							
42							
44							

APPENDIX D
FIELD GROUNDWATER SAMPLING FORMS

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME Sunlaw

PROJECT NO. 194

DATE OF WELL DEVELOPMENT July 3 2003

DEVELOPMENT CREW MEMBERS B. Costellanos / J. Schuller

SUPERVISOR BC

PURGING METHOD Bailer

WELL INFORMATION

WELL NUMBER MW-2

WELL TYPE (diameter/material) 3/4" /PVC

MEASURING POINT ELEVATION

STATIC WATER DEPTH 20.91

ELEVATION

BOTTOM DEPTH 25

ELEVATION

WATER COLUMN LENGTH 4.09

SCREENED INTERVAL

WELL VOLUME 0.1 gallons

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/tot. volume)	0.1	0.3 (Dry)	0.5 (Dry)			
FIELD pH	7.13	7.03	7.08			
FIELD TEMPERATURE	69.9	69.9	69.8			
FIELD CONDUCTIVITY	410	365	361			
CLARITY/TURBIDITY VALUES (NTU)	7200	7200	7200			
COLOUR						
ODOR						
COMMENTS		let recharge	let recharge			

stopped

COPIES TO:

EMA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME Sunlaw

PROJECT NO. 191

DATE OF WELL DEVELOPMENT July 3 2003

DEVELOPMENT CREW MEMBERS B. Castellanos / T. Schuller

SUPERVISOR BP.

PURGING METHOD Bailer

WELL INFORMATION

WELL NUMBER MW-1

WELL TYPE (diameter/material) 2" / PVC

MEASURING POINT ELEVATION

STATIC WATER DEPTH 18.85

ELEVATION

BOTTOM DEPTH 25

ELEVATION

WATER COLUMN LENGTH 6.15

SCREENED INTERVAL

WELL VOLUME 1.0

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/tot. volume)	1 gall	2	3	4	5	
FIELD pH	7.56	7.15	7.14	7.14	7.13	
FIELD TEMPERATURE	69.5	69.5	69.4	69.4	69.4	
FIELD CONDUCTIVITY	296	279	270	269	268	
CLARITY/TURBIDITY VALUES (NTU)	>200	>200	89	79	56	
COLOUR						
ODOR						
COMMENTS					stopped	

COPIES TO:

EMA

SAMPLE COLLECTION DATA SHEET - GROUNDWATER SAMPLING PROGRAM

PROJECT NAME Salem
SAMPLING CREW MEMBERS B. Castellon / J. Schwaller
DATE OF SAMPLE COLLECTION July 7, 2003

PROJECT NO. 191
SUPERVISOR B.C.

(Note: For 2" dia. well, 1 ft. = 0.14 gal(Imp) or 0.16 gal(us))

Sample I.D. Number	Well Number	Measuring Point Elev. (ft. AMSL)	Bottom Depth (ft. btoc)	Water Depth (ft. btoc)	Water Elevation (ft. AMSL)	Well Volume (gallons)	Bailer Volume/ No. Balls	Volume Purged (gallons)	Field pH	Field Temp.	Field Cond.	~~Time~~ Turb.	Sample Description & Analysis
MW-1	MW-1		25	18.90	6.1	0.9		1 2 3	7.13 7.07 7.07	71.6 69.0 71.0	261 257 254	>300 65 35	clear
MW-2	MW-2		25	21.04	3.96	<0.1		0.1 0.2 0.3 (Dry)	6.99 6.97 6.95	70.6 70.5 70.5	403 304 302	>300 >300 95	turbid
	EMW-1			16.43									
	EMW-2			19.85									

ADDITIONAL COMMENTS: Collected dissolved sample for MW-2 (lab filter with 0.45 micron)
Purged both wells from ~8:30-9:30 Am 7-7-2003
Collected samples at 11:45 MW-1 and 12:10 MW-2

COPIES TO:

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

page ___ of ___

Well ID: Mw-3
Field Sampling Personnel: Tyler Boyles

Depth to Screen below MP: 22 of screen (Top) 32 of screen (Bottom)

Pump Intake at (ft. below MP): 29
Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
6/1/12	0930	25.82		5.67	0.141	280	7.49	21.47	220	0			
	0940	27.82		4.92	0.142	516	5.07	21.02	234	.5			
	0950	28.06		4.70	0.141	134	2.92	20.93	246	1			
	1010	28.30		4.90	0.120	85	1.94	20.87	241	2.0			
	1020	28.41		5.07	0.118	37	1.90	20.93	233	2.5			
	1030	28.50		5.03	0.121	19	1.94	21.02	237	3			
	1045	28.48		5.02	0.122	12	1.95	21.08	238	4			
	1100	28.45		5.02	0.123	10	1.96	21.05	239	5			Sample Well

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):

±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

Well ID: MW-4

Field Sampling Personnel: Tyler Boyles

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

Depth to Screen below MP: 22 Top of screen 32 Bottom of screen

Pump Intake at (ft. below MP): 27

Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

page ___ of ___

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
6/7/12	1050	24.85		6.12	0.220	57	7.01	23.65	156	0			
	1056	25.12		5.47	0.212	47.7	6.53	23.46	164	.25			
	1106	25.65		6.30	0.211	38.6	0.58	22.57	164	.5			
	1113	25.85		5.40	0.224	13.9	0.31	20.73	182	1			
	1120	26.00		5.40	0.223	9.51	0.16	20.80	180	1.5			
	1127	26.12		6.40	0.191	8.35	0.05	22.70	198	2			
	1135	26.20		6.11	0.198	8.72	0.00	22.56	218	2.5			
	1146	26.42		5.85	0.183	8.88	0.00	23.04	210	3			
	1155	26.75		5.61	0.181	9.01	0.02	23.30	220	3.5			
	1212	26.75		5.55	0.183	12.91	0.02	23.65	221	4.5			
	1226	26.80		5.53	0.180	17.85	0.02	23.94	223	5			
	1250	26.80		5.51	0.178	11.5	0.02	24.66	223	6.5			
	1300	26.81		5.51	0.175	10.8	0.02	24.78	230	7			
	1310	26.81		5.50	0.176	9.9	0.02	24.80	219	7.5			Well Sampled

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):

±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

040002.03

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

Well ID: MW-4

Field Sampling Personnel: Tyler Boyles

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

Depth to Screen below MP: 22 Top of screen 32 Bottom of screen

Pump Intake at (ft. below MP): 27

Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

page ___ of ___

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
6/1/12	1315	25.00		6.40	0.495	182	7.30	21.41		0			
	1325	25.85		6.37	0.496	249	6.65	21.47		0.5			
	1335	26.05		6.16	0.501	121	1.86	22.03		1			
	1346	26.71		6.23	0.495	52	1.61	22.45		2			
	1400	26.74		6.21	0.497	21	1.62	22.21		3			
	1418	26.85		6.20	0.486	12	1.60	22.38		4			
	1435	26.83		6.21	0.496	9.2	1.60	22.29		5			Well Sampled

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):

±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

page ___ of ___

Well ID: MW-5

Field Sampling Personnel: Tyler Boyles

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

Depth to Screen below MP: 22 of screen (Top) 32 of screen (Bottom)

Pump Intake at (ft. below MP): 26

Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
6/1/12	1150	25.87		7.20	0.754	104	5.50	21.25		0			
	1200	25.89		6.55	0.765	87.8	5.11	20.02		.5			
	1215	25.90		6.68	0.748	46.5	0.79	21.23		1.5			
	1225	25.87		6.74	0.727	23.9	0.72	21.47		3			
	1235	25.87		6.77	0.720	15.9	0.28	21.50		4			
	1250	25.87		6.79	0.722	9.8	0.29	21.12		5			Well Sampled

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):

±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

page ___ of ___

Well ID: MW-1R

Field Sampling Personnel: Tyler Boyles

Depth to Screen below MP: 24.10 of screen (Top) 34.10 of screen (Bottom)

Pump Intake at (ft. below MP): 27

Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
7/5/12	1204	25.50		6.05	0.314	10.1	3.80	33.15	120	0			
	1218	26.65		4.93	0.322	15.6	1.99	32.02	233	1			
	1230	26.65		4.88	0.316	9.6	1.73	31.70	234	2			
	1244	26.04		4.96	0.309	7.91	1.57	31.49	224	3			
	1258	26.65		5.04	0.307	695	1.52	31.44	215	4			
	1312	26.65		5.06	0.303	6.51	1.57	31.40	217	5			well Sampled

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):

±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

040002.03

Attachment 4.4

WELL PURGING - FIELD WATER QUALITY MEASUREMENTS FORM

Location: 1071 Howell Mill Road, Atlanta, Ga

page ___ of ___

Well ID: MW-1R

Field Sampling Personnel: Tyler Boyles

Identify Measuring Point (MP): TOC
(e.g. Top of Casing)

Depth to Screen below MP: 24.10 of screen (Top) 34.10 of screen (Bottom)

Pump Intake at (ft. below MP): 27

Purging Device (Pump Type): Peristaltic
(e.g. Dedicated pump, peristaltic pump, bailer, bladder pump, etc.)

Date	Time 24 hr	Depth to Water Below MP ft	Purge Rate mL/min	pH pH units	Spec Cond. mS/cm	Turbidity NTUs	DO Flow cell mg/L	Temp. °C	Redox Potential mV	Cum. Volume Purged gallons	CHEMetrics DO mg/L (low)	Hach Ferrous Iron mg/L	Comments
7/3/12	1352	25.57		5.65	0.453	400	4.25	36.64	314	0			
	1400	26.69		5.08	0.430	719	3.22	32.98	289	0.5			
	1408	26.68		4.78	0.466	619	2.74	32.13	284	1			
	1422	26.68		5.58	0.396	402	2.60	32.44	276	2			
	1434	26.68		5.80	0.381	195	2.48	32.20	264	3			
	1454	26.68		5.83	0.352	69	2.30	32.63	247	4			
	1510	26.68		5.01	0.342	52	226	32.83	234	5			
	1523	26.68		4.90	0.324	30	2.02	32.56	228	6			
	1544	26.68		5.02	0.319	25.8	1.98	32.76	220	7			Well Sampled for VOC, PCB, PAH
													+ Pesticide Only

Notes:

Note when "Stabilization " has occurred. Stabilization Criteria (achieved after a minimum of three successive readings):
±0.1 for pH
±10 mV for redox
±3% for specific cond.
±10% for DO
<20 NTUs for turbidity
NA for temperature

If stabilization does not occur within 2 hours, contact Site Manager for action.
If well goes dry prior to stabilization, stop, allow well to recharge, and collect sample.

APPENDIX E

VAPOR INTRUSION RISK ASSESSMENT

VAPOR INTRUSION RISK EVALUATION

AMEC evaluated the potential impact of groundwater contamination on future indoor air quality for the proposed building re-development located at 1071 Howell Mill Road in Atlanta, Georgia. Groundwater monitoring wells located close or potentially beneath the building foundations were sampled in June and July 2012 for volatile organic compounds (VOCs). Nine VOCs were detected in three of four groundwater samples, and these data were carried forward into the risk evaluation. The maximum detected VOC concentrations are listed on Table 1.

The proposed redevelopment of the building will likely include a restaurant. However, long term use of the property could include residential occupancy. The surrounding area is currently a mixture of retail, commercial, and residential buildings. The current building is situated on a slab foundation, which will be retained. The interior walls will likely be removed and the interior space redesigned. This vapor intrusion risk evaluation considered the current dimensions for the outer walls and height of the roof will be retained. Maximum groundwater concentrations were used to estimate worst-case potential exposures for future commercial workers and residents that might be exposed to indoor air vapor emissions from the subsurface.

Exposure Assessment

In order to identify constituents of potential concern (COPCs) for the vapor intrusion pathway, the maximum detected groundwater constituents were compared to target groundwater concentrations from USEPA's Vapor Intrusion Screening Level (VISL) Calculator Version 1.0. These screening levels are presented in Table 1 and are based on a residential exposure scenario with target carcinogenic risk of 10^{-6} and target hazard index of 1. As a result of this screening step, five constituents were identified as indoor air COPCs and carried through the vapor intrusion risk evaluation. Selected COPCs include 1,1-dichloroethane, bromodichloromethane, chloroform, tetrachloroethene, and trichloroethene.

These five VOCs in groundwater were evaluated as a potential source of volatile emissions into a future commercial use building located on the property. AMEC utilized the USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (USEPA, 2002) as a primary guidance document. In accordance with the guidance, AMEC estimated future indoor air concentrations at the site, using USEPA's Johnson and Ettinger Model for Subsurface Vapor Intrusion into Buildings (GW-ADV, Version 3.1) (the J&E Model) (USEPA, 2004). Only three monitoring wells had detections, and the maximum detected concentrations were conservatively used as the groundwater exposure point concentrations in the J&E Model runs.

Default and site-specific modeling parameters were used for estimating indoor air concentrations (Table 2). Based on site-specific soil boring logs, the depth to groundwater is estimated at approximately 25 feet. The soil types are a mixture of fill, gravel, and silt with silt the most commonly observed material. Soils were classified as SI (silt) for the purposes of modeling. The dimensions of the current building are approximately 124 feet by 247 feet with 20.6 foot ceilings. For the commercial land use scenario, an assumed air exchange rate of 1.5 exchanges per hour (mean rate for commercial buildings per Exposure Factors Handbook – 2011 Update) was used. For the residential scenario, the model default of 0.25 air exchanges per hour was used (USEPA, 2004).

Toxicity Assessment

Toxicity values [Inhalation Reference Concentrations (RfCs) and Unit Risk Factors (URFs)] used in this evaluation were obtained from the USEPA Integrated Risk Information System (IRIS) and USEPA's April 2012 Regional Screening Level Table. The toxicity values used in this assessment are listed on Tables 3 through 5. The RfC is used to estimate non-carcinogenic inhalation hazards. The RfC is an estimate of the daily exposure to the human population (including sensitive subgroups such as children and the elderly) that is likely to be without an appreciable risk of deleterious effects. The estimated hazard is compared to a target hazard index (HI) of one. Cumulative hazards less than one are not likely to be associated with systemic or non-carcinogenic health risks.

Using the chemical-specific URF, the cumulative carcinogenic risk for the indoor vapor intrusion pathway was calculated and compared to a target risk of 10^{-5}. If the cumulative carcinogenic risk for site workers is less than 10^{-5}, risk is considered to be in the acceptable range under the Hazardous Site Response Act (HSRA). The URF is characterized as an upper-bound estimate designed to be protective of the majority of the human population.

Risk Characterization – Vapor Intrusion Modeling

The J&E Model was used to estimate indoor air concentrations with groundwater concentrations used as the input values. These estimated indoor air concentrations were then used to assess potential indoor air exposures and calculate cumulative incremental risks and hazards related to potential vapor intrusion into the site building (Tables 3, 4, and 5). The J&E Model output for each COPC are attached. The J&E Model incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from the subsurface into indoor spaces located directly above the source of contamination. The model is a one-dimensional analytical solution to vapor transport into indoor spaces, relating the vapor concentration in the building to the chemical concentration at the subsurface source area.

The J&E Model assumes the structure is located above the subsurface impacts and volatile emissions will enter through the concrete floor slab. This model does not incorporate dispersion, dilution, or bioattenuation. However, in actuality, the concentrations of volatile compounds may naturally attenuate over time. The model also assumes an infinite subsurface contamination source, while the distribution under the building is not homogeneous. In general, the assumptions used in the J&E modeling would tend to overestimate indoor air concentrations.

Table 3 summarizes the results of the risk calculations for commercial land use. The estimated incremental risk from vapor intrusion in indoor air is 3×10^{-8}. The estimated hazard index (HI) for vapor intrusion to indoor air from the COPCs in groundwater is 0.001. The HI is less than one and the incremental risks are less than 1×10^{-5}. Based on these results, the vapor intrusion pathway would not pose an unacceptable hazard or risk to occupational receptors working in the building, and would not be of concern to human health in the future.

Tables 4 and 5 summarize the results of the risk calculations for future residential land use. The estimated incremental risk from vapor intrusion in indoor air is 8×10^{-7} for residential adults and 2×10^{-7} for residential children. The estimated hazard index (HI) for vapor intrusion to indoor air from the COPCs in groundwater is 0.03 for both residential adults and children. The HI is less than one and the incremental risks are less than 1×10^{-5}. Based on these results, the vapor intrusion pathway would not pose an unacceptable hazard or risk to future residential receptors living in the building, and would not be of concern to human health in the future.

If other levels were constructed, air concentrations in higher levels of the future building located above the slab-on-grade foundation would be more diluted through mixing with other building air. Therefore, associated risks and hazards for these other areas are expected to be notably less than those calculated for the lower slab-on-grade level.

Uncertainty Analysis

This assessment assumes uniform exposure across the site although groundwater concentrations vary by location. The assessment also assumes site workers will be exposed over a 25-year period for 250 days per year. The assessment assumes future residents will be present 350 days a year with exposure durations of 30 years for residential adults and 6 years for residential children (USEPA, 1991). These assumptions would tend to overestimate risks because commercial restaurant workers do not typically remain in the same job and location for 25 years and residential tenure in one location averages approximately 9 years (USEPA, 2011). In addition, the detected constituents are potentially biodegradable.

Summary and Conclusions

Risk calculations were completed using the June and July 2012 maximum detected groundwater concentrations in the J&E Model in order to estimate the indoor air concentrations for COPCs. Risk and hazard associated with estimated indoor air exposures were then calculated by estimating indoor air exposure concentrations and comparing these concentrations to inhalation toxicity benchmarks. The resulting estimated cumulative hazards and risks indicate no unacceptable risk or hazards for occupational or residential receptors potentially exposed via indoor air vapor emissions based on maintaining the current hard cover and current building parameters.

REFERENCES

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance, OSWER Directive 9285.6-03, March 1991.

USEPA, 2000. Supplemental Guidance to RAGS: Region 4 Human Health Risk Assessment Bulletins, Region 4 USEPA, Updated May 2000.

USEPA, 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, EPA530-D-02-004, November 2002.

USEPA, 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, Office of Emergency and Remedial Response, February 2004.

USEPA, 2011. Exposure Factors Handbook, 2011 Edition. EPA/600/R-090/052F, September 2011.

Table 1
Summary of Groundwater Concentrations - 2012
Former Sunlow, Inc.
1071 Howell Mill Road, Atlanta, GA

Parameter	2012 Maximum Detected Groundwater Concentration, ug/L (a)	Target Groundwater Concentration Protective of Indoor Air, ug/L (b)	Indoor Air COPC? (c)
Volatile Organic Compounds			
1,1,1-Trichloroethane	6.2	NVT	No
1,1-Dichloroethane	14	6.6	**Yes**
1,1-Dichloroethene	2.1	200	No
Bromodichloromethane	3.9	0.76	**Yes**
Chloroethane	1.4	NVT	No
Chloroform	40	0.71	**Yes**
cis-1,2-Dichloroethene	15	NC	No
Tetrachloroethene	120	0.57	**Yes**
Trichloroethene	4.3	1.1	**Yes**

(a) Maximum detected concentrations for MW-R1, MW-3, MW-4, MW-5 sampled in June & July 2012.

(b) Calculated using OSWER Vapor Intrusion Screening Level (VISL) Calculator Version 1.0, November 2011 RSLs for TCR = 0.000001 and THQ = 1

(c) Compound selected as a COPC if maxiumum detected concentration is greater than target groundwater concentration protective of indoor air.

ug/L micrograms per liter

NVT = Not sufficiently volatile

NC = No inhalation toxicity values available for this compound

PREPARED/DATE: MKB 8/28/12
CHECKED/DATE: LMS 8/29/12

Table 2
Occupational and Residential Assumptions Used in Johnson & Ettinger Model (GW-ADV)
Former Sunlow, Inc.
1071 Howell Mill Road, Atlanta, GA

Parameter	Value	Justification
Average Water Temp.	17 °C	Regional average (63° F)
Depth Below Grade to Enclosed Space Floor	15 cm	Slab on grade foundation - assumption
Depth Below Grade to Groundwater /Thickness of Soil Stratum	762 cm	Site-specific (25 ft); based on soil boring logs.
Stratum A Soil Vapor Permeability	SI	Silt – based on site soil borings; fill soil
SCS Soil Type	SI	Silt – based on site soil borings; fill soil
Soil Dry Bulk Density	1.35 g/cm^3	Silt – Model value
Soil Total Porosity	0.489 unitless	Silt – Model value
Soil Water-filled Porosity	0.167 cm^3/cm^3	Silt – Model value
Enclosed Space Floor Thickness	10 cm	Model Default
Soil-Building Pressure Differential	40 g/cm-s^2	Model default
Enclosed Space Floor Length	7,529 cm	Site-specific for "Sunlow" building (247 ft)
Enclosed Space Floor Width	3,780 cm	Site-specific for "Sunlow" building (124 ft)
Enclosed Space Height	628 cm	Ceiling height (20.6 ft) for "Sunlow" building; site-specific.
Floor-Wall Seam Crack Width	0.1 cm	Model default
Indoor Air Exchange Rate	1.5/hr and 0.25/hr	Exposure Factors Handbook – 2011Update. Mean for commercial buildings and default for residential.
Averaging Time, Carcinogens	70 years	Model default
Averaging Time, Noncarcinogens	25 years and 30/6 years	Default for occupational and residential
Exposure Duration	25 years and 30/6 years	Default for occupational and residential
Exposure Frequency	250 days/year and 350 days/year	Default for occupational and residential
Target Risk for Carcinogens	1 x 10^{-6} unitless	Target Risk
Target Hazard for Noncarcinogens	1 unitless	Target Hazard

Prepared by: MKB 8/28/12
Checked by: LMS 9/5/12

Table 3
Calculations of Risk to Indoor Air Concentrations
Site Worker - Future
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m^3)	Exposure Value Type (1)	Exposure Concentration (ug/m^3) (2)		Toxicity Values			Hazard Quotient (3) (Unitless)	Excess Cancer Risk (4) (Unitless)
			Noncarcinogen	Carcinogen	Inhalation RfC (mg/m^3)	Inhalation Unit Risk $(ug/m^3)^{-1}$	Source		
Volatile Organic Compounds									
1,1-Dichloroethane	4.95E-03	Modeled	1.13E-03	4.04E-04	--	1.6E-06	IRIS	--	6.5E-10
Bromodichloromethane	2.66E-04	Modeled	6.07E-05	2.17E-05	--	3.7E-05	Cal EPA	--	8.0E-10
Chloroform	1.08E-02	Modeled	2.47E-03	8.81E-04	9.8E-02	2.3E-05	IRIS. ATSDR	2.5E-05	2.0E-08
Tetrachloroethene	1.22E-01	Modeled	2.79E-02	9.95E-03	4.0E-02	2.6E-07	IRIS	7.0E-04	2.6E-09
Trichloroethene	2.70E-03	Modeled	6.16E-04	2.20E-04	2.0E-03	4.1E-06	IRIS	3.1E-04	9.0E-10
						Total:		1E-03	3E-08

PREPARED/DATE: MKB 8/28/12
CHECKED/DATE: LMS 8/29/12

m^3 = cubic meters
mg = milligram
RfC = Reference Concentration
ug = micrograms
IRIS - Integrated Risk Information System; Cal EPA - California Environmental Protection Agency; ATSDR - Agency for Toxic Substances and Disease Registry.

(1) Infinite source concentration from the Johnson and Ettinger Model (version GW-ADV 3.1, 02/04). Maximum detected groundwater concentration used as the exposure point concentration (Table 1).

(2) Exposure Concentration = See Equations below

(3) Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

(4) Excess Cancer Risk (Carcinogens) = Carcinogen Exposure Concentration x Inhalation Unit Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT_c where:

CA = Constituent Concentration in Air (estimated)	See above
ET = Exposure Time (hours per day)	8
EF = Exposure Frequency (days per year)	250
ED = Exposure Duration (years)	25

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

AT_{nc} = Averaging Time (Noncarcinogen, hours)	219,000
AT_c = Averaging Time (Carcinogenic, hours)	613,200

Table 4
Calculations of Risk to Indoor Air Concentrations
Residential Adult - Future
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m^3)	Exposure Value Type [1]	Exposure Concentration (ug/m^3) [2]		Toxicity Values			Hazard Quotient [3]	Excess Cancer Risk [4]
			Noncarcinogen	Carcinogen	Inhalation RfC (mg/m^3)	Inhalation Unit Risk $(ug/m^3)^{-1}$	Source	(Unitless)	(Unitless)
Volatile Organic Compounds									
1,1-Dichloroethane	2.97E-02	Modeled	2.85E-02	1.22E-02	--	1.6E-06	IRIS	--	2.0E-08
Bromodichloromethane	1.60E-03	Modeled	1.53E-03	6.58E-04	--	3.7E-05	Cal EPA	--	2.4E-08
Chloroform	6.45E-02	Modeled	6.18E-02	2.65E-02	9.8E-02	2.3E-05	IRIS. ATSDR	6.3E-04	6.1E-07
Tetrachloroethene	7.30E-01	Modeled	7.00E-01	3.00E-01	4.0E-02	2.6E-07	IRIS	1.8E-02	7.8E-08
Trichloroethene	1.62E-02	Modeled	1.55E-02	6.66E-03	2.0E-03	4.1E-06	IRIS	7.8E-03	2.7E-08
						Total:		3E-02	8E-07

m^3 = cubic meters
mg = milligram
RfC = Reference Concentration
ug = micrograms
IRIS - Integrated Risk Information System; Cal EPA - California Environmental Protection Agency; ATSDR - Agency for Toxic Substances and Disease Registry.

PREPARED/DATE: LMS 9/4/2012
CHECKED/DATE:MKB 9/4/2012

(1) Infinite source concentration from the Johnson and Ettinger Model (version GW-ADV 3.1, 02/04). Maximum detected groundwater concentration used as the exposure point concentration (Table 1).

(2) Exposure Concentration = See Equations below

(3) Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

(4) Excess Cancer Risk (Carcinogens) = Carcinogen Exposure Concentration x Inhalation Unit Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT_c where:

CA = Constituent Concentration in Air (estimated) See above
ET = Exposure Time (hours per day) 24
EF = Exposure Frequency (days per year) 350
ED = Exposure Duration (years) 30

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

AT_{nc} = Averaging Time (Noncarcinogen, hours) 262,800
AT_c = Averaging Time (Carcinogenic, hours) 613,200

Table 5
Calculations of Risk to Indoor Air Concentrations
Residential Child - Future
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m^3)	Exposure Value Type [(1)]	Exposure Concentration (ug/m^3) [(2)]		Toxicity Values		Source	Hazard Quotient [(3)] (Unitless)	Excess Cancer Risk [(4)] (Unitless)
			Noncarcinogen	Carcinogen	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (ug/m^3)$^{-1}$			
Volatile Organic Compounds									
1,1-Dichloroethane	2.97E-02	Modeled	2.85E-02	2.44E-03	--	1.6E-06	IRIS	--	3.9E-09
Bromodichloromethane	1.60E-03	Modeled	1.53E-03	1.32E-04	--	3.7E-05	Cal EPA	--	4.9E-09
Chloroform	6.45E-02	Modeled	6.18E-02	5.30E-03	9.8E-02	2.3E-05	IRIS. ATSDR	6.3E-04	1.2E-07
Tetrachloroethene	7.30E-01	Modeled	7.00E-01	6.00E-02	4.0E-02	2.6E-07	IRIS	1.8E-02	1.6E-08
Trichloroethene	1.62E-02	Modeled	1.55E-02	1.33E-03	2.0E-03	4.1E-06	IRIS	7.8E-03	5.5E-09
						Total:		3E-02	2E-07

m^3 = cubic meters
mg = milligram
RfC = Reference Concentration
ug = micrograms
IRIS - Integrated Risk Information System; Cal EPA - California Environmental Protection Agency; ATSDR - Agency for Toxic Substances and Disease Registry.

PREPARED/DATE: LMS 9/4/2012
CHECKED/DATE:MKB 9/4/2012

[(1)] Infinite source concentration from the Johnson and Ettinger Model (version GW-ADV 3.1, 02/04). Maximum detected groundwater concentration used as the exposure point concentration (Table 1).

[(2)] Exposure Concentration = See Equations below

[(3)] Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

[(4)] Excess Cancer Risk (Carcinogens) = Carcinogen Exposure Concentration x Inhalation Unit Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT_c where:

CA = Constituent Concentration in Air (estimated) See above
ET = Exposure Time (hours per day) 24
EF = Exposure Frequency (days per year) 350
ED = Exposure Duration (years) 6

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

AT_{nc} = Averaging Time (Noncarcinogen, hours) 52,560
AT_c = Averaging Time (Carcinogenic, hours) 613,200

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
75274	3.90E+00	Bromodichloromethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
2.98E-02	1.06E-05	1.60E-03	25	7,800	363.15	585.85	5.50E+01	6.74E+03	3.7E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
7.45E+06	2.88E+07	7.85E-05	15	8,596	1.07E-03	4.49E-02	1.78E-04	2.87E-03	0.00E+00	0.00E+00	1.14E-04	4.56E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.75E+02	0.10	3.18E+01	2.87E-03	2.26E+03	2.07E+21	1.52E-06	2.66E-04	3.7E-05	NA

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
67663	4.00E+01	Chloroform

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	9.8E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
7.45E+06	2.88E+07	7.85E-05	15	7,482	2.58E-03	1.09E-01	1.78E-04	9.99E-03	0.00E+00	0.00E+00	2.73E-04	1.14E-03	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	4.34E+03	0.10	3.18E+01	9.99E-03	2.26E+03	1.30E+06	2.48E-06	1.08E-02	2.3E-05	9.8E-02

END

GW-ADV
Version 3.1; 02/04

Reset to Defaults

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)		Chemical
75343	1.40E+01		1,1-Dichloroethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	1.6E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
7.45E+06	2.88E+07	7.85E-05	15	7,373	3.98E-03	1.67E-01	1.78E-04	7.13E-03	0.00E+00	0.00E+00	1.94E-04	8.11E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	2.34E+03	0.10	3.18E+01	7.13E-03	2.26E+03	3.69E+08	2.12E-06	4.95E-03	1.6E-06	NA

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
127184	1.20E+02	Tetrachloroethylene

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell G28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H $(atm\text{-}m^3/mol)$	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	2.6E-07	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
7.45E+06	2.88E+07	7.85E-05	15	9,482	1.18E-02	4.96E-01	1.78E-04	6.92E-03	0.00E+00	0.00E+00	1.81E-04	7.58E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	5.95E+04	0.10	3.18E+01	6.92E-03	2.26E+03	6.76E+08	2.05E-06	1.22E-01	2.6E-07	4.0E-02

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
79016	4.30E+00	Trichloroethylene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	1.5	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H $(atm\text{-}m^3/mol)$	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	4.1E-06	2.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
7.45E+06	2.88E+07	7.85E-05	15	8,470	6.93E-03	2.91E-01	1.78E-04	7.59E-03	0.00E+00	0.00E+00	2.01E-04	8.40E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.25E+03	0.10	3.18E+01	7.59E-03	2.26E+03	1.12E+08	2.16E-06	2.70E-03	4.1E-06	2.0E-03

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
75343	1.40E+01	1,1-Dichloroethane

MORE ↓

Totals must add up to value of L_{WT} (cell G28)

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	1.6E-06	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}{}_A$ (cm^2/s)	Stratum B effective diffusion coefficient, $D^{eff}{}_B$ (cm^2/s)	Stratum C effective diffusion coefficient, $D^{eff}{}_C$ (cm^2/s)	Capillary zone effective diffusion coefficient, $D^{eff}{}_{cz}$ (cm^2/s)	Total overall effective diffusion coefficient, $D^{eff}{}_T$ (cm^2/s)	Diffusion path length, L_d (cm)
1.24E+06	2.88E+07	7.85E-05	15	7,373	3.98E-03	1.67E-01	1.78E-04	7.13E-03	0.00E+00	0.00E+00	1.94E-04	8.11E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	2.34E+03	0.10	3.18E+01	7.13E-03	2.26E+03	3.69E+08	1.27E-05	2.97E-02	1.6E-06	NA

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
75274	3.90E+00	Bromodichloromethane

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
2.98E-02	1.06E-05	1.60E-03	25	7,800	363.15	585.85	5.50E+01	6.74E+03	3.7E-05	0.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.24E+06	2.88E+07	7.85E-05	15	8,596	1.07E-03	4.49E-02	1.78E-04	2.87E-03	0.00E+00	0.00E+00	1.14E-04	4.56E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.75E+02	0.10	3.18E+01	2.87E-03	2.26E+03	2.07E+21	9.12E-06	1.60E-03	3.7E-05	NA

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
67663	4.00E+01	Chloroform

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell G28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	9.8E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.24E+06	2.88E+07	7.85E-05	15	7,482	2.58E-03	1.09E-01	1.78E-04	9.99E-03	0.00E+00	0.00E+00	2.73E-04	1.14E-03	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	4.34E+03	0.10	3.18E+01	9.99E-03	2.26E+03	1.30E+06	1.49E-05	6.45E-02	2.3E-05	9.8E-02

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
127184	1.20E+02	Tetrachloroethylene

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell G28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	2.6E-07	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.24E+06	2.88E+07	7.85E-05	15	9,482	1.18E-02	4.96E-01	1.78E-04	6.92E-03	0.00E+00	0.00E+00	1.81E-04	7.58E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	5.95E+04	0.10	3.18E+01	6.92E-03	2.26E+03	6.76E+08	1.23E-05	7.30E-01	2.6E-07	4.0E-02

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒ X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)
79016	4.30E+00

Chemical
Trichloroethylene

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell G28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
17	15	762	762	0	0	A	SI	SI		

MORE ↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-fillec porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SI	1.35	0.489	0.167								

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	7529	3780	628	0.1	0.25	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	4.1E-06	2.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	747	0.322	ERROR	ERROR	0.267	6.83E-09	0.830	5.67E-09	163.04	0.489	0.107	0.382	22,618

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.24E+06	2.88E+07	7.85E-05	15	8,470	6.93E-03	2.91E-01	1.78E-04	7.59E-03	0.00E+00	0.00E+00	2.01E-04	8.40E-04	747

Convection path length, L_p (cm)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)	Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
15	1.25E+03	0.10	3.18E+01	7.59E-03	2.26E+03	1.12E+08	1.29E-05	1.62E-02	4.1E-06	2.0E-03

END

APPENDIX F

SUMMARY OF PROFESSIONAL ENGINEER'S SERVICES

Charles T. Ferry, P.E.
Summary of Hours and Services - Voluntary Remediation Plan
Former Sunlow, Inc.
HSI Site No. 10637
AMEC Project No. 6121-12-0124

Application Submittal to EPD dated 9/17/12
12.5 hours invoiced between 7/23/12 and 9/17/12
Services included client consultation and preparation of submittal