Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive
Binghamton, New York 13904

Remedial Investigation Work Plan
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008

AECOM, Inc.
September 2009
Project No.: 04964-032

AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive
Binghamton, New York 13904

Remedial Investigation Work Plan
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008

Prepared By: Keith Stahle, Project Geologist

Reviewed By: Tamara Raby, Senior Geologist

AECOM, Inc.
September 2009
Project No.: 04964-032

AECOM

Contents

List of Appendices

List of Tables

List of Figures

1.0 Introduction

This Remedial Investigation (RI) Work Plan has been prepared for New York State Electric and Gas Corporation (NYSEG) by AECOM Environment (AECOM) for off-site properties related to a former manufactured gas plant (MGP) site located on West Court Street in the City of Ithaca, New York (Court Street Site). The site is the location of a former MGP [NYSDEC Site No. 7-55-008] that was operated by the Ithaca Gas Light Company and the Ithaca Gas and Electric Company. NYSEG acquired the plant in 1929 and operated an electric operation center until 1964. The site is currently owned by the Ithaca City School District and site remediation is in process.

The investigation is being conducted pursuant to a Multi-Site Order of Consent between NYSEG and the New York State Department of Environmental Conservation (NYSDEC), Index # D0-0002-9309, which was executed on March 25, 1994, and in accordance with applicable guidelines of the NYSDEC, the New York State Department of Health (NYSDOH), the United States Environmental Protection Agency (U.S. EPA) and the National Contingency Plan (NCP).

This RI Work Plan presents the project objectives, provides background information regarding historical site use and current conditions, summarizes the results of previous investigations, and outlines the strategies and methodologies that will be implemented during the investigation. Four appendices have been developed which detail the procedures and protocols outlined in this Work Plan:

- The Field Sampling and Analytical Plan (FSAP) provides information regarding field sampling methods and procedures that will be used during the investigation.
- The Quality Assurance Project Plan (QAPP) specifies the quality assurance/quality control procedures that will be implemented during the fieldwork and in the laboratory which performs the chemical analyses of the samples collected during the RI.
- A Community Air Monitoring Program (CAMP) provides information regarding the procedures to be used to monitor and control, if necessary, the potential release of airborne constituents at the downwind perimeters of the investigation work areas. Included in the CAMP are procedures regarding the control of odors that may be present as a result of the intrusive site investigation activities.
- A site-specific Health and Safety Plan (HASP) has been prepared to outline procedures that will be undertaken to protect site workers and visitors, and the public in the areas adjacent to the site from potential hazards that may exist as a result of the fieldwork performed at the site.

1.1 Project objectives

The objectives of the RI include the following:

- To collect additional data to more completely determine the surface and subsurface characteristics of the site;
- To more completely determine the nature and extent of MGP-related residuals that are present at the site and surrounding areas;
- To further define the potential routes of off-site migration from on-site sources of MGP-related residuals;
- To perform an exposure assessment to evaluate the pathways by which a human receptor (either on-site or off-site) may be exposed to a MGP-related residual; and

- To obtain sufficient data to facilitate the selection of remedial actions to address MGP-residuals at the site.

1.2 Work plan organization

Following this introduction, the remainder of this Work Plan describes the proposed RI activities.

- **Section 2** – provides a description of the site, summary information regarding site ownership and operational history, and the results of the previous investigation work performed at the site.
- **Section 3** – presents the objectives for the investigation followed by a description of the specific tasks that will be undertaken to gather sufficient information to meet the project objectives.
- **Section 4** – describes the companion documents that are included as appendices to the Work Plan, including the FSAP, QAPP, CAMP, and HASP.
- **Section 5** – describes the Community Outreach Plan to be undertaken by NYSEG for this project.
- **Section 6** – presents the approximate project schedule, with key milestones.
- **Section 7** – provides a list of the references cited in the Work Plan.

Appendices to the Work Plan include the following:

- The FSAP is included as Appendix A.
- The QAPP is included as Appendix B.
- The CAMP is included as Appendix C.
- The HASP is included as Appendix D.

2.0 Site description and history

The Court Street site is located in Tompkins County in the City of Ithaca, New York. The location of the site is shown on Figure 2-1. NYSEG's predecessors operated a coal gasification plant at the site from 1853 to 1927. The plant occupied the western portion of the block bound by Esty Street on the north, North Plain Street on the west, and Court Street on the south. The gas plant had two coal sheds, a gas house containing three horizontal retorts, purifiers, two steel gas holders, two underground coal tar storage vessels, a tar separator, and two oil tanks. A subsurface wooden duct system, consisting of two wooden ducts and clay tile lines and located along Court Street and West Court Street, was formerly used to transport coal tar from the MGP site to the Cayuga Inlet for collection and disposal.

NYSEG acquired the plant in 1929 and operated an electric operation center until 1964, when the property was sold to the Ithaca City School District. In April 2002, the site was divided into two Operable Units to facilitate further investigations at portions of the site while evaluating remedial options at other portions. Operable Unit 1 (OU-1) consists of the former MGP property and the (former) wooden duct as far west as Meadow Street. The former MGP property portion of OU-1 is bound by steel sheet piling and remediation of the site is currently in progress. Removal of the wooden duct between the former plant site and Meadow Street occurred from 2003-2005. Operable Unit 2 (OU-2) consists of any properties outside of the sheet piling that may have been impacted by the migration of MGP materials directly from the site (Figure 2-2 Site Plan). OU-2 also includes the remaining portions of the wooden duct system and any properties that may have been impacted by potential tar releases from the ducts. As shown on Figure 2-2, OU-2 has been divided into three areas: Area 1, which consists of the off-site properties in the vicinity of the former plant site; Area 2, which consists of properties located along Washington Street; and Area 3, which consists of the Cayuga Inlet Site and any remaining portions of the wooden duct system and associated properties along West Court Street.

Areas 1 and 2 of OU-2 are located within residential areas that consist of residential buildings, grass-covered areas, sidewalks, asphalt-covered areas (predominantly streets and driveways), and overhead and subsurface utilities. The locations of the subsurface utilities in OU-2 are shown on Figure 2-3. Area 3 of OU-2 is located within a mixed-use zone that includes both residential and commercial properties. To the north of West Court Street, Area 3 is occupied primarily by commercial properties while the south side of West Court Street is largely occupied by residential properties.

2.1 Summary of previous investigations

From October 2001 through March 2002 NYSEG conducted a Supplemental Remedial Investigation (SRI) at OU-2. The purpose of the SRI was to locate the wooden duct system that ran beneath West Court Street, investigate the contents of the ducts, investigate the nature of the bedding material in the vicinity of the ducts, and to characterize the nature and extent of any contamination that may have been released and migrated from the ducts. The fieldwork conducted during the SRI included the collection of surface and subsurface soil samples, the completion of soil borings, the installation of monitoring wells, and the analyses of soil and groundwater samples. The results of the SRI were submitted to the NYSDEC in a remedial investigation report titled *Interim Draft Supplemental Remedial Investigation Report for Operable Unit -2* dated August 27, 2002. Visual evidence of coal tar or coal tar non-aqueous phase liquids (NAPL) combined with the analytical results indicated that MGP-related impacts to subsurface soils were present along Washington Street and at West Court Street near the intersection of Washington Street. The impacts observed along Washington Street were located in proximity of the municipal sewer line. Analytical results for groundwater samples collected during the SRI identified MGP related compounds in the shallow aquifer along West Court Street and along Washington Street. Additional investigations were recommended to evaluate the extent of groundwater impacts observed along Washington Street.

During October 2002, April 2003, and March 2005, NYSEG implemented residential air monitoring programs to evaluate and delineate any potential air exposures due to MGP related materials. All residences within 100 feet of tar-like materials identified during the SRI were selected for sampling. A total of 173 air samples, which included a combination of sub-slab, indoor air, and ambient air samples, were collected from residences and the Markles Flats food storage area (within OU-1) during the implementation of the air monitoring programs. The air samples were analyzed by USEPA Method TO-15. No formal reports were completed for the programs but the laboratory data and Data Usability Summary Reports (DUSRs) were provided to the NYSDEC and New York State Department of Health (NYSDOH) and data specific to individual properties were provided to the property owners.

Based on the results of the SRI, 26 additional surface soil samples were collected from OU-2 during May 2003. The results of the surface soil sampling were provided to the NYSDEC for use in evaluating the results from OU-2 as compared to polycyclic aromatic hydrocarbons (PAHs) in background of an urban environment. With the exception of one sample, all of the samples contained at least one PAH in a concentration greater than the cited corresponding NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 soil cleanup objective. However, these PAHs are presumably indicative of background urban PAH impacts.

Based on the review of previous investigations of OU-2, a Phase II investigation was implemented to close identified data gaps. Between March and June of 2004, twenty four soil borings were installed, and 18 monitoring wells were installed in OU-2. Groundwater samples were collected from 8 previously installed monitoring wells and the 18 newly installed monitoring wells. Seven direct-push groundwater grab samples were also collected. A data summary report titled *Phase II OU-2 Data Summary* dated September 13, 2004 was submitted to the NYSDEC. With the exception of one sample, which contained two PAHs in concentrations greater that the cleanup objectives, none of the subsurface soil samples contained constituents of concern (COCs) in concentrations greater than their respective NYSDEC TAGM 4046 soil cleanup objectives. Strong coal tar-like odors, NAPL, and NAPL stringers were observed during the installation of several soil borings. Where these impacts were observed, no samples were collected for laboratory analysis. Of the samples collected from the 26 monitoring wells, five contained benzene, ethylbenzene, toluene, or total xylenes (BTEX) and PAHs in concentrations greater than the NYSDEC groundwater standards.

Three test pits were excavated in October of 2004 to evaluate the possible conduits for NAPL along Park Place and Washington Street, and to investigate the wooden duct system along West Court Street between Meadow Street and the Cayuga Inlet. No MGP-related impacts were observed in the test pit excavated along Park Place. Slight coal tar odors were noted and NAPL was observed in the silty clay within a sand lens during the excavation of the test pit along Washington Street. During the excavation of the test pit along Court Street, a wooden duct, an 8-inch diameter clay pipe, and a 6-inch diameter steel pipe were identified. Stained soils and MGP-like odors were identified in the vicinity of the wooden duct and pipes.

2.2 Interim remedial measures

Between February and April of 1999, NYSEG implemented Interim Remedial Measures (IRM) at the Ithaca Cayuga Inlet Site to limit potential exposure to MGP residuals and to limit potential future impacts to groundwater. The IRM consisted of the excavation and disposal of a coal tar collection well and associated materials. The IRM also included the excavation and disposal of approximately 1,500 tons of impacted soil and debris in the vicinity of the former tar well. A portion of the wooden duct system was identified during the excavation activities. The wooden duct system was removed from the Cayuga Inlet to the east side of the Cayuga Inlet Site. At the eastern property line, the duct was cut and plugged with grout. Post excavation soil samples were collected to demonstrate the reduction in concentrations of PAHs, volatile organic compounds (VOCs), and heavy metals typically associated with MGP residuals.

Between October 2003 and September 2005, NYSEG implemented an IRM to excavate, remove, and dispose of two subsurface wooden ducts and clay tile pipes along West Court Street, from the intersection of Meadow

and West Court Streets to the former MGP site at the intersection of West Court and North Plain Streets. The IRM also included the excavation and removal of coal tar impacted soil on Washington Street, between West Court and Cascadilla Streets. The locations of the excavations are shown on Figure 2-2. Approximately 41,000 tons of coal tar impacted soil and 750,000 gallons of water were removed and disposed of off site during the implementation of the IRM. Post excavation soil samples were collected to demonstrate the reduction in concentrations of MGP residuals. The results of the field activities were submitted to the NYSDEC in a Final Engineering Report, dated April, 2007.

2.3 Geology and hydrogeology

This section describes the regional geologic setting of the Ithaca area, and describes the site geological and hydrogeological conditions defined during previous Remedial Investigation activities.

2.3.1 Geology

The geology in the Ithaca area consists of Devonian age sedimentary bedrock overlain by fluvial outwash and lucustrine deposits which are reported to exceed 300 feet in thickness in the Cayuga Valley. The Court Street site lies on these lucustrine deposits at the southern end of Cayuga Lake (USDA-SCS, 1965; Crain, 1974). Lucustrine deposits in this area generally consist of laminated silts and clays.

The stratum at OU-2 consists of fill, overlain by a silty sand, and silty clay, with some local deposits of sand and gravel. These four units are described below.

The fill material in OU-2 is comprised of gravel, brown medium to course sands, and some brick fragments and ash. Fill is present in all areas of the site in thicknesses generally ranging from 1 to 2 feet. The fill material is similar in nature and thickness along both Washington Street and in the vicinity of OU-1.

Beneath the fill is a silty sand unit that is composed of tan-gray fine sand and silt with some mottling. The unit becomes denser and finer-grained with depth. The highest silt content was observed at the bottom of the unit, where traces of clay were identified. The silty sand unit was identified in every soil boring installed in OU-2.

Beneath the tan-gray silty sand lies a gray silty clay unit. Some fine sand was observed in the top of the unit but grades out with depth. Thin lenses of medium to coarse sand were also identified in this unit. The boundary between the overlying sand unit and the silty clay varies as shown on the cross sections. A contour map showing the top of the silty clay unit is presented as Figure 2-4. As shown on the figure, the top of the silty clay unit ranges from approximately 5 to 18 feet below ground surface (bgs).

A gray sand and gravel unit was identified beneath the silty clay at several locations in OU-2. This sand and gravel unit consists of medium to fine-grained brown sand, with course gravel. The gravel content of this unit varies, and the unit shows a course texture where it is more prominent

Five cross sections were developed to illustrate the subsurface conditions in Area 1 and Area 2. A cross section location map is shown on Figure 2-5. The cross sections are presented on Figures 2-6 through 2-10.

2.3.2 Hydrogeology

Based on these investigations, two groundwater flow systems exist above a deep gravely sand aquifer at the OU-2. The two groundwater systems are defined as a shallow, unconfined aquifer in the fill and upper silty sands and an intermediate, confined aquifer in the deeper permeable sands.

Water level measurements taken at the site wells during the 2002 SRI indicated that the groundwater table is between 3 and 6 feet bgs across OU-2. Shallow groundwater flows toward the northwest across OU-2 at a horizontal gradient of approximately 0.003-0.006 feet per foot (ft/ft). Based on the permeability data presented

in previous reports, flow within the aquifer is believed to be primarily horizontal due to the underlying silty clay unit. Horizontal flow in the shallow aquifer was previously estimated to be approximately 23-32 feet per year. Previous data also suggested that the silty clay unit was acting as an aquitard that limits the hydraulic connection between shallow groundwater and the underlying intermediate aquifer.

Seven monitoring wells were installed in OU-2 during the 2002 SRI to investigate the characteristics of the groundwater in the intermediate aquifer. Gauging of these wells indicated that the intermediate aquifer was found at depths between 21 and 28 feet bgs across OU-2. This aquifer appeared to be confined at the top by the silty clay unit and below by another clayey unit. The aquifer consists of gray sand and gravel. Horizontal flow in the intermediate aquifer in OU-2 is anticipated to be similar to the horizontal determined in OU-1, which was estimated to be in the range of 25 to 45 feet per year (E.C. Jordan, 1987).

3.0 Remedial investigation objectives and field activities

Although investigation work has been performed at the site, data gaps remain for the characterization of the site media and impacts in the areas discussed in Section 2. The overall objectives for this RI are to complete the investigation of the site and lay the groundwork for the selection of a site remedy. The specific objectives for the RI and the activities that will be undertaken to meet these objectives are discussed below. The discussion of investigation activities has been grouped by environmental media of concern or field task in the following sections. The locations of each of the proposed RI sample points are shown in purple on the figures.

3.1 Underground utility clearance

Prior to the start of any intrusive fieldwork, clearance of underground utilities will be performed. Dig Safely New York will be contacted to arrange for the location and marking of all underground utilities in the vicinity of the proposed sample locations. Based on the previous work performed at the site, subsurface utilities are present in the investigation area. The subsurface sample locations may be adjusted in the field based on the locations of the subsurface utilities.

3.2 Test pit excavation (Area 3)

Within Area 3, two test pits will be excavated in the vicinity of the former Cayuga Inlet Site to evaluate subsurface soil conditions and to identify, if present, the location of any remaining wooden ducts and/or clay tile pipes. The proposed test pit locations are shown on Figure 3-1. Additional information regarding the test pit excavations is included in Table 3-1 including: the test pit designations, the sampling rationale and location, the anticipated test pit excavation depth, and the number and type of the laboratory samples to be collected. The test pits will be excavated with a backhoe or excavator using methods presented in the FSAP.

3.3 Subsurface soil sampling and well installation (Area 1 and Area 2)

Subsurface soil borings will be advanced in order to:

- obtain additional information regarding the geologic composition of subsurface soil;
- to determine the depth to the water table;
- to observe and screen subsurface soil in order to identify the horizontal extent of MGP residuals previously observed; and,
- to install the additional wells to further characterize groundwater.

The locations of the proposed soil borings and wells in Area 1 and Area 2 are shown in purple on Figures 3-2 and 3-3, respectively. Table 3-1 provides summary information regarding the borings and wells, including the boring or well designation, the sampling location or rationale, the anticipated completion depth, and the laboratory analyses to be performed. As shown in Table 3-1, if impacts are observed in the overlying soil, the boring will be advanced to a depth of approximately eight feet below the top of the silty clay unit to delineate the vertical extent of MGP residuals. If impacts are not observed in the overlying soil, the boring will be advance to the top of the silty clay unit.

Based on historical drilling at the site, the subsurface borings will be advanced by a mini-sonic rig in order to obtain sufficient sample recoveries. The mini-sonic rig utilizes vertical vibration to advance the drill rods and sampling tools. This vibration causes liquefaction of the soil immediately surrounding the drill rods, which reduces friction and increases sample recovery. The borings may also be advanced by either a direct-push (Geoprobe™) drilling rig equipped with Macro-Core™ samplers, or by a conventional hollow-stem auger (HSA) drill rig equipped with 2-inch diameter split-spoon samplers. All of these methods will allow for

continuous soil samples to be taken from the ground surface to the bottom of the borehole for both field characterization (photoionization detector screening and observations) and for the collection of samples for the chemical analyses. Initially, a mini-sonic boring will be attempted at each location shown on Figures 3-2 and 3-3. The sampling barrel will be equipped with a mechanism to obtain discrete samples of soil (e.g. a closed-piston Macro-Core®) to ensure maximum recovery and maintain the integrity of the soil interval. If this sampling method does not successfully obtain the required soil samples at a given location, or if the mini-sonic tools encounter refusal above the target sampling depths, HSA drilling and split-spoon or direct-push sampling will be used as alternatives.

The soil samples obtained by either method will be logged by a geologist recording such data as the presence of fill material or subsurface structures, the nature of each geologic unit encountered, observations regarding moisture content, the results of PID readings, and visual and olfactory observations regarding the presence of hydrocarbon-like residuals.

It is anticipated that one to two samples for laboratory analyses will be collected from each boring. Samples will be collected from the most apparently impacted intervals based on PID screening and field observations. If impacts are not encountered, a sample will be collected from the 1-foot interval immediately above the silty clay layer, and possibly a second sample from the bottom of the boring to confirm “non-impacted” conditions.

Samples of grossly impacted soil containing visible tar-like or oil-like NAPL will not be sampled for laboratory analyses. These “MGP source” materials will be assumed to be impacted to the extent that management will be required by the NYSDEC. Information regarding the vertical extent of this material will be recorded on the borelogs by the field geologist and the areal extent of this material will be surveyed during the survey task as discussed in Section 3.6.

Overburden monitoring wells will be installed in six of the RI soil borings. The monitoring well locations, shown on Figures 3-2 and 3-3, were selected so that there would be a sufficient number of wells (along with the previously installed wells) to evaluate groundwater conditions in areas that are considered upgradient, cross-gradient, and downgradient of the site. In general, the groundwater monitoring wells will be installed so that the screen straddles either the most impacted interval (if any) based on the field screening, or will be screened across the water table. Actual well design will depend on site conditions encountered, such as thickness of the saturated zone, observed stratigraphy, and the presence, location, and thickness of NAPL, if any. The wells will be constructed using a 2-inch diameter Schedule 40 PVC well riser with a 0.02-inch slotted screen, and a 2-foot long sump for monitoring the presence of any dense non-aqueous phase liquid (DNAPL). Additional details for monitoring well installation are provided in the FSAP.

Recovery wells will be installed in three of the RI soil borings to evaluate the potential for NAPL collection in areas downgradient of OU1. The recovery wells will be constructed using a 4-inch diameter Schedule 40 PVC well riser with a 0.02-inch slotted screen, and a 2-foot long sump. The recovery well locations are shown on Figure 3-2.

3.4 Well development

Each of the new monitoring wells will be developed to evacuate fine-grained sediments that may have accumulated within the well during installation. Monitoring well development will not be initiated sooner than 24 hours after well installation. Well development methods are presented in the FSAP.

3.5 Groundwater sampling

Following completion of the well development, the monitoring wells will be allowed to stabilize for a minimum of two weeks, and then sampled. All new and existing wells will be checked for the presence of light non-aqueous phase liquids (LNAPL) or DNAPL. Water levels will be measured in all the new and existing wells, and a groundwater contour flow direction map will be prepared and included in the RI Report. Table 3-1 provides summary information for the groundwater samples to be collected including the sample designations, sample rationale, and the laboratory analyses to be completed.

3.6 Site survey

A survey of the investigation sampling points and important site features will be conducted at the end of the fieldwork by a NYSEG survey crew or a licensed surveying contractor. All horizontal locations will be reported in the applicable (NAD83 NYS Zone) coordinates. All vertical measurements will be reported in NAVD88.

3.7 Investigation-derived waste management

All soil cuttings, used disposable sampling equipment, and personal protective equipment (PPE) will be containerized in drums or roll-off containers, sampled, and properly disposed of off site at a permitted disposal facility. Decontamination, well development, and groundwater sampling purge water will be containerized in 55 gallon drums or poly tanks. All IDW will be placed within the fenced portion of the former plant site area prior to being properly disposed of off site.

3.8 Analytical program

The laboratory samples for each media and the chemical analyses to be performed, including the quality assurance/quality control (QA/QC) samples are included in Table 3-1. These analyses are summarized below.

3.8.1 Subsurface soil analyses

The subsurface soil samples will be analyzed for the following parameters:

- VOC compounds by U.S. EPA Method 8260B;
- Semi-volatile organic compounds (SVOCs) by U.S. EPA Method 8270C; and,
- Total Cyanide by U.S. EPA Method 9012A.

3.8.2 Groundwater analyses

The groundwater samples will be analyzed for the following parameters:

- VOC compounds by U.S. EPA Method 8260B;
- SVOC compounds by U.S. EPA Method 8270C; and,
- Total Cyanide by U.S. EPA Method 9012A.

3.8.3 Quality assurance/quality control sampling

Field and laboratory quality control samples for the investigation will be collected and analyzed to document the accuracy and precision of the samples. The QA/QC samples, summarized in Table 3-1, include trip blanks, field equipment blanks, field duplicates and matrix spikes, and matrix spike duplicates. The data quality level for the investigation will be consistent with procedures outlined in the NYSDEC Analytical Services Protocol (ASP) July 2005 methodologies. A full ASP Category B data package will be prepared by the

laboratory for all samples. The data will be reviewed, and a Data Usability Summary Report (DUSR) will be prepared by a qualified chemist. Additional QA/QC information is provided in the QAPP.

4.0 Additional work plan documents

Four companion documents have been prepared to detail the methods and procedures to be used during the RI. Each of the documents is included as an Appendix to this Work Plan.

4.1 Field sampling and analytical plan

All sampling and analyses will be conducted in accordance with the methods described in the site-specific FSAP. The FSAP provides a description of the objectives and methods for each of the investigation field activities, and details concerning the project organization.

4.2 Quality assurance project plan

In addition to the FSAP, a QAPP has been developed for use on this project. The QAPP identifies the quality assurance objectives for the measurement data, the QA/QC procedures to be used in the field, the sample chain-of-custody methods to be used, and the analytical procedures to be followed. The QAPP also includes a description of the manner in which each type of data is to be used.

4.3 Community air monitoring plan

A CAMP has been developed for this project that will be followed during all intrusive fieldwork (soil borings, borings for well installations, and test pitting). Included in the CAMP is a description of methods that may be used to control odors during the RI if needed.

4.4 Site-specific health and safety plan

A site-specific HASP has been prepared to outline health and safety risks and procedures for all site workers and visitors. Included in the HASP is information regarding physical and chemical hazards at the site, emergency procedures and contact information, incident reporting procedures, and the route to the hospital.

5.0 Community outreach activities

Community outreach efforts will be initiated as directed by the NYSDEC, or as interest from the public suggests the need. The outreach efforts will consist of some or all of the following:

- Mailing Fact sheets to those on the established site mailing list;
- Placing documents into the established document repositories; and
- Participation and preparation for public meetings.

The community outreach activities will be patterned to meet the needs of the community and would be modeled after other community outreach programs NYSDEC has established on other MGP projects. The plans will be shared with the NYSDEC's Regional Public Participation Specialists to refine the program, and to ensure that the NYSDEC's concerns with respect to community awareness of the project are met.

6.0 Project schedule and deliverables

6.1 Schedule

The RI fieldwork will be initiated following approval of the scope of work presented in this Work Plan by the NYSDEC. If approval is obtained in September 2009, it is anticipated that the investigation phase of the project will be performed in the fall of 2009, with laboratory analyses of soil and groundwater samples completed by the winter of 2009. A revised schedule with more specific dates will be submitted upon approval of the Work Plan by the NYSDEC. The initial target dates for the project milestones are as follows:

1. **Mid September 2009** – RI Work Plan and attached documents submitted to the NYSDEC for review, comment, and approval.

2. **Early October 2009** – NYSDEC approves the RI Work Plan.

3. **Fall 2009** – After the RI Work Plan is approved, the field investigation activities will be initiated.

4. **Winter 2009 – 2010** – The RI Report will be prepared.

5. **Spring 2010** – The RI Report will be submitted to the NYSDEC for review and approval.

The milestones presented above are subject to change based on the planning and scheduling of the consulting geologist and delays caused by weather and unforeseen circumstances. However, it is intended to maintain a schedule to complete the project as expeditiously as possible.

6.2 Deliverables

6.2.1 Remedial Investigation Report

Within 90 days of receipt of the validated analytical data, an RI Report will be prepared to document the findings of the investigations performed at the site. The report will be consistent with the specifications presented in the Draft DER-10 [NYSDEC, 2002] document and will include:

- An executive summary;
- A site description and history;
- Summary information regarding previous investigations and remedial work performed at the site;
- Descriptions of all field activities performed;
- A summary of all field observations, field measurements, and laboratory analytical data summarized in tabular format;
- Plan view and cross-section figures presenting laboratory analytical data and field observations of surface and subsurface soil and groundwater impacts;
- A qualitative risk assessment which assesses the sources of impact, on and off-site human and ecological receptors, and exposure pathways;
- An integration of field observations and measurements with laboratory analytical data to evaluate the nature and extent of impacts;
- A set of conclusions for the investigation; and

- Recommendations.

The RI Report will be reviewed and approved by a qualified senior geologist. The report and site data will be prepared and organized such that it can be used for the preparation of a feasibility study for the site. If appropriate, recommendations for additional site activities will be furnished.

7.0 References

Crain, L.J., 1974. Groundwater Resources of the Western Oswego River Basin, New York. State of New York Department of Environmental Conservation, Basin Planning Report ORB-5.

E.C. Jordan Co., 1986. Investigation of the Former Coal Gasification Site at Court Street Ithaca, New York; Task 1 Report, Preliminary Site Evaluation. April 1986.

E.C. Jordan Co., 1987. Investigation of the Former Coal Gasification Site at Court Street Ithaca, New York; Task 2 Report, Initial Field Investigation Program. February 1987.

MWH Americas, Inc., 2002. Interim Draft Supplemental Remedial Investigation Report for Operable Unit-2, Ithaca Court Street MGP Site; NYSEG RFP#02-063. August 27, 2002.

NYSDEC, 1994a. Division Technical and Administrative Guidance Memorandum [TAGM 4046]: Determination of Soil Cleanup Objectives and Cleanup Levels. Division of Hazardous Waste Remediation, Albany, New York, January 24, 1994.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values, Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), October, and addendums added: January, 1999, April 2000, and June 2004.

NYSDEC, 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

NYSEG, 1999. Interim Remedial Measures Final Engineering Report for Activities at Ithaca Cayuga Inlet Coal Tar Site, City of Ithaca, Tompkins County, New York. NYSEG, June 1999.

NYSEG, 2007. Interim Remedial Measures Final Engineering Report; Removal of the Subsurface Wooden Duct and Removal of Coal Tar Impacted Soil on Washington Street Between W. Court and Cascadilla Streets, Associated with Ithaca Court Street Former Manufactured Gas Plant Site, City of Ithaca, Tomkins County, New York. NYSEG, April 2007.

U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS), 1965. Soil Survey for Tompkins County, New York. Prepared in cooperation with Cornell University Experiment Station, Series 1961, No. 25, Ithaca, New York.

Tables

Table 3-1
RI Sample Summary and Rationale
Ithaca Court Street Former MGP Site - OU2

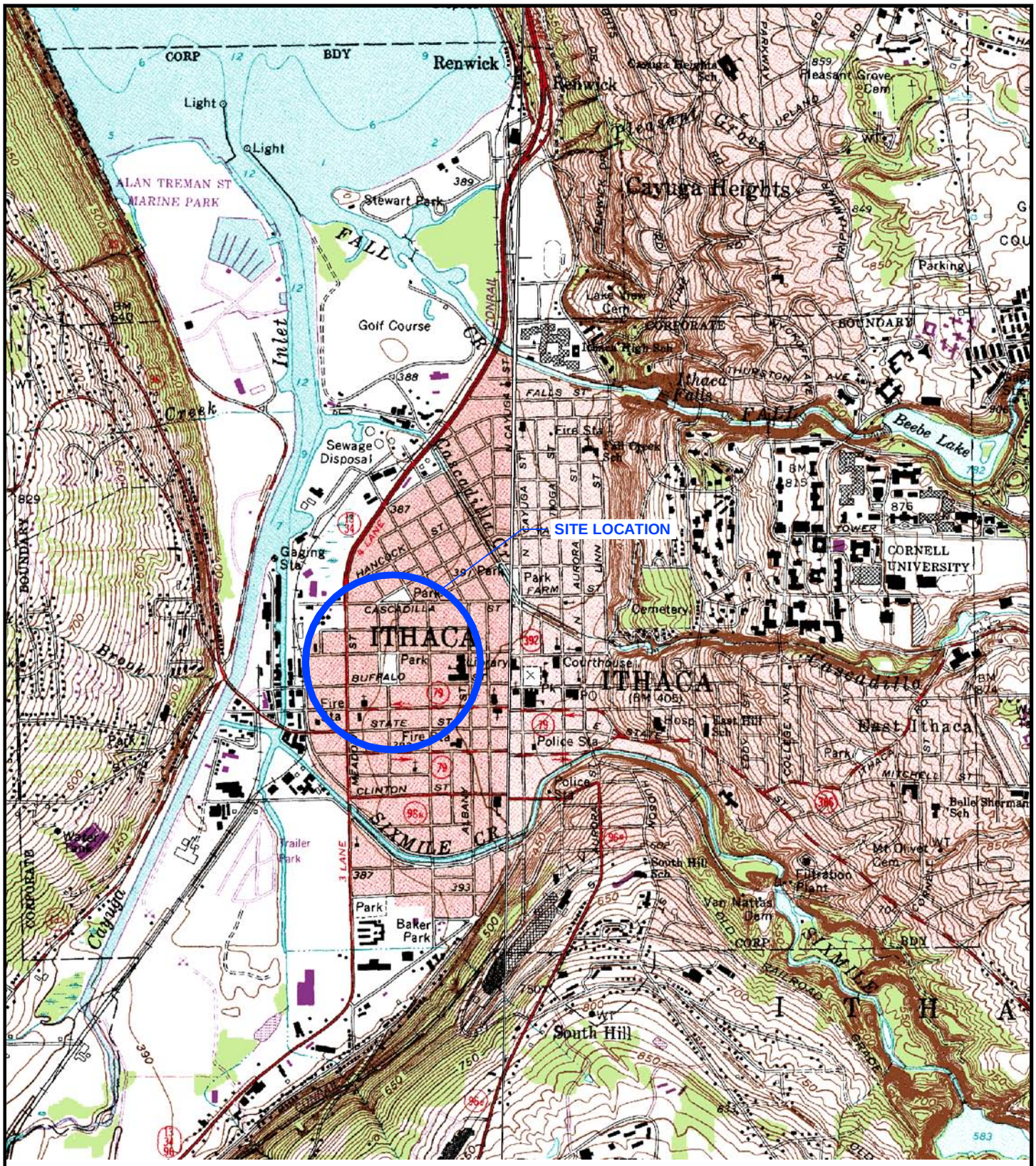
Sample ID	Rationale or Location	Target Completion Depth	Laboratory Sample Depth	Number of Samples	Laboratory Analyses
Test Pits - Area 3					
TP101	To asses subsurface soil conditions and identify the location or confirm the removal of the subsurface wooden ducts and clay tile pipe	10 -12 feet bgs (to be determined based on field	To be determined based on field conditions	A total of up to six soil samples will be obtained from the test pits	Each sample: VOC, SVOC, Total CN
TP102					
Subsurface Soil Borings - Area 1					
SB131	To assess the horizontal and vertical extent of impacts observed in the vicinity of the northeast corner of Esty and North Plain Streets	20 feet bgs (8 feet into silty clay) (final depth to be determined based on field observations)	Most impacted interval. If impacts are not observed, a sample will be collected from the interval immediately above the silty clay and/or the bottom of the boring, depending on field conditions. Samples may also be collected from beneath impacted intervals.	At each location: 2	Each sample: VOC, SVOC, Total CN
SB132	To assess the horizontal and vertical extent of impacts observed at SB52				
SB133	To assess the horizontal and vertical extent of impacts observed at SB52 and SB108				
SB134	To assess the horizontal and vertical extent of impacts observed at SB108				
SB135	To assess the horizontal and vertical extent of impacts observed at GL-9				
SB136					
SB137					
SB138	To assess the horizontal and vertical extent of impacts observed at SB24				
SB139	To assess the horizontal and vertical extent of impacts observed at SB48				
SB140	To assess the horizontal and vertical extent of impacts observed at SB48 and SB21				
SB141	To assess the horizontal and vertical extent of impacts observed at SB21				
Subsurface Soil Borings - Area 2					
SB142	To assess soil conditions in a location north of impacts observed at SB96	20 feet bgs (8 feet into silty clay) (final depth to be determined based on field observations)	Most impacted interval. If impacts are not observed, a sample will be collected from the interval immediately above the silty clay and/or the bottom of the boring, depending on field conditions. Samples may also be collected from beneath impacted intervals.	At each location: 2	Each sample: VOC, SVOC, Total CN
SB143					
SB144	To assess the horizontal and vertical extent of impacts observed at SB96				
SB145					
SB146	To assess soil conditions in an area along the subsurface utility corridor on Washington St.				
SB147					
SB148	To assess soil conditions in an area west of subsurface utilities along Washington St.				
SB149	To assess soil conditions in an area along the subsurface utility corridor on Washington St.				
SB150	To assess soil conditions in an area east of subsurface utilities along Washington St.				
SB151	To assess soil conditions at a location west of impacts observed at the intersection of Esty and Washington Streets.				
SB152					
SB153					
SB154	To assess soil conditions at a location east of impacts observed at the intersection of Esty and Washington Streets.				
SB155					
SB156					
SB157	To assess soil conditions at a location east of impacts observed at SB60.				
SB158	To assess soil conditions at a location south of impacts observed at SB60.				
SB159	To assess soil conditions at a location east of impacts observed at SB119.				
SB160	To assess soil conditions in the vicinity of SB118. This location has been selected due to insufficient sample recovery at SB118.				
SB161	To assess soil conditions at a location south of impacts observed at SB123 and SB124.				
SB162	To assess soil conditions at a location west of impacts observed at SB124.				
SB163	To assess the horizontal and vertical extent of impacts observed at SB123 and SB124.				
SB164					
SB165	To assess the horizontal and vertical extent of impacts observed at SB96.				
SB166	To assess soil conditions in an area east of subsurface utilities along Washington St.				
Monitoring Well Subsurface Soil Borings - Area 1					
MW-43S	A soil boring will be advanced to install a shallow water table well at a location downgradient of OU1.	15 feet bgs (10 feet below water table) (final depth to be determined based on field observations)	Most impacted interval. If impacts are not observed, a sample will be collected from immediately above the silty clay and/or the bottom of the boring, depending on field conditions. Samples may also be collected from beneath impacted intervals.	At each location: 2	Each sample: VOC, SVOC, Total CN
MW-44S					
Monitoring Well Subsurface Soil Borings - Area 2					
MW-45S	A soil boring will be advanced to install a shallow water table well at a location downgradient of MW-22S.	15 feet bgs (10 feet below water table) (final depth to be determined based on field observations)	Most impacted interval. If impacts are not observed, a sample will be collected from immediately above the silty clay and/or the bottom of the boring, depending on field conditions. Samples may also be collected from beneath impacted intervals.	At each location: 2	Each sample: VOC, SVOC, Total CN
MW-46S	A soil boring will be advanced to install a shallow water table well in the vicinity of former monitoring well MW-16S and subsurface utilities along Washington St.				
MW-47S	A soil boring will be advanced to install a shallow water table well in the vicinity of subsurface utilities along Washington St.				
MW-48S	A soil boring will be advanced to install a shallow water table well in the vicinity of the historic IRM at the intersection of Washington and Esty Streets.				
Recovery Well Subsurface Soil Borings - Area 1					
RW-4	A soil boring will be advanced to install a recovery well at a location downgradient of OU1.	15 feet bgs (10 feet below water table) (final depth to be determined based on field observations)	Most impacted interval. If impacts are not observed, a sample will be collected from immediately above the silty clay and/or the bottom of the boring, depending on field conditions. Samples may also be collected from beneath impacted intervals.	At each location: 2	Each sample: VOC, SVOC, Total CN
RW-5					
RW-6					

Table 3-1
RI Sample Summary and Rationale
Ithaca Court Street Former MGP Site - OU2

Sample ID	Rationale or Location	Target Completion Depth	Laboratory Sample Depth	Number of Samples	Laboratory Analyses
Groundwater Samples - Area 1					
MW-11S	To assess shallow (S) and deep (D) groundwater conditions at a location downgradient of OU1.	NA	Center of screened interval	At each location: 1	Each sample: VOC, SVOC, Total CN
MW-11D					
MW-12S					
MW-14S					
MW-14D					
MW-20S					
MW-20D					
MW-24S					
MW-24D					
MW-25S					
MW-27					
MW-41S					
MW-42					
MW-48S					
MW-49S					
Groundwater Samples - Area 2					
MW-17S	To assess shallow (S) and deep (D) groundwater conditions in the vicinity of the former wooden duct system and the Washington Street utility corridor.	NA	Center of screened interval	At each location: 1	Each sample: VOC, SVOC, Total CN
MW-17D					
MW-21S					
MW-21D					
MW-22S					
MW-22D					
MW-23S					
MW-23D					
MW-29S					
MW-30S					
MW-31S					
MW-32S					
MW-33S					
MW-35S					
MW-36					
MW-37					
MW-38					
MW-39					
MW-40					
MW-44S					
MW-45S					
MW-46S					
MW-47S					
QA/QC Samples					
Trip Blank	To test for any contaminants introduced while groundwater samples are being stored or transported to the laboratory.	NA	NA	TBD	VOC
Field Equipment Blank	To test for any contaminants introduced by field equipment during the collection of soil and groundwater samples.	NA	NA	TBD	Each sample: VOC, SVOC, Total CN
Field Duplicates	To evaluate the consistency of the laboratory analytical methods.	NA	NA	1 per 20	Each sample: VOC, SVOC, Total CN
Matrix Spike/Matrix Spike Duplicate	Laboratory quality control samples to be collected as part of the laboratory analytical batch quality control.	NA	NA	1 per 20	Each sample: VOC, SVOC, Total CN

Notes:
bgs - below ground surface
CN - Cyanide
ICP - Inductive coupling plasma
NA - Not Applicable
SVOCs - Semi-Volatile Organic Compounds
TBD - To Be Determined
VOCs - Volatile Organic Compounds
ZHE - Zero Headspace Extractions

Figures



REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES OF EAST ITHACA AND WEST ITHACA, NEW YORK

N

1000 0 2000

1"=2000'

AECOM

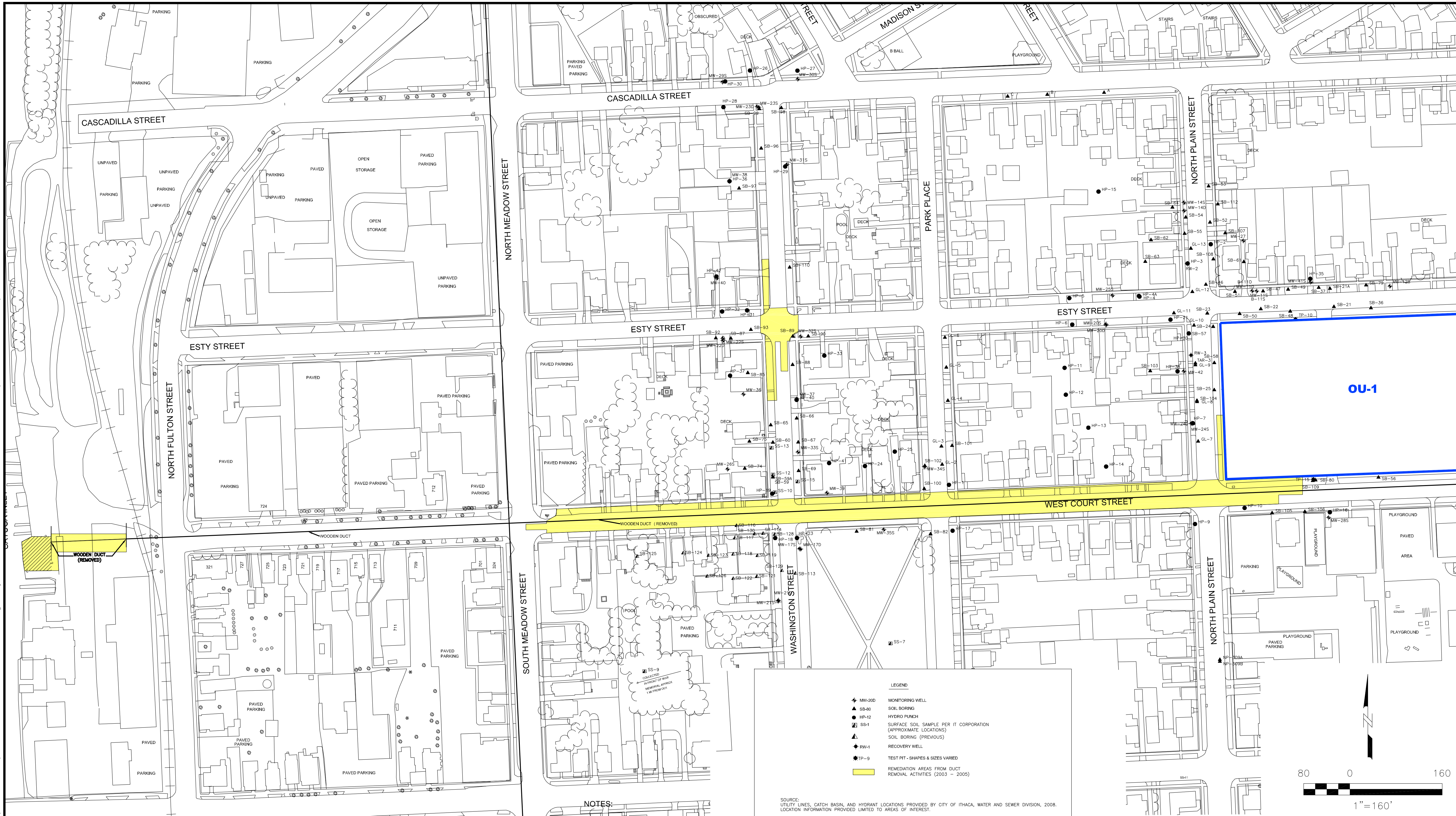
NYSET - OU-2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-0106)

SITE LOCATION MAP

DATE: 06/12/09 | DRWN: DLS/PGH

FIGURE 2-1

File: F:\04964_OU2\Court Street\Remedial Alternatives\FIGURE 1_SITE LOCATION MAP.dwg Layout: ANSI_AVI-CP User: SilvermonD Plotted: Jun 12, 2009 - 12:19pm Xref's:



NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS–1 – SS–10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS–8 AND SS–9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS–11 – SS–15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

AECOM

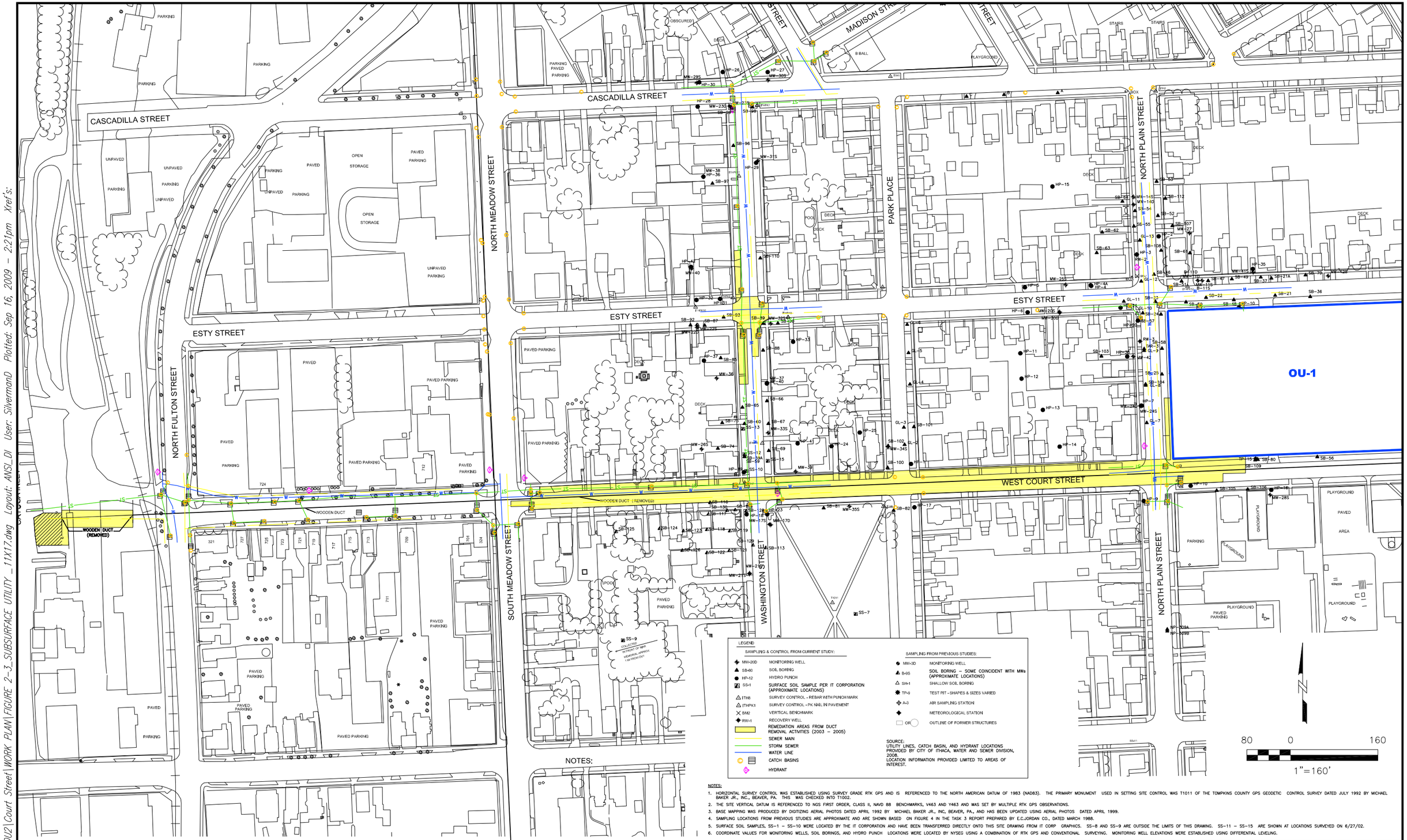
NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

DATE: 09/16/09 | DRWN: DLS/PGH

SITE PLAN

FIGURE 2-2

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-2_SITE PLAN_11x17.dwg Layout: ANSI_D/ User: SilvermanD Plotted: Sep 16, 2009 - 2:19pm Xref's:



NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS-1 – SS-10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS-8 AND SS-9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS-11 – SS-15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

SUBSURFACE UTILITY LOCATION MAP

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-3**

LEGEND

- MW-20D — MONITORING WELL
- SB-80 — SOIL BORING
- HP-12 — HYDRO PUNCH
- SS-1 — SURFACE SOIL SAMPLE PER IT CORPORATION (APPROXIMATE LOCATIONS)
- RW-1 — RECOVERY WELL
- TP-9 — TEST PIT - SHAPES & SIZES VARIED
- 376 — TOP OF CLAY CONTOUR (NAVD88) (2 FOOT INTERVAL)
- 385.50 — TOP OF CLAY ELEVATION
- REMEDIATION AREAS FROM DUCT REMOVAL ACTIVITIES (2003 – 2005)

390
388
386
384
382
380
378
376
374
372

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROLS WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS–1 – SS–10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS–8 AND SS–9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS–11 – SS–15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

N

60 0 120

1"=120'

CASCADILLA STREET
ESTY STREET
WEST COURT STREET
PARK PLACE
NORTH PLAIN STREET
NORTH ALBANY STREET
WASHINGTON STREET
WOODEN DUCT (REMOVED)
OBSCURED
STAIRS
BOX
PAVED PARKING
PLAYGROUND
PAVED AREA
SOIL BORING – SOME COINCIDENT WITH MW (APPROXIMATE LOCATIONS)

OU-1

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-0200)

TOP OF SILTY CLAY

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-4**

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-4_TOP OF SILTY CLAY.dwg Layout: FIGURE 1 User: SilvermanD Plotted: Sep 16, 2009 – 11:27am Xref's:

LEGEND

- MW-20D — MONITORING WELL
- SB-80 — SOIL BORING
- HP-12 — HYDRO PUNCH
- SS-1 — SURFACE SOIL SAMPLE PER IT CORPORATION (APPROXIMATE LOCATIONS)
- RW-1 — RECOVERY WELL
- TP-9 — TEST PIT - SHAPES & SIZES VARIED
- CROSS SECTION LOCATION
- REMEDIATION AREAS FROM DUCT REMOVAL ACTIVITIES (2003 – 2005)

NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS-1 – SS-10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS-8 AND SS-9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS-11 – SS-15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

N

50 0 100

1"=100'

CASCADILLA STREET
PARK PLACE
NORTH PLAIN STREET
ESTY STREET
WEST COURT STREET
WOODEN DUCT (REMOVED)
PLAIN STREET
OU-1
PLAYGROUND
PAVED AREA
PARKING

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

CROSS SECTION LOCATION MAP

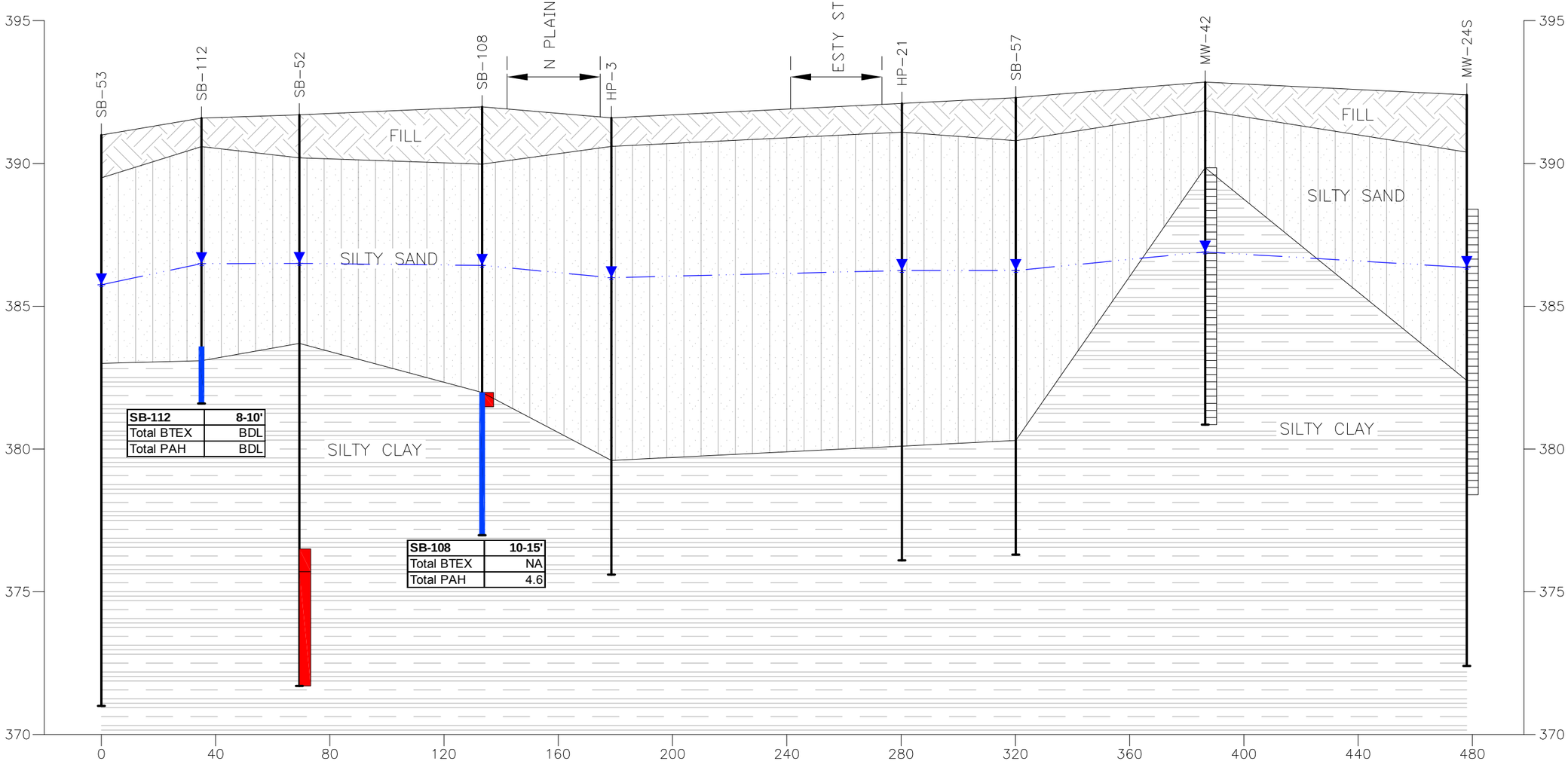
DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-5**

NORTH

A

SOUTH

A'



OBSERVED HYDROCARBON IMPACTS

- HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
- COAL TAR PRESENT OR COAL TAR SATURATED
- COAL TAR ODORS
- SOIL SAMPLE INTERVAL

LEGEND

- FILL
- SILTY SAND
- SILTY CLAY
- OBSERVED CONTACT
- INFERRED CONTACT
- APPROXIMATE GROUNDWATER ELEVATION (2002)

BDL BELOW DETECTION LIMIT

NA NOT ANALYZED

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.
3. ANALYTICAL SOIL DATA REPORTED IN PPM.

30 0 60

1"=60'

Vertical Exaggeration: 10

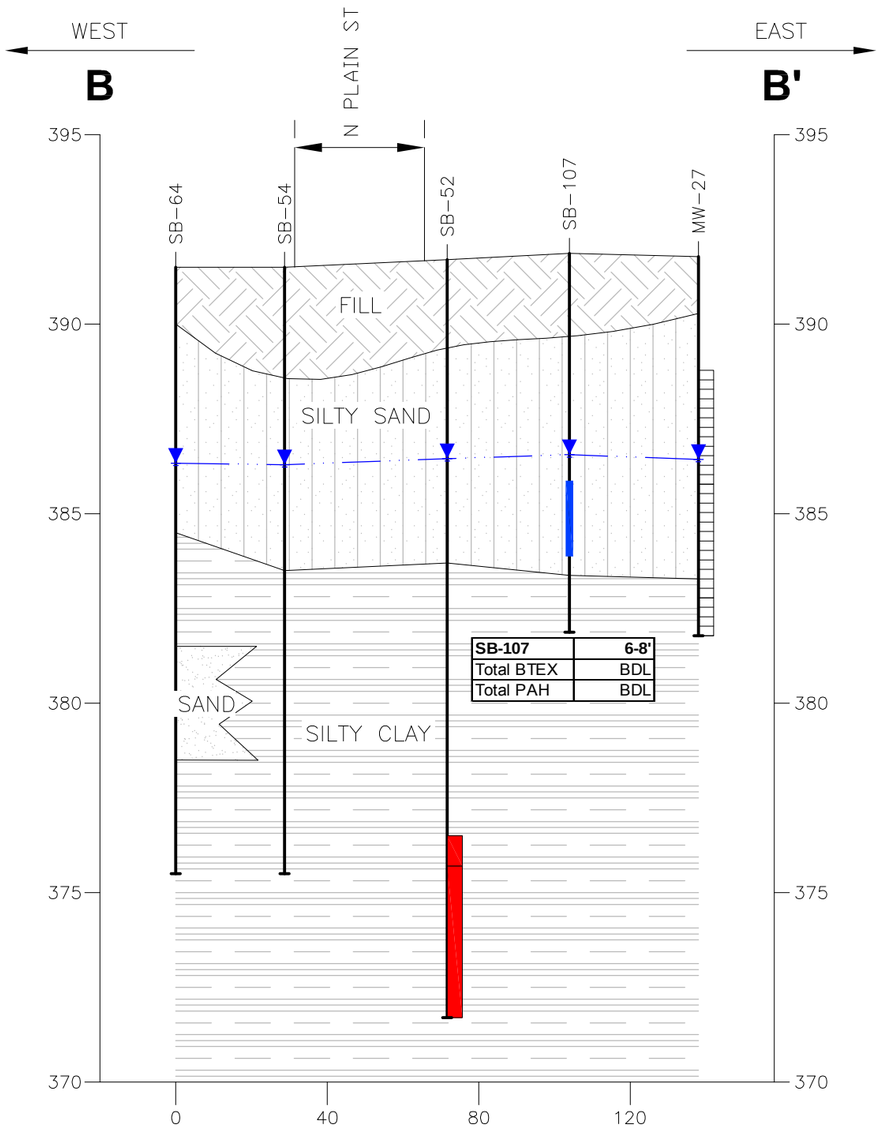
AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

CROSS SECTION A-A'

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-6**

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-6_CROSS SECTION A-A.dwg Layout: ANSL_BW-LJ User: SilvermanD Plotted: Sep 16, 2009 - 2:54pm Xref's:



OBSERVED HYDROCARBON IMPACTS

- HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
- COAL TAR ODORS
- COAL TAR PRESENT OR COAL TAR SATURATED

LEGEND

- SOIL SAMPLE INTERVAL
- FILL
- SILTY SAND
- SILTY CLAY
- SAND
- OBSERVED CONTACT
- INFERRED CONTACT
- APPROXIMATE GROUNDWATER ELEVATION (2002)
- BDL BELOW DETECTION LIMIT

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.
3. ANALYTICAL SOIL DATA REPORTED IN PPM.

20 0 40
1"=40'

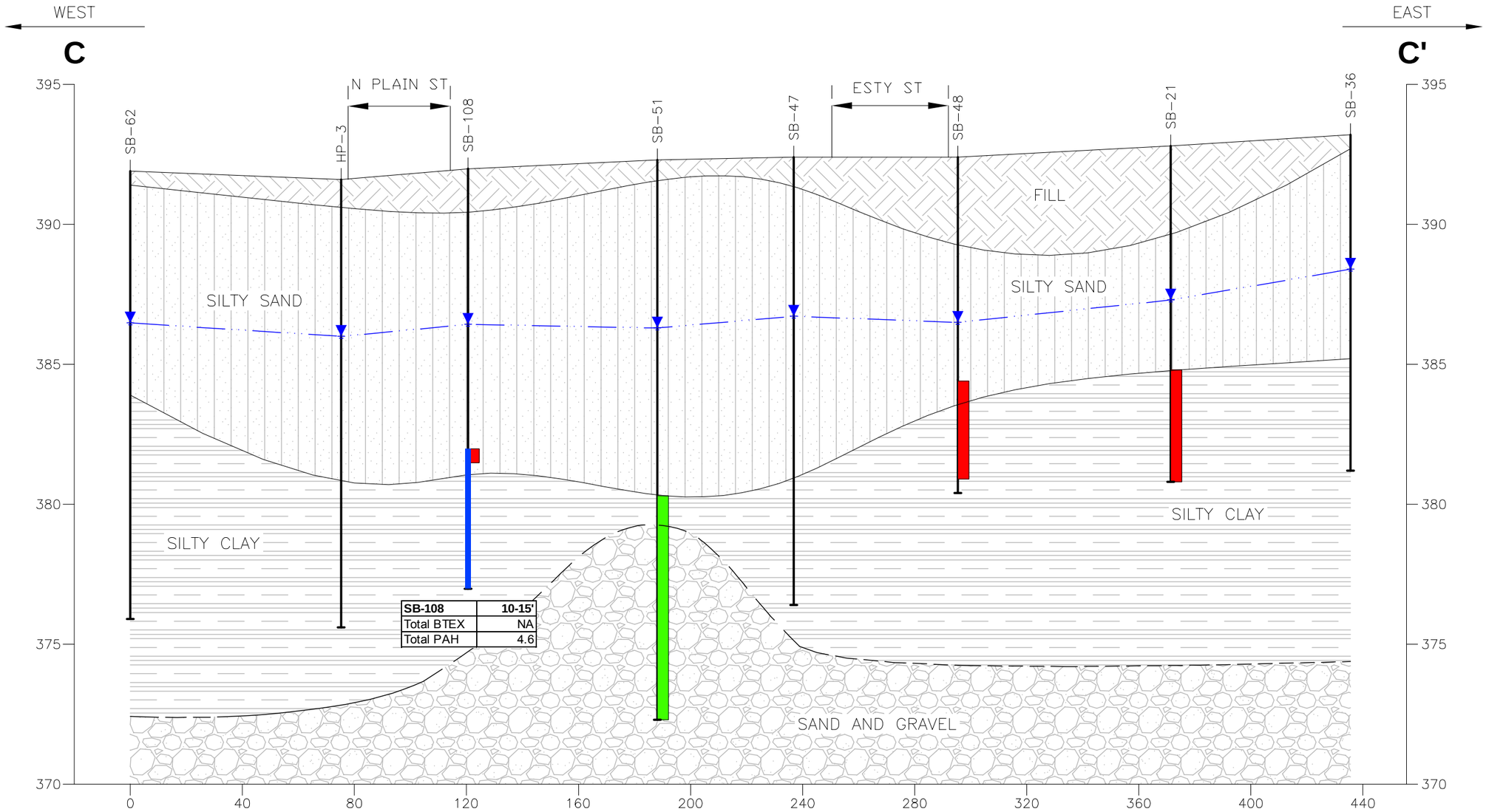
VERTICAL EXAGGERATION = 10X

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

CROSS SECTION B-B'

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-7**



OBSERVED HYDROCARBON IMPACTS

- HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
- COAL TAR PRESENT OR COAL TAR SATURATED
- COAL TAR ODORS

LEGEND

- SOIL SAMPLE INTERVAL
- FILL
- SILTY SAND
- SILTY CLAY
- SAND & GRAVEL
- OBSERVED CONTACT
- INFERRED CONTACT
- APPROXIMATE GROUNDWATER ELEVATION (2002)

BDL BELOW DETECTION LIMIT
NA NOT ANALYZED

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.
3. ANALYTICAL SOIL DATA REPORTED IN PPM.

20 0 40
1"=40'

VERTICAL EXAGGERATION = 10X

AECOM

NYSEG - OU2 ITHACA/COURT STREET SITE ITHACA, NEW YORK (04964-032-200)			CROSS SECTION C-C'
DATE: 09/16/09	DRWN: DLS/PGH		FIGURE 2-8

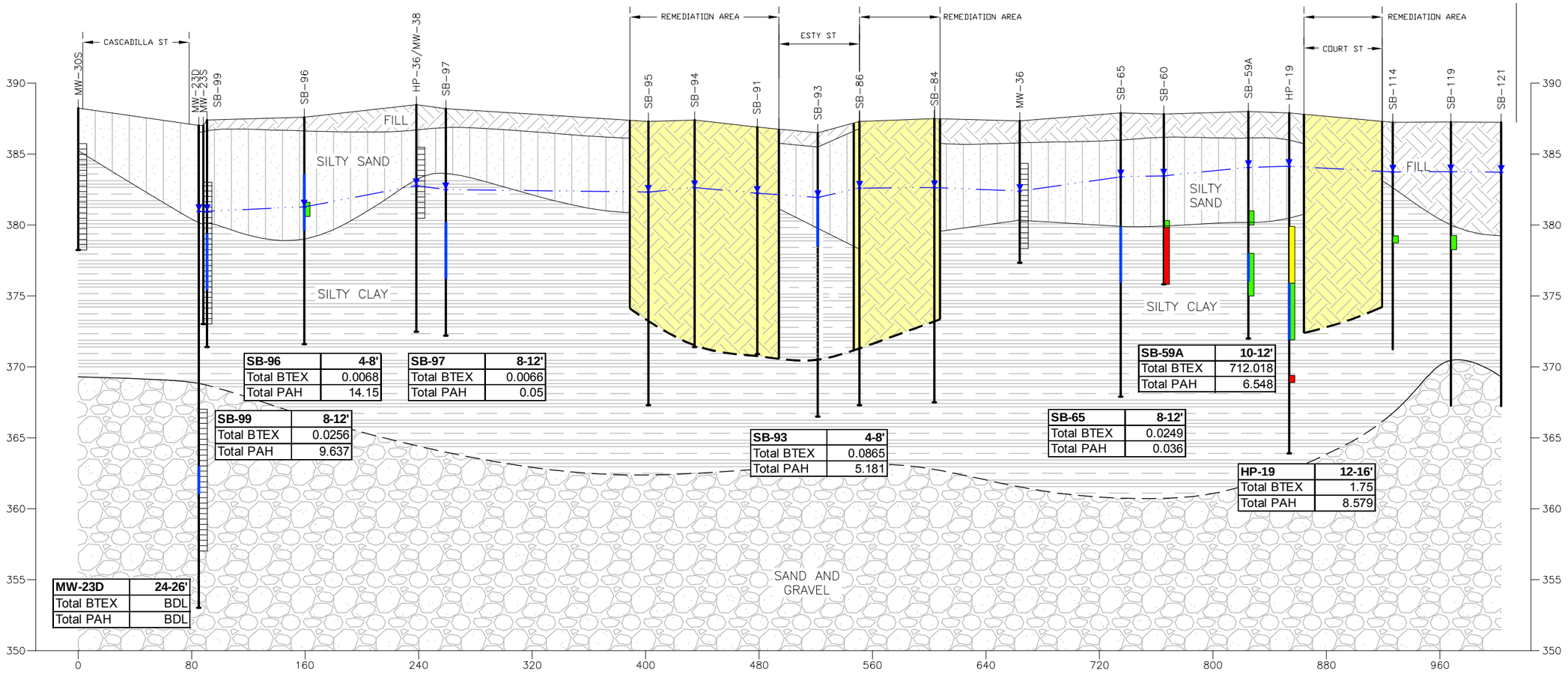
File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-8_CROSS SECTION C-C.dwg Layout: ANSL_BI-LJ User: SilvermanD Plotted: Sep 16, 2009 - 2:52pm Xref's:

NORTH

D

SOUTH

D'



SB-96	4-8'
Total BTEX	0.0068
Total PAH	14.15

SB-97	8-12'
Total BTEX	0.0066
Total PAH	0.05

SB-59A	10-12'
Total BTEX	712.018
Total PAH	6.548

SB-99	8-12'
Total BTEX	0.0256
Total PAH	9.637

SB-93	4-8'
Total BTEX	0.0865
Total PAH	5.181

SB-65	8-12'
Total BTEX	0.0249
Total PAH	0.036

HP-19	12-16'
Total BTEX	1.75
Total PAH	8.579

MW-23D	24-26'
Total BTEX	BDL
Total PAH	BDL

OBSERVED HYDROCARBON IMPACTS

- HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
- COAL TAR PRESENT OR COAL TAR SATURATED
- COAL TAR ODORS
- HISTORIC EXCAVATION AREA

LEGEND

- FILL
- SILTY SAND
- SILTY CLAY
- SAND & GRAVEL
- OBSERVED CONTACT
- INFERRED CONTACT
- APPROXIMATE GROUNDWATER ELEVATION (2002)
- SOIL SAMPLE INTERVAL

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.
3. ANALYTICAL SOIL DATA REPORTED IN PPM.

40 0 80

1"=80'

VERTICAL EXAGGERATION = 10X

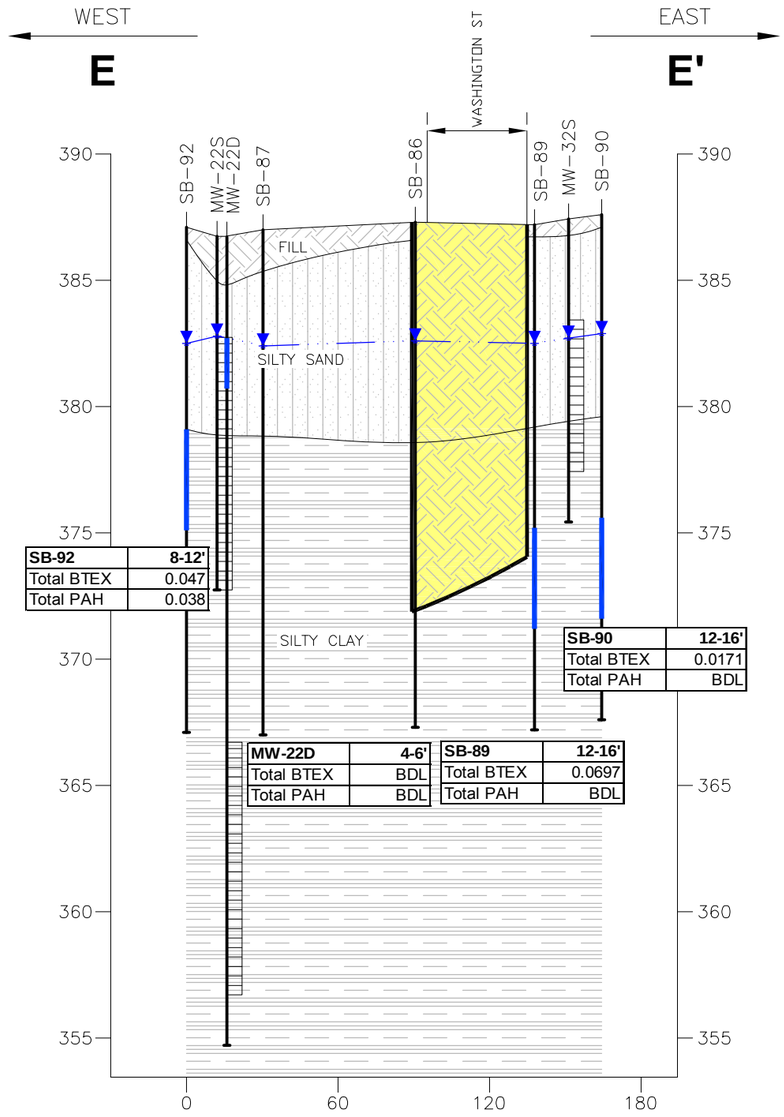
AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

CROSS SECTION D-D'

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-9**

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-9_CROSS SECTION D-D.dwg Layout: ANSI_B\-LJ User: SilvermanD Plotted: Sep 16, 2009 - 2:52pm Xref's:



OBSERVED HYDROCARBON IMPACTS

- HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
- COAL TAR PRESENT OR COAL TAR SATURATED
- COAL TAR ODORS

LEGEND

- HISTORIC EXCAVATION AREA
- FILL
- SILTY SAND
- SILTY CLAY
- OBSERVED CONTACT
- INFERRED CONTACT
- APPROXIMATE GROUNDWATER ELEVATION (2002)
- BDL BELOW DETECTION LIMIT
- SOIL SAMPLE INTERVAL

NOTES:
1. THE DESCRIPTIONS AND COLORED PORTIONS OF THE FIGURE ARE GENERAL IN NATURE AND ARE BASED ON A LIMITED NUMBER OF SAMPLES. REFER TO THE BORING LOGS AND THE RESULTS OF THE CHEMICAL ANALYSES FOR SPECIFIC INFORMATION REGARDING THE SUBSURFACE GEOLOGICAL UNITS AND THE DISTRIBUTION OF ANALYTICAL COMPOUNDS.
2. SECTION IS POINT TO POINT.
3. ANALYTICAL SOIL DATA REPORTED IN PPM.

30 0 60
1"=60'

VERTICAL EXAGGERATION = 10X

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

CROSS SECTION E-E'

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 2-10**

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 2-10_CROSS SECTION E-E.dwg Layout: ANSI_B1-LJ User: SilvermanD Plotted: Sep 16, 2009 - 2:55pm Xref's:

LEGEND

- MW-20D — MONITORING WELL
- SB-80 — SOIL BORING
- HP-12 — HYDRO PUNCH
- SS-1 — SURFACE SOIL SAMPLE PER IT CORPORATION (APPROXIMATE LOCATIONS)
- RW-1 — RECOVERY WELL
- REMEDIATION AREAS FROM DUCT REMOVAL ACTIVITIES (2003 – 2005)
- PROPOSED TEST PIT LOCATION

NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS–1 – SS–10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS–8 AND SS–9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS–11 – SS–15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

CASCADILLA STREET
ESTY STREET
WEST COURT STREET
NORTH FULTON STREET
NORTH MEADOW STREET
SOUTH MEADOW STREET
CAYUGA INLET
FIFTH STREET
MADISON STREET
PARK PLACE
WASHINGTON STREET
AREA 3
TP102
TP101
WOODEN DUCT (REMOVED)
WOODEN DUCT
PAVED PARKING
UNPAVED PARKING
OPEN STORAGE
OBSCURED
POOL

N

70 0 140

1"=140'

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

AREA 3
PROPOSED RI TEST PIT LOCATIONS

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 3-1**

File: F:\|04964_OU2|Court Street|WORK PLAN|FIGURE 3-1_AREA 3_PROPOSED TEST PITS.dwg Layout: FIGURE 1 User: SilvermanD Plotted: Sep 16, 2009 – 11:23am Xref's:

LEGEND

MW-20D	MONITORING WELL
SB80	SOIL BORING
HP-12	HYDRO PUNCH
RW-1	RECOVERY WELL
TP-9	TEST PIT - SHAPES & SIZES VARIED
	CONFIRMATION SAMPLE
106(7)	CONFIRMATION SAMPLE ID(DEPTH)
	STRONG HYDROCARBON–LIKE ODOR, LIGHT STAIN OR SHEEN
	HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
	COAL TAR PRESENT OR COAL TAR STRINGERS, LAYERS, OR SATURATED SOIL
	REMEDIATION AREAS FROM DUCT REMOVAL ACTIVITIES (2003 – 2005)
MW-48S	PROPOSED MONITORING WELL
SB157	PROPOSED SOIL BORING
RW-1	PROPOSED RECOVERY WELL
BOLD	PROPOSED GROUNDWATER SAMPLING LOCATION

NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS–1 – SS–10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS–8 AND SS–9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS–11 – SS–15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

NORTH PLAIN ST.

ESTY STREET

OU-1

30 0 60

1"=60'

N

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

DATE: 09/16/09 | DRWN: DLS/PGH

AREA 1
PROPOSED RI SOIL BORING AND MONITORING WELL LOCATIONS
FIGURE 3-2

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 3-2_AREA 1_Proposed Soil Boring and Monitoring Well Location.dwg Layout: FIGURE 1 User: Silverman0 Plotted: Sep 16, 2009 - 11:20am Xref's:

LEGEND

MW-20D	MONITORING WELL
SB80	SOIL BORING
HP-12	HYDRO PUNCH
SS-1	SURFACE SOIL SAMPLE PER IT CORPORATION (APPROXIMATE LOCATIONS)
	CONFIRMATION SAMPLE
106(7)	CONFIRMATION SAMPLE ID(DEPTH)
	STRONG HYDROCARBON-LIKE ODOR, LIGHT STAIN OR SHEEN
	HEAVY COAL TAR STAIN, SHEEN, OR COAL TAR BLEBS
	COAL TAR PRESENT OR COAL TAR STRINGERS, LAYERS, OR SATURATED SOIL
	SAMPLE CONTAINS COCs AT CONCENTRATIONS GREATER THAN NYSDEC RESIDENTIAL SOIL CLEANUP OBJECTIVES
	REMEDIATION AREAS FROM DUCT REMOVAL ACTIVITIES (2003 - 2005)
MW-46S	PROPOSED MONITORING WELL
SB133	PROPOSED SOIL BORING
BOLD	PROPOSED GROUNDWATER SAMPLING LOCATION

NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS-1 - SS-10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS-8 AND SS-9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS-11 - SS-15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

30 0 60

1"=60'

N

FIFTH STREET

MADISON S

CASCADILLA STREET

PARK PLACE

ESTY STREET

KING

HP-26 HP-27 HP-30 MW-29S MW-30S MW-23D MW-23S HP-28 SB143 SB142 SB98 SB99 SB144 SB145 SB165 SB96 MW-31S HP-29 MW-38 HP-36 SB146 SB97 SB147 SB166 SB148 MW-47S SB149 SB110 SB150 HP-42 MW-40 MW-48S HP-31 HP-32 SB153 SB93 117(11) SB154 SB156 MW-45S SB151 SB87 113(14) 115(6) SB155 SB92 SB152 MW-32S SB89 SB90 MW-22D MW-22S HP-33 HP-37 SB85 128(8) SB88 MW-36 MW-37 HP-40 MW-46S SB66 SB65 SB60 SB157 SB75 SB67 SS-13 MW-33S HP-25 SB158 SB74 HP-41 SB69 HP-24 SB102 MW-34S SS-12 SB59A HP-19 SB59 SS-15 SB100

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-200)

DATE: 09/17/09 DRWN: DLS/PGH

AREA 2
PROPOSED RI SOIL BORING AND MONITORING WELL LOCATIONS

FIGURE 3-3

Appendix A

Field Sampling and Analytical Plan

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Appendix A

Field Sampling and Analytical Plan

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

AECOM, Inc.
September 2009
Document No.: 04964-032

AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, Binghamton, New York 13902-5224

Appendix A

Field Sampling and Analytical Plan

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

Prepared By
Keith A. Stahle, Project Geologist

Reviewed By
Tamara Raby, Senior Geologist

AECOM, Inc.
September 2009
Document No.: 04964-032

AECOM

Contents

List of Figures

1.0 Introduction

This Field Sampling and Analytical Plan (FSAP) presents the methods and procedures to be used for performing the Remedial Investigation (RI) at the Ithaca Court Street former manufactured gas plant (MGP) site located in the City of Ithaca, New York.

1.1 Overview of field activities

The following field activities will be performed as part of the RI:

- Test Pit Excavation – Two test pits will be excavated at the site.
- Soil Boring Installation – There will be 41 soil borings (including 6 borings advanced for monitoring well installation) with up to 82 soil samples collected.
- Monitoring Well Installation and Groundwater Sampling –Six monitoring wells will be installed and developed. Groundwater samples will be collected from the 6 new wells in addition to 32 existing wells.
- Surveying – The locations and elevations of the RI data points and important site features will be surveyed.

2.0 General field guidelines

2.1 Site hazards

Potential on-site surface hazards such as sharp objects, overhead power lines, energized areas, and building hazards will be identified prior to initiation of the fieldwork. Generally, potential hazards at the site will be identified during a site reconnaissance by the project team on the first day of the investigation field activities. Additional safety measures to be undertaken for the work performed during the investigation will be addressed in the Site-Specific Health and Safety Plan (HASP), which is provided as Appendix D to the Work Plan.

2.2 Underground utilities

Underground utilities, including electric lines, gas lines, water lines, storm and sanitary sewers, and communication lines will be identified prior to initiation of drilling and other subsurface work. Underground utility location will be accomplished as follows:

- All RI data points will be flagged or marked out with white paint.
- Dig Safely of New York (800) 272-4480 will be contacted to initiate the locating activities. New York State law requires that Dig Safely of New York be notified at least two working days, and not more than 10 working days, before subsurface work is conducted.
- Companies with subsurface utilities present will locate and mark out all subsurface utility lines.

2.3 Field log books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is developed. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number;
- Field books will be bound with consecutively numbered pages;
- Field books will be controlled by the Site Manager while fieldwork is in progress;
- Entries will be written with waterproof in;.
- Entries will be signed and dated at the conclusion of each day of fieldwork;
- Erroneous entries made while fieldwork is in progress will be corrected by the field person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction; and,
- Corrections necessary after departing the field will be made by the person who entered the original information. Corrections will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members on site and site contacts;

- Names, titles of any site visitors, as well as the date and time entering and leaving the site;
- Weather information, for example: temperature, cloud coverage, wind speed, and direction;
- Purpose of field activity;
- A detailed description of the fieldwork conducted;
- Sample media (soil, sediment, groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- All field measurements made, such as volatile organic compounds (VOCs) using a PID, pH, temperature, conductivity, water level, etc.;
- References for all maps and photographs of the sampling site(s); and
- Information pertaining to sample documentation such as:
  - Bottle lot numbers;
  - Dates and method of sample shipments;
  - Chain-of-custody (COC) record numbers; and
  - Federal Express air bill number.

3.0 Field equipment decontamination and management of investigation-derived residuals

3.1 Decontamination area

A temporary decontamination area lined with polyethylene sheeting will be constructed within OU1 for use during decontamination of the drilling and test pitting equipment. Water collected from the decontamination of activities will be collected in 55-gallon drums and managed as described in Section 3.3.

3.2 Equipment decontamination

The following procedures will be used to decontaminate equipment used during the RI activities.

- All drilling equipment including the backhoe, bucket, and drilling rig; augers; bits; rods; tools; split-spoon samplers; and tremie pipes will be cleaned with a high-pressure, hot water pressure washing unit before beginning work.
- Tools, drill rods, and augers will be placed on polyethylene plastic sheets following pressure washing. Direct contact with the ground will be avoided.
- All augers, rods, and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the site.

3.2.1 Sampling equipment decontamination

Suggested Materials:

- Potable water;
- Phosphate-free detergent (such as Alconox™ or Simple Green™);
- Distilled water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes; and
- Personal protective equipment (PPE) in accordance with the HASP.

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be washed with potable water and a phosphate-free detergent (such as Alconox™). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a de-ionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil, if necessary. At no time will washed equipment be placed directly on the ground.

- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

3.3 Management of investigation-derived residuals

3.3.1 Decontamination fluids

Hot water pressure wash and decontamination fluids will be collected in 55-gallon drums. The storage drums or tank will be labeled as "pending analysis – investigation-derived residual decon water" and temporarily stored on wooden pallets in OU1 of the site pending characterization and proper disposal.

3.3.2 Drill cuttings

Drill cuttings will be contained in 55-gallon drums. The drums will be labeled as "pending analysis – investigation-derived residual – soil from drill cuttings" and temporarily stored on wooden pallets in OU1 of the site area pending characterization and proper disposal.

3.3.3 Development and purge water

All development and purge water will be contained in 55-gallon drums. The drums or tank will be labeled as "pending analysis - investigation derived residual development and purge water" and temporarily stored on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.4 Personal protective equipment

All PPE will be placed in 55-gallon drums or a lined cardboard yard box for proper disposal.

3.3.5 Dedicated sampling equipment

All dedicated groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene rope, polyethylene tubing) will be placed in 55-gallon drums for disposal.

4.0 Subsurface soil sampling procedures

4.1 Introduction

Subsurface investigation activities to be conducted at the Ithaca Court Street former MGP site consist of:

- Exploratory test pit excavation;
- Advancement of soil borings; and
- Installation of monitoring wells.

Procedures for these activities are described in the following sections.

4.2 Test pit excavation

Test pits will be excavated using a rubber-tired or track backhoe. In the event deep excavations are anticipated, a track hoe will be utilized. Locations of test pits are specified in the RI Work Plan, and will be finalized in the field, based on the location of existing underground utilities. If the prospective test pit location is covered by concrete, the area will be saw-cut prior to excavation.

During test pit investigation activities, personnel will stand upwind of the excavation area to the extent possible. Air monitoring and odor mitigation (if necessary) will be conducted in accordance with the Community Air Monitoring Project (CAMP) and HASP, provided as Appendix C and Appendix D of the Work Plan respectively. Test pit materials will be photographed and logged for future reference. Material removed from the test pit will be placed on polyethylene sheeting. Should sampling of excavated material be performed, samples will be collected from the excavator bucket. Upon completion, the materials from the test pit will be placed back in the excavation in the reverse order in which it was removed. The location and size of the test pit will be measured and described in the field logbook.

Visually clean soils, such as surface soils, will be segregated from soils that may be impacted. The visually clean soils will be used to cover the impacted soils/source materials when placed back in the excavation. At a minimum, the top 2 feet of backfilled soil will be visually clean. The test pit will be backfilled as soon as possible after completion and in general prior to the cessation of activities at the end of the day. Restoration of the test pit areas may include replanting or repaving. Following restoration of the excavation, the test pit will be staked/marked to facilitate subsequent location by surveying crews.

4.3 Soil borings and subsurface soil sampling

The following methods will be used during installation of the soil borings.

Required Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Stakes, flagging and marking paint;
- Plastic bags for soil screening samples;
- Tape measure;

- Decontamination supplies;
- Water level indicator;
- PID with a 10.2 or 10.6 eV lamp;
- Camera;
- Clear tape, duct tape;
- Laboratory sample bottles;
- Coolers and ice; and
- Shipping supplies.

4.3.1 Drilling and geologic logging methods

- Soil borings will be sampled initially with mini-sonic drilling method. It is likely that the mini-sonic method will also be utilized for borings where groundwater monitoring wells will be installed. The use of mini-sonic drilling methods will also allow for a more accurate determination of the depths and thicknesses of geologic units. Direct-push or hollow stem auger drilling methods may also be used to advance soil borings and install monitoring wells.
- Soil samples will be collected continuously from the ground surface to the bottom of the borings using either 2.5-inch or 5-inch diameter core barrel samplers.
- Soil samples retrieved from the borehole will be visually described for: 1) percent recovery, 2) soil type, 3) color, 4) moisture content, 5) texture, 6) grain size and shape, 7) consistency, 8) visible evidence of staining or other hydrocarbon-related impacts, and 9) any other relevant observations. The descriptions will be in accordance with the Unified Soil Classification System (USCS) and the American Society for Testing and Materials (ASTM) guidelines.
- Immediately after describing the core, a representative portion of the sample will be placed in a re-sealable plastic (e.g., “ziplock”) bag filled approximately half full. The bag will be labeled with the boring number and interval sampled.
- After allowing the bagged soil to warm the tip of the sample probe attached to the PID will be inserted into the bag to measure the headspace for organic vapors.
- Soil remaining after completion of sample description, collection, and field screening will be disposed of properly.
- All borings will be sealed with bentonite or cement/bentonite grout following completion.
- All drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.
- The field geologist will log borehole geology and headspace measurements in the field book and the Drilling Record shown in Figure 4-1, or similar form and any other observations (e.g., odors, NAPL, soil staining, etc.).

4.3.2 Soil sampling

- The number and frequency of samples to be collected from each boring and the associated analytical parameters are summarized on Table 3-1 in the RI Work Plan.
- Samples for laboratory analyses will be collected directly from the polyethylene liners, acetate liners or split-spoons, placed into appropriate containers, and compacted to minimize headspace and pore space. Soil used for headspace analysis will not be used for laboratory VOC analysis.

- The sample containers will be labeled, placed in a laboratory-supplied cooler, and packed with ice. The coolers will then be shipped to the laboratory for analysis.
- If there is a delay of sample shipment due to insufficient samples to warrant overnight delivery, the samples will be stored in a cool, secure place with sufficient ice to maintain a temperature of 4° C.
- COC procedures will be followed as outlined in the QAPP, provided as Appendix B to the Work Plan.
- The sampling equipment will be decontaminated between samples in accordance with procedures described in Section 3.
- Soil remaining after completion of sample description, collection, and field screening will be disposed of properly.
- The sample locations, descriptions, and depths will be recorded on the borelogs in the field book.

4.3.3 Borehole abandonment

Boreholes for the mini-sonic or direct-push borings will be filled with bentonite chips. All auger soil borings not used for the construction of monitoring wells will be grouted to the ground surface following the completion of the soil sampling to prevent cross-contamination of permeable zones. The borings will be filled using a cement/bentonite grout mixture with the following specifications:

- Bentonite will be powdered sodium montmorillonite furnished in moisture resistant sacks without additives.
- Cement shall be a low-alkaline Portland cement, Type I in conformance with ASTM C-150 and without additives.
- The cement/bentonite grout mixture shall be to the following proportion:
  - Three sacks (94 pounds) of Type I Portland cement;
  - 14 pounds of granular bentonite (5% mix); and
  - 25 gallons of water.

The cement will be mechanically mixed, above ground, with water from a potable water source. Bentonite will be added to ensure a lump-free consistency. The mixture will be pumped through a tremie pipe as the drill is being withdrawn.

4.4 Monitoring well installation and development

The following methods will be used for drilling, installing, and developing the monitoring wells:

Required Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Plastic bags for soil screening samples;
- Tape measure;
- Decontamination supplies;
- Electronic oil/water interface probe;

- PID with a 10.2 or 10.6 eV lamp;
- Camera;
- Clear tape, duct tape;
- Aluminum foil;
- Laboratory sample bottles;
- Coolers and ice;
- Shipping supplies;
- Clear polyethylene disposable bailers (NAPL confirmation);
- Polyethylene disposable bailers (development);
- Polypropylene rope (development);
- Polyethylene tubing;
- Waterra™ pump or other purge pump (development);
- Submersible electric pump (development);
- Stainless steel or glass beakers (development);
- Turbidity meter (development); and
- Temperature, conductivity, pH meter (development).

4.4.1 Overburden monitoring well installation

Figure 4-2 illustrates the construction details for a typical overburden monitoring well. The monitoring wells will be installed according to the following specifications:

- The monitoring well borings will be advanced with 5-inch inner diameter (ID) core barrels.
- Wells will be constructed with 2-inch ID, threaded, flush-joint, PVC casings and screens.
- Screens will be 10-feet long with 0.02-inch slot openings with a 2-foot DNAPL sump at the base. Alternative screen lengths up to 15' long may be used at the discretion of the field geologist and with the approval of NYSEG and NYSDEC, based on site conditions.
- The annulus around the screens will be backfilled with clean silica sand having appropriate size (e.g., Morie No. 1) to a minimum height of 2 feet above the top of the screen. Core barrels will be withdrawn as sand is poured in a manner that will minimize hole collapse and bridging.
- A bentonite chip seal with a minimum thickness of 1 foot will be placed above the sand pack. The bentonite seal will be hydrated with clean, potable water before placement of grout above the seal layer.
- The remainder of the annular space will be filled with cement-bentonite grout to ground surface. The grout will be allowed to set for a minimum of 24 hours before wells are developed.
- Each monitoring well will be a flush-mounted installation with a locking cap.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- The top of the PVC well casing and ground surface will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.

- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on the Construction Log shown in Figure 4-3, or similar form.

4.4.2 Monitoring well development

- After a minimum of 24 hours after installation, the monitoring wells will be developed by surging and pumping. Surging will be performed periodically, across the lengths of screen in 2-foot increments prior to, at interim periods of pumping, and immediately before the final pumping. Pumping methods may include using a centrifugal, submersible, or peristaltic pump and dedicated polyethylene tubing, using a Waterra™ positive displacement pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- The wells will be developed until the water in the well is reasonably free of visible sediment (50 NTU if possible or until pH, temperature, and specific conductivity stabilize). A portable nephelometer will be used to make the turbidity measurement.
- Development water will be contained in and properly disposed of as described in Section 3.3.3).
- Following development, wells will be allowed to recover for at least 14 days before groundwater is purged and sampled. All monitoring well development will be performed or overseen by a field geologist and recorded in the field book.

5.0 Groundwater sampling procedures

5.1 Introduction

Procedures for obtaining samples of groundwater are described in this section. Groundwater samples will be collected using low-flow, low-stress purge and sampling methods.

5.2 Groundwater sampling

The number and frequency of the samples that will be collected for laboratory analysis from each well and the analytical parameters are listed in Table 3-1 of the RI Work Plan.

The following method will be used to collect groundwater samples from monitoring wells:

Required Equipment and Supplies

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Electronic oil/water interface probe;
- Clear disposable polyethylene bailers and low-flow sampling pump;
- Polyethylene tubing;
- Polypropylene rope;
- Temperature, conductivity, ORP, and pH meter;
- Turbidity meter;
- Flow-through cell;
- Decontamination supplies;
- Peristaltic or submersible pump capable of achieving low-flow rates (i.e., 0.5 liters per minute or less);
- Plastic tubing;
- Plastic sheeting;
- PID;
- Clear tape, duct tape;
- Coolers and ice;
- Laboratory sample bottles; and
- Federal Express labels.

5.2.1 Groundwater sampling method

Purging

- Prior to sampling, the static water level and thickness of any light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) will be measured to the nearest 0.01 foot from the

surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book.

- The oil/water interface probe will be decontaminated between uses.
- Groundwater from the well will be purged until field parameters stabilize, up to three well volumes are removed, or 1 hour of continuous purging is performed. Field parameters are considered to be stable when three consecutive readings are within the stabilization criteria for that parameter. The stabilization criteria are as follows: 10% or below 10 NTUs for turbidity, 3% for conductivity and temperature, 0.1 unit for pH, and 10 mV for ORP. Purging will be conducted using the low-flow sampling technique specified by the U.S. EPA Region 1 in its guidance document entitled "Low-Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells".
- The flow rate measurement will be approximately 0.5 liter per minute or less.
- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required parameters are met, and sampled when it recovers sufficiently, in accordance with low-flow sampling protocol.
- Purge water will be managed and disposed of properly as described in Section 3.3.3.

Sampling

- Samples will be collected using dedicated 1/4- or 3/8-inch polyethylene tubing and/or bailers.
- Prior to filling the sample bottles, the temperature, pH, conductivity, and oxidation reduction potential (ORP) will be measured within a flow-through cell. Turbidity will be measured with a hand-held turbidity meter. All measurements will be recorded in the field book.
- Three 40-ml VOA vials with Teflon™ lined septa and hydrochloric acid as a preservative will be filled for analysis of VOCs. The VOA vials will be filled to ensure that no bubbles are in the sample. Two 1-liter amber glass sample bottles will be filled for SVOC analysis. An opaque, 250 mL plastic bottle, with sodium hydroxide added for preservative will then be filled for the analysis of cyanide.
- The sample containers will be labeled, placed in a laboratory-supplied cooler, and packed on ice (to maintain a temperature of 4˚ C). The cooler will be shipped overnight or delivered to the laboratory for analysis.
- COC procedures will be followed as outlined in the QAPP.
- Well sampling data will be recorded on the Groundwater Sampling Record shown in Figure 5-1, or similar form.

6.0 Air monitoring

6.1 Introduction

Two types of air monitoring will be performed during the site investigation: 1) work zone monitoring for protection of the workers performing the site investigation, and 2) community air monitoring at the perimeter of the work site for protection of the local community.

6.2 Breathing zone air monitoring during drilling and sampling

Monitoring of air in the breathing zone within the work site will be conducted periodically during all drilling and sampling activities.

- An organic vapor meter (OVM) equipped with a PID will be used to monitor for VOCs or other organic vapors in the breathing zone and borehole, and to screen the samples.
- Additional air monitoring may be required as specified in the site-specific HASP.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The procedure for the PID operation and calibration is included in the HASP. Note that equipment calibration will be performed as often as needed to account for changing conditions or instrument readings. The minimum frequency of calibration is specified in the HASP; more frequent calibration will be performed if spurious readings are observed or there are other problems with the instruments.

6.3 Community air monitoring

Community air monitoring requires real-time monitoring for VOCs, particulates (i.e., dust), and MGP-related odors at the downwind perimeter of each designated work area when certain activities are in progress at impacted sites. The community air monitoring is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels for community air monitoring require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, community air monitoring helps to confirm that work activities do not spread contamination off site through the air.

The procedures and action levels for community air monitoring are presented in the CAMP that has been prepared for the RI at the Ithaca Court Street MGP Site.

7.0 Field instruments and calibration

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all of the instrument manuals will be maintained on site by the Field Team Leader. All changes to instrumentation will be noted in the field log book.

The following field instruments will be used during the investigation:

- PID;
- Particulate monitors;
- pH, specific conductivity, and temperature meter; and
- Turbidity meter.

7.1 Portable photo-ionization detector

- The photo-ionization detector (PID) will be equipped with either a 10.2 or 10.6 eV lamp. The PID is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the VOCs on the U.S. EPA Target Compound List.
- Calibration must be performed at the beginning of each day of use with a standard calibration gas having a concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, more frequent or additional calibration will be required.
- All calibration data must be recorded in the project field notebooks and on an instrument calibration log.
- A battery check must be completed at the beginning and end of each working day.
- All changes to the PID will be noted in the field notes (such as lamp or filter cleaning or replacement or change of instrument).

7.2 pH meter

- Calibration of the pH meter must be performed at the start of each day of use, and after very high or low readings as required by this Plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0, and 10.0 standard units.
- The use of the pH calibration must be used to set the meter to display the value of the standard being checked.
- The calibration data must be recorded in the project field book and on an instrument calibration log.

7.3 Specific conductivity meter and temperature probe

- Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to 10 readings or after very high or low readings as required by this Plan, according to manufacturer's instructions.
- The portable conductivity meter must be calibrated using a reference solution of 200 uohms/cm (or the manufacturer's specified concentration) on a daily basis. The date and lot number of the reference solution must be recorded. Readings must be within five percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

7.4 Turbidity meter

- The turbidity meter must be checked at the start of each day of use according to manufacturer's instructions.

8.0 Analytical program

8.1 Environmental sample analyses

The laboratory samples for each media and the chemical analyses to be performed, including the QA/QC samples are summarized in Table 3-1 of the RI Work Plan.

8.1.1 Subsurface soil analyses

The subsurface soil samples will be analyzed for the following parameters:

- TCL VOC compounds by U.S. EPA Method 8260B;
- TCL SVOC compounds by U.S. EPA Method 8270C; and
- Total Cyanide by U.S. EPA Method 9012A.

8.1.2 Groundwater analyses

The groundwater samples will be analyzed for the following parameters:

- TCL VOC compounds by U.S. EPA Method 8260B;
- TCL SVOC compounds by U.S. EPA Method 8270C; and
- Total Cyanide by U.S. EPA Method 9012A.

8.2 Field quality control samples

Field quality control samples will be collected and analyzed to document the accuracy and precision of the samples. The quality control samples, are described as follows:

- Trip Blank: One trip blank will accompany each shipment of aqueous samples for VOC analysis sent to the laboratory. The trip blank will be analyzed to test for any contaminants introduced while samples are being stored or transported to the laboratory. The trip blanks will be analyzed for volatiles only.
- Field Equipment Blanks: The purpose of the equipment blank is to detect any contamination from sampling equipment, cross-contamination from previously sampled locations, and contamination caused by conditions at sampling locations (e.g., airborne contaminants). One equipment blank will be collected for every 20 samples collected during sampling. The samples will be collected by pouring analyte-free water, prepared in the laboratory, over decontaminated sampling equipment and collecting it in sample jars. The blanks will be collected in the vicinity of a sample location. This field blank will be analyzed for VOCs, SVOCs, and total cyanide. An equipment blank will not be collected if sampling is conducted with dedicated sampling equipment.
- Field Duplicates: Field duplicates are collected to determine the precision of the soil samples collected. This is achieved by compositing soil and splitting it evenly between separate sample jars. Duplicate samples will be collected and analyzed for VOC, SVOCs, and total cyanide. The minimum required number of field duplicates is one for every 20 samples.
- Matrix Spikes, and Matrix Spike Duplicates: These samples are laboratory quality control samples and will be completed as part of the laboratory analytical batch quality control. These samples will be collected in the same manner as the field duplicates. Both the matrix spike and matrix spike duplicate will be collected at the same sample location.

8.3 Sample location numbering system

- Subsurface soil borings will be numbered consecutively beginning with SB131 (soil borings) or MW-44S (monitoring well borings). Individual samples will also be designated with a depth code (see below).
- Monitoring wells will be numbered consecutively beginning with MW-44S.
- Test Pits will be numbered consecutively beginning with TP-101

8.4 Sample identification

Each sample will be given a unique alphanumeric identifier in accordance with the following classification system:

SAMPLE IDENTIFICATION

LL* Sample Type	NN* Sample Number	N-N Depth Code	LL QC Identifier

	Solid	Water
Sample Type:	MW – Monitoring Well Boring SB – Soil Boring TP-Test Pit	MW – Monitoring Well
Sample Number:	Number referenced to a sample location map.	
Depth Code:	Depth in feet of sample interval (0-0.5, 2-4, 10-12, etc.)	
QC Identifier:	TB – Trip Blank EB – Equipment Blank	MS – Matrix Spike MSD–Matrix Spike Duplicate MB – Matrix Blank

* L = Letter
* N = Number

Field duplicate samples will be assigned identifiers that do not allow the laboratory to distinguish them as field duplicates. Each sample container will be labeled prior to packing for shipment. The sample identifier, site name, date and time of sampling, and analytical parameters will be written on the label in waterproof ink and recorded in the field book.

8.5 Chain of custody

- A Chain of Custody (COC) record (Figure 8-1 or similar) will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field, and during return shipment to the laboratory.
- The COC will include the sample identities of each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, preservation method, the project name and number, the name of the analytical laboratory that will receive the samples, and the method of sample shipment.

- If samples are split and sent to different laboratories, such as to a specialty laboratory for fingerprint analysis, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.
- The REMARKS space will be used to indicate if the sample is a matrix spike or matrix spike duplicate. This section will also be used to provide the laboratory with any special instructions
- Trip and field blanks will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s), and the shipper airbill number will be entered on the COC.
- Finally, a member of the sampling team will write his/her signature, the date, and time on the first RELINQUISHED BY space.
- One copy of the COC will be retained by sampling personnel. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler.
- Sample shipments will be refrigerated at 4˚C, typically by packing with bagged ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid, and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape, and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished to the shipper, typically an overnight carrier.
- The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the samples will not be analyzed until directed to do so.
- The samples must be delivered to the laboratory within 48 hours of collection.

8.6 Sample documentation

The field team leader will retain a copy of the COC, and, in addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier;
- Identification of sampled media (e.g., soil, sediment, groundwater);
- Sample location with respect to known reference point;
- Physical description of sample location;
- Field measurements, (e.g., pH, temperature, conductivity, and water levels);
- Date and time of collection;
- Sample collection method;
- Volume of groundwater purged before sampling;
- Number of sample containers;
- Analytical parameters;

- Preservatives used; and
- Shipping information:
  - Dates and method of sample shipments;
  - COC Record numbers;
  - Federal Express Air Bill numbers; and
  - Sample recipient (e.g., laboratory name).

Figures

AECOM
1001 W. Seneca Street, Ste 204, Ithaca, NY 14850
(607) 277-5716 - office, (607) 277-9057 - fax

Figure 4-1

Boring/Well ID:_____

Page _____ of _____

Project Name:	**Drilling Company:**	**Surface Comp:**
Project Number:	**Drilling Method:**	**Grout (bgs):**
Date Pre-Cleared:	**Rig Type:**	**Filter Pack (bgs):**
Date Started Drilling:	**Casing ID:**	**Riser (bgs):**
Date Finished Drilling:	**Water Level While Drilling (bgs):**	**Well Screen (bgs):**
Logged By:	**Total Depth of Boring (bgs):**	**Sump (bgs):**

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:_____

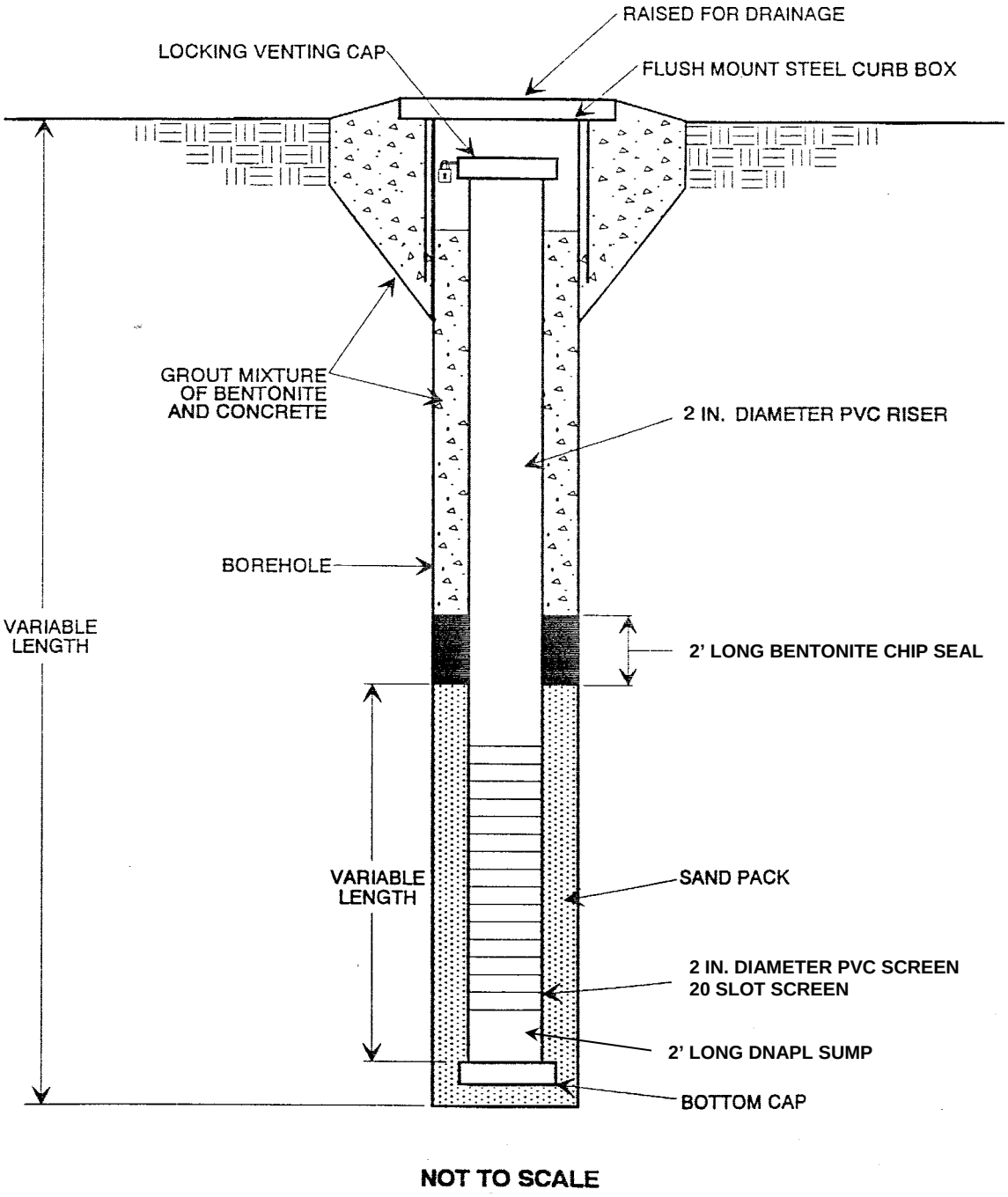
Lithology:

1.)	**5.)**
2.)	**6.)**
3.)	**7.)**
4.)	**8.)**

Comments:

Figure 4-2

TYPICAL MONITORING WELL CROSS SECTION

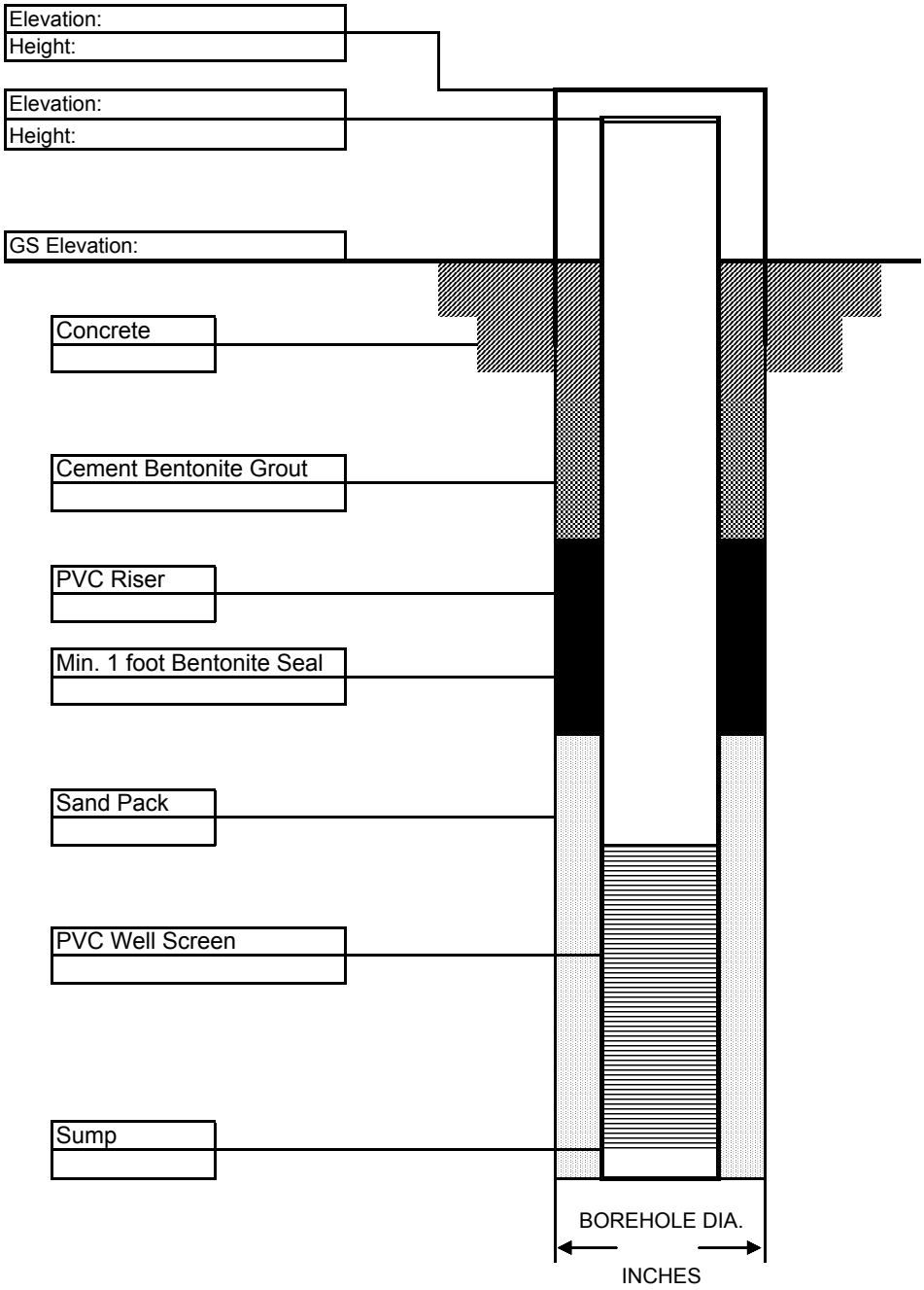


NOT TO SCALE

Figure 4-3

WELL CONSTRUCTION LOG

WELL NO.:	FACILITY/SITE NAME:
PROJ. NO.:	CLIENT:
INSPECTOR:	DRILLING CONTACTOR:
DATE START:	DATE END:
LOCATION:	DRILLING METHOD:



PROTECTIVE CASING
Material:
Diameter:
Depth BGS:
Water Tight Seal:
Flushmount:
Weep hole:

GUARD POSTS
Material:
No. & Size:

SURFACE PAD
Composition:
Size:

RISER PIPE
Material:
Schedule:
Joint Type:
O-ring:
Diameter:

GROUT
Amt cement:
Amt bentonite:
Amt water:
Tremied:
Interval:

SEAL
Material:
Type:
Amount Used:
Interval:

FILTER PACK
Material:
Brand Name:
Amount Used:
Grain Size Dist.:
Interval:
Tremied:

SCREEN
Material:
Diameter:
Slot Size & Type:
Interval BGS:

SUMP
Interval BGS:
Bottom Cap:

BACKFILL PLUG
Material:
Setup/Hydration Time:

Figure 5-1

LOW-STRESS GROUND WATER SAMPLING FORM

Project Number: _____ Well ID: _____
Project Name: _____ Sample ID: _____
Date: _____ Permit Number: _____
Weather: _____ Well Condition: _____

PRE-PURGE INFORMATION

Protective Casing Diameter (inch): _____ Depth to Product* (feet): _____
Inner Casing Diameter (inch): _____ Initial Depth to Water* (feet): _____
Inner Casing Material: _____ Product Thickness (feet): _____
Purge/Sample Method: _____ Depth to Top of Screen* (feet): _____
Pump Intake Setting* (feet): _____ Total Depth* (feet): _____
PID/FID Reading of Well Headspace (ppm) Water Column (feet): _____
Before Cap Removal: _____ Casing Volume (gal): _____
After Cap Removal: _____ DTW After Pump Installed: _____

PURGING/SAMPLING INFORMATION

Time	Rate (gpm)	Gallons Purged	pH (SI Units)	Conductivity (µohms/cm)	Temp (^{o}C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	ORP (mv)	Depth to Water (ft)	Comments

Start Purge Date/Time: _____ Pre-Sample Depth to Water* (feet): _____
End Purge Date/Time: _____ Start Sample Date/Time: _____
Total Volume Purged (gal): _____ End Sample Date/Time: _____
Depth to Water After Purge* (feet): _____ Sampler Names: _____

Observations During Sampling (e.g. slow recharge, turbidity, odor, sheen, PID/FID readings):

_____

_____

_____

Figure 5-1

LOW-STRESS GROUND WATER SAMPLING FORM

Sampling Sequence:

Analysis	Method	Container	Number of Bottles	Preservative	Comments
Volatile Organics					
Base/neutrals					
TPH					
Total Metals					
Dissolved Metals					
Cyanide					
Sulfate and Chloride					
Nitrate and Ammonia					
Preserved Inorganics					
Non-Preserved Inorg					
Bacteria					

Complete those analyses that apply.

Stabilization Ranges
Dissolved Oxygen: +/- 10%
Turbidity: +/- 10%
Specific Conductance: +/- 3%
Temperature: +/-3 %
pH: +/- 0.1 unit
Redox Potential: +/- 10mv

* = Measured from top of inner casing
DTW - Depth to Water
Thermo Environmental Instruments Model 580s OVM w/ 10.2 ev bulb
Water Levels Measured with an Electronic Water Level Meter
Field parameter meter calibration results are recorded in the field book.

FIGURE 8-1
Sample Chain of Custody Record

Chain of Custody Record

AECOM

Client Contact	Project Manager:	Site Contact:	Date:	COC No:
Your Company Name here	Tel/Fax:	Lab Contact:	Carrier:	_____ of _____ COCs
Address	**Analysis Turnaround Time**			Job No.
City/State/Zip	Calendar (C) or Work Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from Below _____			
(xxx) xxx-xxxx FAX	☐ 2 weeks			SDG No.
Project Name:	☐ 1 week			
Site:	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample																		Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification

☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Appendix B

Quality Assurance Project Plan

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix B

Quality Assurance Project Plan

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

AECOM, Inc.
August 2009
Project No.: 04964-032

AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix B

Quality Assurance Project Plan

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

Prepared By: Keith A. Stahle, Project Geologist

Reviewed By: Greg Malzone, Project Chemist

AECOM, Inc.
August 2009
Project No.: 04964-032

AECOM

Contents

List of Tables

List of Figures

1.0 Project description

This Quality Assurance Project Plan (QAPP) specifies the quality control and quality assurance procedures to ensure the generation of statistically valid data. All procedures are equivalent to those specified in the United States Environmental Protection Agency's (U.S. EPA) QA/R-5 *U.S. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations*, *Test Methods for Evaluating Solid Waste*, U.S. EPA SW-846, Third Edition, and its promulgated updates, and New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) to be used to ensure that data from the Remedial Investigation (RI) at the Ithaca Court Street former manufactured gas plant (MGP) site in Ithaca, New York are precise, accurate, representative, comparable, and complete. An ELAP-certified laboratory will be used for the analysis of the samples.

1.1 Introduction

The Ithaca Court Street MGP site contains subsurface remnants of MGP-related structures and site remediation is in progress. MGP-related residuals have been identified in offsite areas during previous investigations performed at the site. Additional investigation is required to fully delineate the MGP-related impacts. Additional information regarding the impacts observed in the offsite areas is included in the RI Work Plan.

1.2 Scope of work

The scope of work for the RI is described in the project Work Plan. Samples will be collected from soil borings, test pits, and groundwater monitoring wells. The majority of these samples will be analyzed using U.S. EPA SW-846 Methods with NYSDEC ASP Category B laboratory data deliverables. Samples submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis will be analyzed using U.S. EPA SW-846 *Test Methods for Evaluating Solid Waste*, November 1986, 3rd edition (and subsequent updates).

1.3 Data quality objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements to ensure that data of known and appropriate quality are obtained during sampling and analysis activities. Data developed during the site investigation will be used to fulfill the overall objectives of the program.

1.3.1 Data quality levels

There are five analytical levels of data quality which may be used to accomplish these site objectives. They are typically designated as follows:

- Level I - field screening or analysis using portable instruments, calibrated to non-compound specific standards;
- Level II - field analysis using portable instruments calibrated to specific compounds;
- Level III - non-Contract Laboratory Program (ASP-CLP) laboratory methods;
- Level IV - ASP-CLP Routine Analytical Services methods; and
- Level V - non-standard analytical methods.

To meet the specific objectives of this project, Levels I and IV data quality objectives will be utilized.

Level I - Field screening methods

Level I screening will be performed for health and safety purposes according to procedures provided in the site-specific health and safety plan (HASP) (Appendix D of the Work Plan) as well as to qualitatively assess the presence of volatile organic compounds (VOCs) in soil at the site.

Level IV - CLP/ASP methodologies

Soil and groundwater samples will be analyzed according to the U.S. EPA SW-846 Methods and the data reported following procedures specified in the most recent edition of the NYSDEC ASP (July, 2005). Analytical reports will be prepared in accordance with NYSDEC ASP Category B laboratory data deliverable specifications. This level of data quality will ensure the generation of legally, and technically defensible data for project use. Level IV data will also be provided for the hazardous characteristics testing. If available cyanide is analyzed, a CLP-equivalent data package will be prepared for this analysis.

2.0 Project organization

This RI will be performed for NYSEG by AECOM Environment (AECOM), an environmental consultant (the Consultant). AECOM will arrange for the drilling and analytical services and provide on-site field representative to perform the soil characterization, soil sampling, and groundwater sampling. The consultant will also perform the data interpretation and reporting tasks.

Key contacts for this project are as follows:

NYSEG Project Manager

Tracy L. Blazicek
New York State Electric and Gas
James A. Carrigg Center
18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224
Telephone: (607) 762-8787
Cell: (607) 725-3801

Consultant Senior Technical Advisor (AECOM):

Tamara Raby
AECOM
100 Corporate Parkway
Suite 341
Amherst, New York 14226
Telephone: (716)-836-4506 ext 14
Fax: (716)-834-8785
Cell: (716)-836-4506

Consultant Project Manager (AECOM):

Keith Stahle
AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York 14850
Telephone: (607) 277-5716
Fax: (607) 277-9057
Cell: (607) 342-4603

Consultant Field Team Leader (AECOM):

Jesse Lloyd
AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York 14850
Telephone: (607) 277-5716
Fax: (607) 277-9057
Cell: (607) 351-9543

Consultant Quality Assurance Manager (AECOM):

Greg Malzone

AECOM
Four Gateway Center
444 Liberty Avenue, Suite 700
Pittsburgh, Pennsylvania 15222
Telephone: (412) 261-2910
Fax: (412) 765-1421

Laboratory Representative (TestAmerica):

Paul Morrow

TestAmerica - Buffalo
10 Hazelwood Drive, Suite 106
Amherst, NY 14228
Phone: (716) 691-2600
Fax: (716) 691-7991

3.0 Quality assurance/quality control objectives for measurement of data

3.1 Introduction

The quality assurance and quality control (QA/QC) objectives for all quantitative measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in the following subsections. They are formulated to meet the requirements of the NYSDEC ASP and U.S. EPA SW-846. The analytical methods and Contract Required Quantitation Limits (CRQLs) are provided in Section 7.

3.2 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value [U.S. EPA, 1987]. Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative percent difference.
V1, V2	=	The two values to be compared.
|V1 - V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The DQOs for analytical precision, calculated as the RPD between duplicate analyses, are presented in Tables 3-1 and 3-2.

3.3 Accuracy

Accuracy is a measure of the degree of agreement between a measured value and the true or expected value of the quantity of concern [Taylor, 1987], or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R = Percent recovery.

SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Tables 3-1 and 3-2.

3.4 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program [U.S. EPA, 1987]. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort

will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Field Sampling and Analysis Plan (FSAP). Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow U.S. EPA-approved procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody (COC) procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate, and COC procedures are presented in Sections 4 and 5.

3.5 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid [U.S. EPA, 1987]. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.
V = Number of measurements judged valid.
T = Total number of measurements.

3.6 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another [U.S. EPA, 1987]. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. EPA or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data. Soil data will be reported on a dry-weight basis with the percent moisture or percent solids measurement;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4.0 Sampling program

4.1 Introduction

The sampling program was developed to provide analytical and field data that can be used to satisfy the project objectives (as outlined in Section 1.2). This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be collected, are summarized in Table 4-1. The sampling procedures are presented in the FSAP.

4.2 Sample container preparation and sample preservation

Sample containers delivered to the field will be new and certified clean by the vendor. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged, and the appropriate chemical preservatives will be added. The types of containers are shown in Tables 4-2 and 4-3.

Samples shall be preserved according to the preservation techniques listed in Tables 4-2 and 4-3. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles must be placed on ice in the shipping cooler, cooled to 4° ± 2° C with ice, and delivered to the laboratory within 48 hours of collection under COC. COC procedures are described in Section 5.

4.3 Sample holding times

The sample holding times for organic and inorganic parameters are listed in Tables 4-2 and 4-3 and are in accordance with the NYSDEC ASP requirements. Holding times for TCLP samples are given in Table 4-4. The NYSDEC ASP holding times must be strictly adhered to by the field and laboratory personnel.

4.4 Field quality control samples

Field quality control (QC) samples will consist of a series of blanks and duplicates that will be collected to assess field sampling and decontamination performance. Two types of field blanks will be collected and submitted to the laboratory to assess the collection of field samples for analyses (trip and equipment blanks). In addition, the precision of the laboratory analytical procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. **Trip blanks** - A trip blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of one or more 40-ml VOA vials containing U.S. EPA Type 2 water, that accompanies all water sample bottles into the field and back to the laboratory. A trip blank will be included in each shipping container of water samples for volatiles analysis. The trip blank will be analyzed for VOCs to assess any contamination from sampling, storage, transport, and internal laboratory procedures.

b. **Equipment blanks** - Equipment blanks are collected to determine the effectiveness of the decontamination procedures for sampling equipment. Equipment blanks are collected by passing U.S. EPA Type 2 water provided by the laboratory through decontaminated sampling equipment. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The equipment blank will be analyzed for all of the parameters of interest.

The duplicates will consist of:

a. **Coded field duplicate** - To determine the representativeness of the sampling methods, coded field duplicates will be collected at a frequency of one per 20 field samples. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are duplicate samples. This will eliminate any possible bias that could arise.

b. **Matrix spike/matrix spike duplicate** - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be collected at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and relative percent differences (RPDs) are listed in Tables 3-1 and 3-2.

5.0 Sample tracking and custody

5.1 Introduction

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the COC and transfer of samples will be trained on the purpose of the COC and specific procedures prior to implementation.

Evidence of sample traceability and integrity is developed by implementation of, and adherence to, the COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is presented in Figure 5-1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.2 Field sample custody

A COC record (Figure 5-2 or equivalent) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample set.

The REMARKS space on the COC is used to indicate if the sample is an MS/MSD, or any other sample information for the laboratory. Trip and equipment blanks are indicated on separate rows because they are not specific to any one sample point. Once all bottles are properly accounted for on the COC, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper air bill number on the top of the COC. Errors will be crossed out with a single line in ink and initialed and dated by the author.

One copy of the COC is retained by sampling personnel and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample(s) will not be analyzed.

5.3 Laboratory sample custody

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used.

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check and record the cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or description errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming COC procedure.
- The samples will be stored in a secured area and, if required, stored at a temperature of 4°± 2° C.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis and final storage for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

6.0 Calibration procedures

6.1 Field instruments

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the FSAP (Appendix A of the Work Plan). This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader in a notebook. Copies of all the instrument manuals will be maintained on site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photo-ionization detector and explosimeter) are provided in the Health and Safety Plan (Appendix D of the Work Plan). More frequent calibration may be needed depending on conditions encountered in the field.

6.2 Laboratory instruments

The laboratory will follow all calibration procedures and schedules as specified in the sections of the U.S. EPA SW-846 and NYSDEC ASP and subsequent updates as they apply to the instruments used for the analytical methods listed in Section 7.

7.0 Analytical procedures

7.1 Introduction

Samples will be analyzed according to methods approved by the NYSDEC Analytical Services Protocol (ASP) program or U.S. EPA SW-846 *Test Methods for Evaluating Solid Waste*, November 1986, 3rd edition and subsequent updates. The methods to be used for the laboratory analysis of water and soil samples are listed in Table 4-1. These methods were selected because they attain the DQOs required for the project, and the quantitation limits that are listed in Tables 7-1 and 7-2.

Should an analytical method be required that is outside the scope to the references cited above, the method used will be published by a nationally recognized authority (e.g., U.S. EPA, API) and approved for use by the regulatory agency.

The Project Manager shall ensure that laboratories (primary or subcontracted) generating data in support of NYSEG remediation and investigative projects maintain the relevant state and federal government regulatory accreditations, certifications, and/or registrations to perform the required analyses.

8.0 Data reduction, assessment, and reporting

8.1 Data reduction

Data collected during the field investigation will be reduced in accordance with U. S. EPA method specifications and NYSDEC ASP protocols. The procedures for identification and quantification of the analytes will be specified in the NYSDEC ASP or U.S. EPA SW-846 *Test Methods for Evaluating Solid Waste*, November 1986, 3rd edition and subsequent updates, and peer reviewed by laboratory supervising personnel.

8.2 Data quality assessment

NYSDEC generally recommends two levels of data review for data collected in support of site investigations. The basic review is a Data Usability Summary Report (DUSR). Current NYSDEC policy is to require a DUSR for data collected during investigations on most sites. The more rigorous full data validation procedure is called for at sites where the data will be used in litigation. The laboratory deliverables (i.e., NYSDEC ASP Category B) are the same in both cases, and a DUSR can be upgraded to full validation at a later time if necessary. For this investigation a DUSR will be generated.

Based on the results of data assessment, the validated analytical results reported by the laboratory will be assigned one of the following usability flags by the data validator:

- U The analyte was analyzed for, but was not detected above the level of the reported samples quantitation limit.
- UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximated and may be inaccurate or imprecise.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J- (Inorganics) The result is an estimated quantity, likely to be biased low. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ (Inorganics) The result is an estimated quantity, likely to be biased high. The associated numerical value is the approximate concentration of the analyte in the sample.
- N (Organics) Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling events.
- NJ (Organics) Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
- R The data are unusable. The sample results are rejected due to serious deficiencies in the ability to meet quality control criteria. The presence or absence of the analyte cannot be verified.

Trained and experienced data assessors, who meet NYSDEC approval criteria, will perform the data assessment. Resumes of people performing data assessments and generating DUSRs will be provided to NYSDEC for review and approval.

8.2.1 Data usability summary report

Data for this investigation will be evaluated in accordance with method specifications and the validation criteria set forth in the *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-07-003, July 2008, with additional reference to *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review*,

document number EPA 540/R-99-008 of May 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA-540-R-04-004, October 2004, as they apply to the analytical methods employed. Field duplicate RPD control limits were taken from the *USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses,* February 1988, upheld in DRAFT 1993.

A DUSR will be prepared which will include a review and an evaluation of all the analytical results. To ensure compliance with the analytical method protocols the following will be reviewed:

- COC forms;
- Holding times;
- Initial and continuing calibrations;
- Blanks;
- Laboratory control standards and matrix spikes;
- Surrogate recoveries;
- Matrix interference checks;
- Field and laboratory duplicates; and
- Sample data.

The DUSR will contain a description of the samples and parameters reviewed. Any deficiencies identified during the review will be noted and the effect on the generated data will be discussed. Any re-sampling or re-analysis recommendations will then be made to the investigation's Project Manager. The results of the evaluation will be incorporated into the final investigative report.

8.2.2 Data validation

The determination to validate data will be made based on the presence of data anomalies, suspect data, or laboratory issues. Unless required to address anomalies, the data will be subject to the DUSR process and will not be subject to full validation. Where necessary, data will be validated in accordance with method specifications and the validation criteria set forth in the *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-07-003, July 2008, with additional reference to *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review*, document number EPA 540/R-99-008 of May 1999 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA-540-R-04-004, October 2004, as they apply to the analytical methods employed. Field duplicate RPD control limits were taken from the *USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses,* February 1988, upheld in DRAFT 1993. If applicable, a data validation report will be prepared and reviewed by the Quality Assurance Officer (QAO) before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;

- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Field duplicate results;
- Target compound identification;
- Result calculations;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix spike(s);
- Furnace atomic absorption analysis QC;
- ICP serial dilutions;
- Results verification and reported detection limits; and
- Result verification.

8.3 Data reporting

The data package provided by the laboratory will contain all items discussed above in a "CLP-equivalent" format. Data quality issues will be discussed in a case narrative included with the data report. The completed copies of the COC records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

One copy of the analytical data packages and an electronic disk deliverable will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the disk deliverable, will be used to generate summary tables. These tables will form the database for the assessment of the extent of the MGP-related impacts at the site.

The electronic deliverable format required is usually an ASCII comma-delimited file with the fields and character lengths summarized in Table 8-1. Alternatively, a comma-delimited MS Excel file may be issued. The final electronic deliverable format for each project will be determined in consultation with the NYSDEC Project Manager.

9.0 Internal quality control checks and frequency

9.1 Quality assurance batching

Each set of up to 20 samples submitted to the laboratory will be analyzed concurrently with associated calibration standards, method blanks, MS/MSD or laboratory duplicates, and QC check samples (if required by the protocol). Note that the MS/MSD samples will be provided with the field samples and identified by the field personnel.

9.2 Calibration standards and surrogates

All organic standard and surrogate compounds are checked by method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the U.S. EPA or NIST, or other similar nationally-recognized program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions for sample analysis. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard working solutions are replaced monthly or more frequently, based upon data indicating deterioration. No stock or working standard will be used past the manufacturer's expiration date.

9.3 Organic blanks and matrix spike

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing KMnO4. The matrix spike is generated by addition of analyte and surrogate standards to a designated field sample.

9.4 Trip and field blanks

Trip blanks and equipment blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross-contamination of the samples.

10.0 Quality assurance performance audits and system audits

10.1 Introduction

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the project quality assurance officer (QAO). These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate QA management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 System audits

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory QC procedures and associated documentation may be audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

10.3 Performance audits

The laboratory is required to perform periodic analyses of Performance Evaluation (PE) samples to maintain NELAP accreditation and/or state regulatory certifications. PE samples obtained from a U.S. EPA-approved vendor or a state agency must be analyzed by the laboratory at least semi-annually.

10.4 Formal audits

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that QA requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be out of compliance shall be identified at exit interviews conducted with the involved management. Compliance deviation will be logged, and documented through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within 15 days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

TestAmerica-Buffalo's NYS DOH audit to maintain NELAC accreditation will be accepted as the on-site inspection for this project.

11.0 Preventive maintenance procedures and schedules

11.1 Preventive maintenance procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce downtime, if any. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 Schedules

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 Records

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

12.0 Corrective action

12.1 Introduction

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 Procedure description

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader, and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When QA requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by U.S. EPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with QA requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to QA functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12-1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions were implemented and effective, documented, and approved.

13.0 References

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan.

U.S. EPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986 and subsequent updates. U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7B U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA, 2001. CLP Organics Data Review and Preliminary Review based on CLP/SOW OLM04.2. SOP No. HW-6, Revision 12 dated September 2005. U.S. EPA Region II.

U.S. EPA, 2005. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW - ILM05.3. SOP No. HW-2, Revision 13, dated January 1992. U.S. EPA Region II.

Tables

Table 3-1
Quality Control Limits for Water Samples

		Laboratory Accuracy and Precision					
Analytical Parameters	**Analytical Method [a]**	**Matrix Spike (MS) Compounds**	**MS/MSD [b] % Recovery**	**MS/MSD RPD [c]**	**LCS [d] % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260B	1,1-Dichloroethane	71-129	20	71-129	Toluene-d8	71-126
		Trichloroethene	74-123	16	74-123	p-Bromofluorobenzene	73-120
		Benzene	71-124	13	71-124	1,2-Dichloroethane-d4	66-137
		Toluene	70-122	15	70-122		
		Chlorobenzene	72-120	25	72-120		
SVOCs (f)	8270C	Phenol	17-120	34	17-120	Nitrobenzene-d5	46-120
		2-Chlorophenol	48-120	25	48-120	2-Fluorobiphenyl	48-120
		1,4-Dichlorobenzene	30-120	36	30-120	p-Terphenyl-d14	24-136
		N-Nitroso-di-n-propylamine	56-120	31	56-120	Phenol-d5	16-120
		1,2,4-Trichlorobenzene	40-120	30	40-120	2-Fluorophenol	20-120
		4-Chloro-3-methylphenol	64-120	27	64-120	2,4,6-Tribromophenol	52-132
		Acenaphthene	60-120	24	60-120		
		4-Nitrophenol	16-120	48	16-120		
		2,4-Dinitrotoluene	59-125	20	59-125		
		Pentachlorophenol	39-136	37	39-136		
		Pyrene	58-136	19	58-136		
Inorganics (i)	9012 A (total cyanide)	Inorganic Analyte	85-115 (j)	15 (k)	90-110	NA	NA

(a) Analytical Methods: NYSDEC ASP-CLP Methods with Category B data deliverables, NYSDEC, 2000 and U.S. EPA SW-846, 3rd edition, Revision 1, November 1990.
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semi-volatile Organic Compounds
(g) Limits are advisory only
(i) Target Analyte List Inorganics (cyanide)
(j) Matrix spike only
(k) Laboratory duplicate RPD
NA - Not Applicable

Table 3-2
Quality Control Limits for Soil Samples

		Laboratory Accuracy and Precision					
Analytical Parameter	**Analytical Method [a]**	**Matrix Spike (MS) Compounds**	**MS/MSD [b] % Recovery**	**MS/MSD RPD [c]**	**LCS [d] % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260B	1,1-Dichloroethane	79-126	20	79-126	Toluene-d8	71-125
		Trichloroethene	77-129	24	77-129	p-Bromofluorobenzene	72-126
		Benzene	79-127	20	79-127	1,2-Dichloroethane-d4	64-126
		Toluene	74-128	20	74-128		
		Chlorobenzene	76-124	25	76-124		
SVOCs (f)	8270C	Phenol	36-120	35	36-120	Nitrobenzene-d5	34-132
		2-Chlorophenol	38-120	25	38-120	2-Fluorobiphenyl	37-120
		1,4-Dichlorobenzene	34-120	35	34-120	p-Terphenyl-d14	58-147
		N-Nitroso-di-n-propylamine	46-120	31	46-120	Phenol-d5	11-120
		1,2,4-Trichlorobenzene	39-120	24	39-120	2-Fluorophenol	18-120
		4-Chloro-3-methylphenol	49-125	27	49-125	2,4,6-Tribromophenol	39-146
		Acenaphthene	53-120	35	53-120		
		4-Nitrophenol	43-137	25	43-137		
		2,4-Dinitrotoluene	55-125	20	55-125		
		Pentachlorophenol	33-136	35	33-136		
		Pyrene	51-133	35	51-133		
Inorganics (i)	9012 A (total cyanide)	Inorganic Analyte	85-115 (j)	15 (k)	40-160	NA	NA

(a) Analytical Methods: NYSDEC ASP-CLP Methods with Category B data deliverables, NYSDEC, 2000 and U.S. EPA SW-846, 3rd edition, Revision 1, November 1990,

(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semi-volatile Organic Compounds
(g) Limits are advisory only
(h) Target Analyte List Inorganics (cyanide)
(i) Matrix spike only
(j) Laboratory duplicate RPD
NA - Not Applicable

Table 4-1
Summary of Sampling and Analytical Program

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks		Total
			Field Samples	Field Duplicate	MS/MSD[(a)] (Total)	Sub-Total	Trip Blank	Equip-ment Blank	
Soil Boring and Test Pit Samples (approximate maximum total)	VOCs SVOCs Total Cyanide	U.S. EPA SW 8260B U.S. EPA SW 8270C U.S. EPA SW 9012A	70 70 70	4 4 4	4 4 4	78 78 78	NA NA NA	4 4 4	82 82 82
Groundwater Samples	VOCs SVOCs Total Cyanide	U.S. EPA SW 8260B U.S. EPA SW 8270C U.S. EPA SW 9012A	38 38 38	2 2 2	2 2 2	42 42 42	4 4 4	NA NA NA	46 46 46

(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis.

* The number of duplicates, MS/MSD, and field QC samples can be reduced if these samples are obtained in conjunction with the sampling of other media during the sampling event.

\+ Rinse blanks not required if dedicated sampling equipment is used.

Table 4-2
Water Sample Containerization, Preservation, and Holding Times

Analysis [b]	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	3-40 mL glass vial w/ Teflon septum	Cool to 4 ^{O}C	14 days
Semi-volatile Organics Compounds (SVOCs)	2-1000 mL glass w/ Teflon lined cap	Cool to 4 ^{O}C	7 days to extraction 40 days to analysis
Total Cyanide	500 mL plastic bottle	NaOH to pH > 12 Cool to 4 ^{O}C	14 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from date of sample collection.

Table 4-3
Soil and Hazardous Characteristics
Sample Containerization and Holding Times

Analysis [b]	Bottle Type	Preservation [a]	Holding Time[b]
Volatile Organic Compounds (VOCs)	Wide-mouth glass w/ teflon lined cap	Cool to $4^{o}\pm2$ ^{o}C	14 days
Semi-Volatile Organic Compounds (SVOCs)	Wide-mouth glass w/ teflon lined cap	Cool to $4^{o}\pm2$ ^{o}C	7 days to extraction 40 days to analysis
Total Cyanide	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	14 days
TCLP Organic Compounds	Wide-mouth glass w/ teflon lined cap	Cool to $4^{o}\pm2$ ^{o}C	See Table 4-4
TCLP Metals	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	See Table 4-4
Corrosivity	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	2 days
Ignitability	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	NA
Reactive Cyanide	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	14 days
Reactive Sulfide	Wide-mouth glass	Cool to $4^{o}\pm2$ ^{o}C	7 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from date of sample collection.

NA Not Applicable

Table 4-4
Toxicity Characteristics Leaching Procedure Sample Holding Times

Analytical Parameter	From: Sample Collection To: TCLP Extraction*	From: TCLP Extraction To: Preparative Extraction	From: Preparative Extraction To: Determinative Analysis
Volatiles	7 days	NA	7 days
Semi-volatiles	5 days	7 days	40 days
Total Cyanide	180 days	NA	180 days)

NA - Not Applicable

*Times shown are from verified time of sample receipt.

Table 7-1
Project Quantitation Limits

Analysis/Compound	Method	Quantitation Limits		New York State Standard or Guidance Values
		Water (ug/L)	Soil (ug/Kg)	Water (ug/L) [(a)]
Volatile Organics				
1,1,1-Trichloroethane	8260B	1.0	5	5
1,1,2,2-Tetrachloroethane	8260B	1.0	5	5
1,1,2-Trichloroethane	8260B	1.0	5	1
1,1,2-Trichloro-1,2,2-trifluoroethane	8260B	1.0	5	5
1,1-Dichloroethane	8260B	1.0	5	5
1,1-Dichloroethene	8260B	1.0	5	5
1,2-Dibromoethane	8260B	1.0	5	NL
1,2-Dichlorobenzene	8260B	1.0	5	3
1,2-Dichloroethane	8260B	1.0	5	0.6
1,2-Dichloropropane	8260B	1.0	5	1
1,2-Dibromo-3-chloropropane	8260B	1.0	5	0.04
1,2,4-Trichlorobenzene	8260B	1.0	5	5
1,3-Dichlorobenzene	8260B	1.0	5	3
1,4-Dichlorobenzene	8260B	1.0	5	3
2-Butanone (MEK)	8260B	5.0	25	50
2-Hexanone	8260B	5.0	25	50
4-Methyl-2-pentanone(MIBK)	8260B	5.0	5	NL
Acetone	8260B	5.0	25	50
Benzene	8260B	1.0	5	1
Bromodichloromethane	8260B	1.0	5	50
Bromoform	8260B	1.0	5	50
Bromomethane	8260B	1.0	5	5
Carbon Disulfide	8260B	1.0	5	60
Carbon Tetrachloride	8260B	1.0	5	5
Chlorobenzene	8260B	1.0	5	5
Chloroethane	8260B	1.0	5	5
Chloroform	8260B	1.0	5	7
Chloromethane	8260B	1.0	5	5
Cyclohexane	8260B	1.0	5	NL
cis-1,2-Dichloroethene	8260B	1.0	5	5
cis-1,3-Dichloropropene	8260B	1.0	5	0.4
Dibromochloromethane	8260B	1.0	5	5
Dichlorodifluoromethane	8260B	1.0	5	5
Ethylbenzene	8260B	1.0	5	5
Isopropylbenzene	8260B	1.0	5	5
Methyl acetate	8260B	1.0	5	NL
Methylene Chloride	8260B	1.0	5	5
Methylcyclohexane	8260B	1.0	5	NL
Methyl tert-butyl ether	8260B	1.0	5	10
Styrene	8260B	1.0	5	5
Tetrachloroethene	8260B	1.0	5	5
Toluene	8260B	1.0	5	5
trans-1,2-Dichloroethene	8260B	1.0	5	5
trans-1,3-Dichloropropene	8260B	1.0	5	0.4
Trichloroethene	8260B	1.0	5	5
Trichlorofluoromethane	8260B	1.0	5	5
Vinyl Chloride	8260B	1.0	5	2
Xylenes(total)	8260B	2.0	10	5

NL = Not Listed

Table 7-1
Project Quantitation Limits

Analysis/Compound	Method	Quantitation Limits Water (ug/L)	Quantitation Limits Soil (ug/kg)	New York State Standard or Guidance Values Water (ug/L)
Semivolatile Organics				
1,1'-Biphenyl	8270C	5	170	5
2,2'-oxybis(1-chloropropane)	8270C	4	170	5
2,4,5-Trichlorophenol	8270C	5	170	1
2,4,6-Trichlorophenol	8270C	5	170	1
2,4-Dichlorophenol	8270C	5	170	1
2,4-Dimethylphenol	8270C	5	170	1
2,4-Dinitrophenol	8270C	10	330	1
2,4-Dinitrotoluene	8270C	5	170	5
2,6-Dinitrotoluene	8270C	5	170	5
2-Chloronaphthalene	8270C	5	170	10
2-Chlorophenol	8270C	5	170	1
2-Methylnaphthalene	8270C	5	170	NL
2-Methylphenol	8270C	5	170	1
2-Nitrolaniline	8270C	10	330	5
2-Nitrophenol	8270C	5	170	1
3,3'-Dichlorobenzidine	8270C	5	170	5
3-Nitroaniline	8270C	10	330	5
4-Bromophenyl-phenyl ether	8270C	5	170	NL
4-Chloro-3-methylphenol	8270C	5	170	NL
4-Chloroaniline	8270C	5	170	5
4-Chlorophenyl phenyl ether	8270C	5	170	NL
4-Methylphenol	8270C	10	330	1
4-Nitroaniline	8270C	10	330	5
4-Nitrophenol	8270C	10	330	1
4,6-Dinitro-2-methylphenol	8270C	10	330	NL
Acenaphthene	8270C	5	170	20
Acenaphthylene	8270C	5	170	NL
Acetophenone	8270C	5	170	NL
Anthracene	8270C	5	170	50
Atrazine	8270C	5	170	7.5
Benzo(a)anthracene	8270C	5	170	0.002
Benzo(a)pyrene	8270C	5	170	ND
Benzo(b)fluoranthene	8270C	5	170	0.002
Benzo(g,h,i)perylene	8270C	5	170	NL
Benzo(k)fluoranthene	8270C	5	170	0.002
Benzaldehyde	8270C	5	170	NL
bis(2-Chloroethoxy) methane	8270C	5	170	5
bis(2-Chloroethyl) ether	8270C	5	170	1
bis(2-ethylhexyl)phthalate	8270C	5	170	5
Butyl benzyl phthalate	8270C	5	170	50
Caprolactum	8270C	5	170	NL
Carbazole	8270C	5	170	NL
Chrysene	8270C	5	170	0.002
Di-n-butyl phthalate	8270C	5	170	50
Di-n-octyl phthalate	8270C	5	170	NL
Dibenz(a,h)anthracene	8270C	5	170	NL
Dibenzofuran	8270C	10	170	NL
Diethyl phthalate	8270C	5	170	50
Dimethyl phthalate	8270C	5	170	50
Fluoranthene	8270C	5	170	50
Fluorene	8270C	5	170	50
Hexachlorobenzene	8270C	5	170	0.4
Hexachlorobutadiene	8270C	5	170	0.5
Hexachlorocyclopentadiene	8270C	5	170	5
Hexachloroethane	8270C	5	170	5
Indeno(1,2,3-cd)pyrene	8270C	5	170	0.002
Isophorone	8270C	5	170	50
N-Nitroso-n-propylamine	8270C	5	170	50
N-nitrosodiphenylamine	8270C	5	170	50
Naphthalene	8270C	5	170	10
Nitrobenzene	8270C	5	170	0.4
Pentachlorophenol	8270C	10	330	1
Phenanthrene	8270C	5	170	50
Phenol	8270C	5	170	1
Pyrene	8270C	5	170	50

ND = Nondetect

NL = Not Listed

Table 7-1
Project Quantitation Limits

Analysis/Compound	Method	Estimated Quantitation Limits		New York State Standard or Guidance Values
		Water (mg/L)	Soil (mg/kg)	Water (mg/L)
Metals				
Cyanide	9012A	0.010	1.0	200

NL = Not Listed

Notes:
N/A - Not Applicable
(a) - Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC, October 1993
(b) - Determination of Soil Cleanup Objectives - NYSDEC Part 375-6, Remedial Program, December 14, 2006

Table 7-2
TCLP
Practical Quantitation Limits (PQLs)

TCLP VOLATILE	SW-846 Analysis	Water (ug/L)
Benzene	8260B	1
Carbon Tetrachloride	8260B	1
Chloroform	8260B	1
1,2-Dichlorethane	8260B	1
1,1-Dichloroethene	8260B	1
2-Butanone	8260B	5
Tetrachloroethene	8260B	1
Trichloroethene	8260B	1
Vinyl Chloride	8260B	1

TCLP SEMIVOLATILE	SW-846 Analysis	Water (ug/L)
2-Methylphenol	3510 / 8270C	5
3 & 4-Methylphenol	3510 / 8270C	10
1,4-Dichlorobenzene	3510 / 8270C	10
2,4-Dinitrotoluene	3510 / 8270C	5
Hexachlorobutadiene	3510 / 8270C	5
Hexachloroethane	3510 / 8270C	5
Hexachlorobenzene	3510 / 8270C	5
Nitrobenzene	3510 / 8270C	5
Pentachlorophenol	3510 / 8270C	10
Pyridine	3510 / 8270C	25
2,4,5-Trichlorophenol	3510 / 8270C	5
2,4,6-Trichlorophenol	3510 / 8270C	5

TCLP METALS	SW-846 Analysis	Water (mg/L)
Arsenic	3010 / 6010	5
Barium	3010 / 6010	100
Cadmium	3010 / 6010	1
Chromium	3010 / 6010	5
Lead	3010 / 6010	5
Selenium	3010 / 6010	1
Silver	7760 / 6010	5
Mercury	7470	0.0002

ND - Not Determined

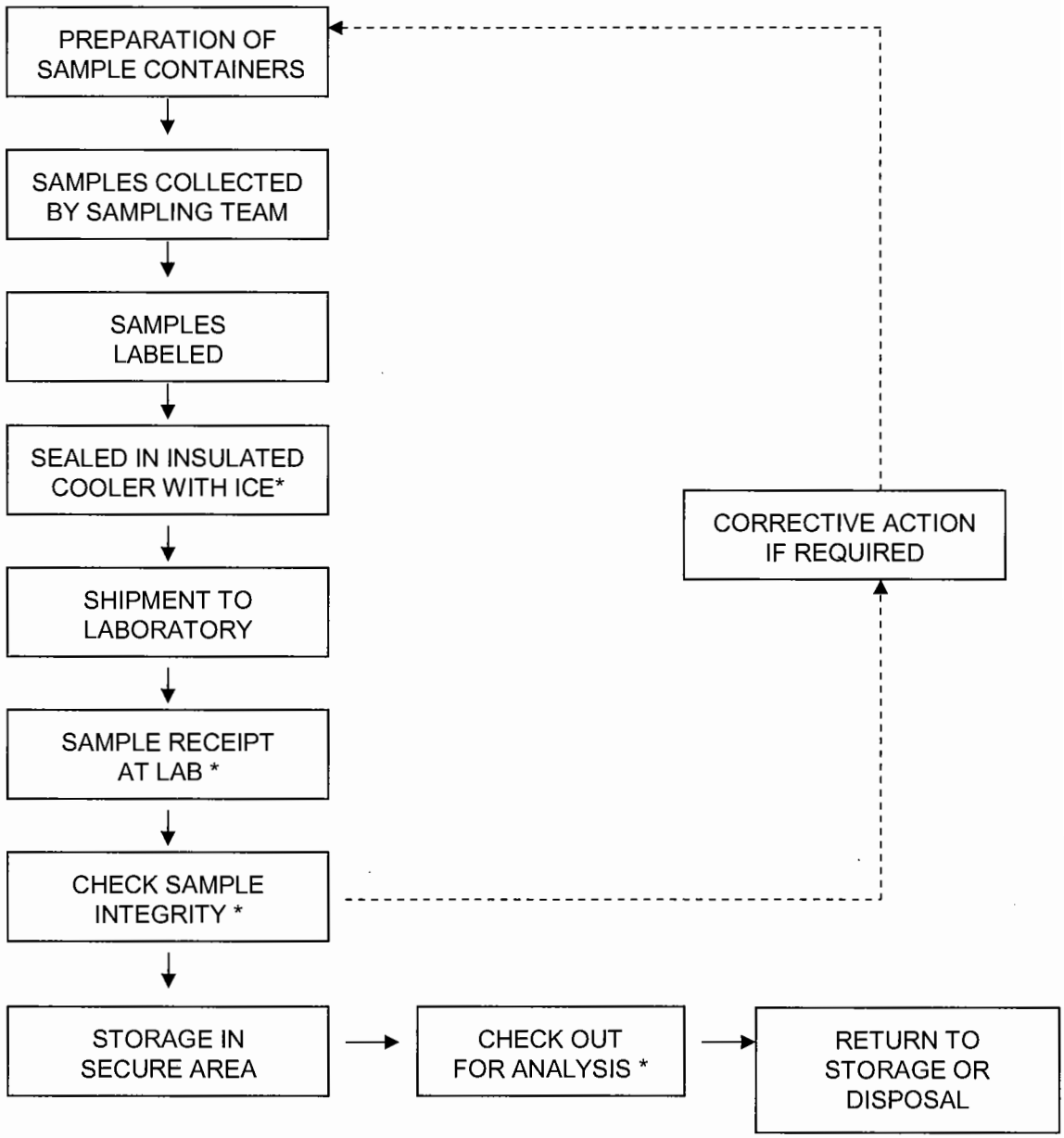
Table 8-1
Field and Character Lengths for Disk Deliverable

Description	Length	Format
Field Sample ID (as shown on COC)	15	Character
CAS. No. (including -'s)	10	Character
Parameter Name	31	Character
Concentration	13	Numeric
Qualifier	4	Character
Units	8	Character
SDG	8	Character
Lab Sample ID	15	Character
Date Sampled (from COC)	D	Date
Matrix (soil/water/air)	5	Character
Method Detection Limit	13	Numeric
Method Code	8	Character
Lab Code	6	Character

Figures

Figure 5-1

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

FIGURE 5-2
Sample Chain of Custody Record

Chain of Custody Record

AECOM

Client Contact	Project Manager:	Site Contact:	Date:	COC No:
Your Company Name here	Tel/Fax:	Lab Contact:	Carrier:	_____ of _____ COCs
Address	**Analysis Turnaround Time**			Job No.
City/State/Zip	Calendar (C) or Work Days (W) _____			
(xxx) xxx-xxxx Phone	TAT if different from Below _____			SDG No.
(xxx) xxx-xxxx FAX	☐ 2 weeks			
Project Name:	☐ 1 week			
Site:	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample																		Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification

☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* *Poison B* ☐ *Unknown* ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Figure 12-1 Corrective Action Request

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

Appendix C

Community Air Monitoring Plan

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix C

Community Air Monitoring Plan

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

AECOM, Inc.
September 2009
Project No.:04964-032

AECOM

Prepared for:
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224, Binghamton, New York 13902-5224

Appendix C

Community Air Monitoring Plan
Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York
NYSDEC Site No.:7-55-008
Index #: D0-0002-9309

Prepared By: Keith A. Stahle, Project Geologist

Reviewed By: Tamara Raby, Senior Geologist

AECOM
September 2009
Project No.:04964-032

AECOM

Contents

List of Tables

List of Figures

List of Attachments

1.0 Introduction

This document presents the Community Air Monitoring Plan (CAMP) that will be implemented during the Remedial Investigation (RI) of the New York State Electric and Gas Corporation (NYSEG) former manufactured gas plant (MGP) site, located in the City of Ithaca, New York. The location and layout of the site is shown on Figure 1.

Operable Unit 2 (OU-2) of the Ithaca former MGP site is divided into Areas 1 through 3. Areas 1 and 2 are located in a residential neighborhood and Area 3 is mixed-use zone that includes both residential and commercial properties. This CAMP presents methods and procedures that will be used to provide protection to potential receptors by assuring that the investigation work activities do not spread constituents off site through the air.

This CAMP specifically applies to the RI phase of work for the Ithaca MGP site. The RI fieldwork is scheduled to be performed in the fall of 2009, as described in the document "*Remedial Investigation Work Plan, NYSEG's Ithaca Court Street Former MGP Site, Operable Unit 2, Ithaca, New York*", dated August 14, 2009.

The RI fieldwork involves the completion of test trenches, subsurface soil borings, the installation of monitoring wells, and the collection of soil and groundwater samples.

The objectives of this CAMP are to:

- Ensure that the airborne concentrations of constituents of concern (COC) are minimized to protect human health and the environment;
- Provide an early warning system so that potential emissions can be controlled on site at the source; and
- Measure and document the concentrations of airborne COC to confirm compliance with regulatory limits.

The community air monitoring will be performed around the work zone perimeter, and will measure the concentrations of organic vapors and dust during all ground-intrusive activities (test pitting, soil boring, and well installations). Real time air quality will include upwind, down wind, and nearest receptor measurements..

This CAMP is a companion document to AECOM's site-specific Health and Safety Plan (HASP) provided as Appendix D of the RI Work Plan. The HASP is a separate document and is directed primarily toward protection of on-site workers within the designated work zones.

2.0 Constituents of concern and action levels

The Ithaca Court Street former MGP site is known to have coal tar impacts dating from the site's historical use as a MGP. As such, the COCs are volatile and semi-volatile organic compounds (VOCs and SVOCs). The primary VOCs of concern are benzene, ethylbenzene, toluene, and xylene (the BTEX compounds). VOCs are more volatile than SVOCs and are generally of greater concern when monitoring the air quality during MGP site investigations.

Total suspended particulates (airborne dust) are also a concern and must be monitored and controlled due to its ability to co-transport adsorbed constituents and because of its nuisance properties.

Odors, though not necessarily indicative of high constituent concentrations, could create a nuisance and will be monitored and controlled to the extent practicable.

State and federal regulatory agencies have provided action levels for many of these constituents. The action levels are the allowable airborne concentrations above which respiratory protection or other health and safety controls are required. For work at the Ithaca-Court Street former MGP site, the following levels should not be exceeded for more than 15 consecutive minutes at the downwind perimeter or nearest receptor of the site:

- Benzene 0.5 part per million (ppm)
- Total VOCs 2.5 ppm
- Dust 0.15 milligrams per cubic meter (mg/m^3)

The action levels cited here are above (i.e., in addition to) the background ambient (upwind) concentration.

3.0 Air monitoring equipment and methods

Air quality monitoring will be performed for total VOCs, benzene, and dust as outlined below.

Two perimeter locations will be established each day and an air monitoring technician will check the instrumentation at each of these locations frequently during the completion of field activities. Typically there will be monitoring locations at one upwind site perimeter location and one downwind perimeter location. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Field personnel will be prepared to monitor multiple locations in the event that there is little wind or if the wind direction changes frequently.

The monitoring instruments will be calibrated at the start of each workday, and again during the day if the performance of an instrument is in question.

3.1 VOC and Benzene monitoring

3.1.1 Ambient air monitoring

Real-time VOC monitoring will be performed using a total volatile organic analyzer (TVA) equipped with a photo- ionization detector (PID) using a 10.2 eV lamp (RAE Systems MiniRAE$^{(TM)}$ or equivalent). The equipment will be calibrated each day to benzene with a 10 ppm isobutylene air standard. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. The PIDs will be equipped with an audible alarm to indicate an exceedance of the action level.

In addition to the real-time VOC air monitoring, a portable gas chromatograph (GC) unit will be used to determine the concentration of the individual BTEX compounds. The GC instrument will be equipped with a PID detector that can accurately determine the BTEX compounds with detection limits in the low ppb (parts per billion) range. The purpose in generating this data will be to supplement the real time VOC readings and to monitor emissions of BTEX to the surrounding community during drilling activities.

The equipment used will be capable of calculating 15-minute running average calculations which may be compared to the action levels. If requested by the New York State Department of Environmental Conservation (NYSDEC) on-site, 15-minute running average concentrations may be calculated, which can then be compared to the action levels.

Real-time monitoring will be initiated one day prior to any intrusive work. Prior to the start of each work day, and immediately following any change in wind schedule, up wind measurements will be taken. Baseline emissions due to natural and anthropogenic sources will be established from these measurements. In order to compensate for the existing ambient conditions, the baseline value will be added to the air monitoring limits.

PID measurements will be made at one upwind and one downwind location around the work area. Additionally, the nearest receptor will be monitored if it is closer than the downwind location. The locations of the instruments may be changed during the day to adapt to changing wind directions.

3.2 Total Suspended Particulate (dust) monitoring)

Total suspended particulate (dust) monitoring will be performed during any intrusive activities at the site (i.e., drilling and testpitting). Two particulate monitors (TSI DustTrak$^{(TM)}$ or equivalent) will be used at the site perimeter (upwind and downwind) for continuous real-time dust monitoring. The monitors will respond to particles in the size range of 0.1 to 10 micrometers within a concentration range of 0.01 to 400 mg/m^3. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements

recorded. The equipment used will be capable of calculating 15-minute running average calculations which may be compared to the action levels.

In addition, fugitive dust migration will be visually assessed during all work activities, and the observations recorded. Dust suppression techniques will be implemented as further discussed in Section 4.

Measurements will be made at one upwind and one downwind location around the work area. The locations of the instruments may be changed during the day to adapt to changing wind directions.

4.0 Emission control plan

4.1 Ambient air

Odor, vapor, and dust control will be required for this project due to the close proximity to residential and commercial buildings, public roadways, and sidewalks. The attached Table 1 provides a response chart for the monitoring and control of vapor emissions. Table 2 provides a list of emergency contacts.

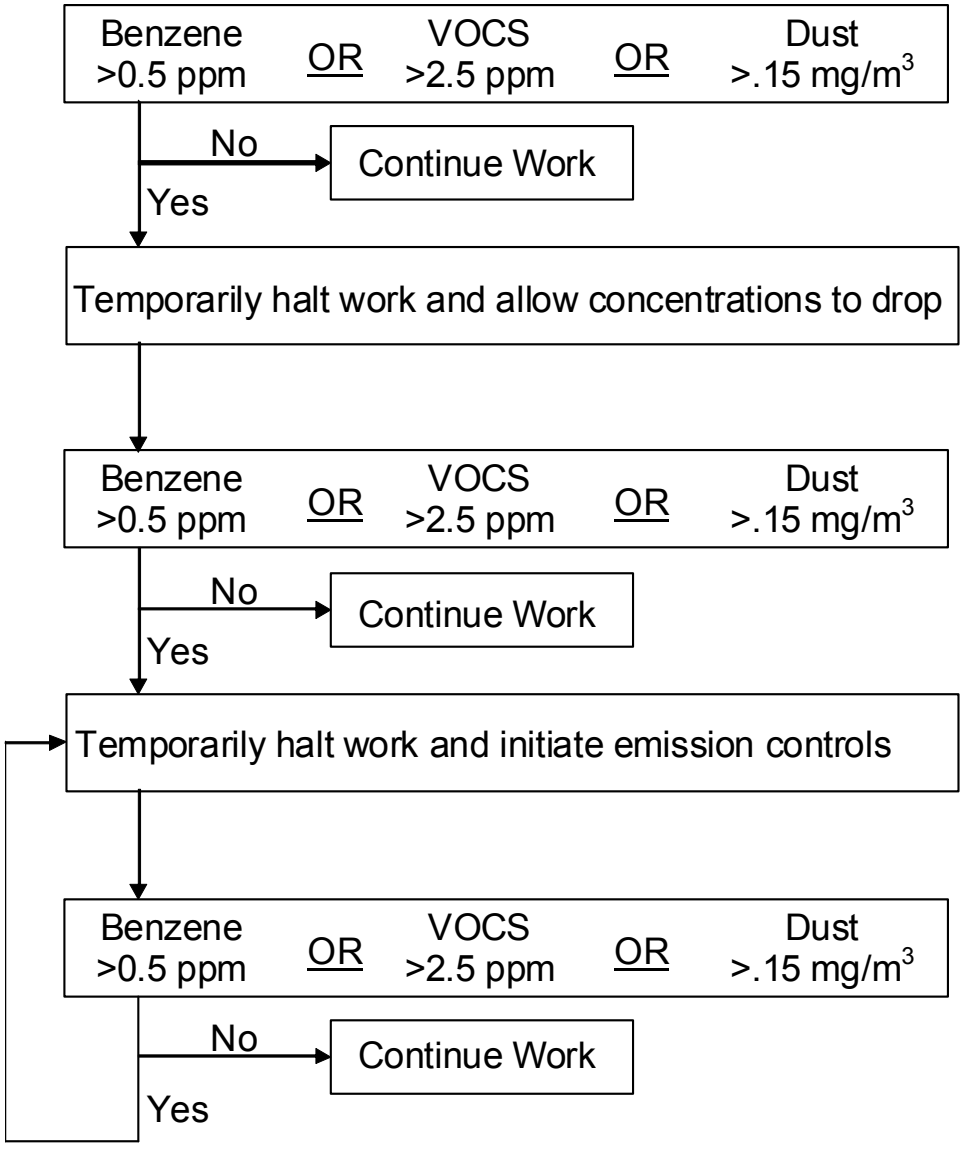
If the concentration of total VOCs at the site perimeter exceeds 2.5 ppm (or the benzene level exceeds 0.5 ppm) above background over a 15-minute period, then work activities will be temporarily halted. If the total VOC level then decreases below 2.5 ppm (and the benzene level drops below 0.5 ppm) over background, work activities will resume. If the total VOC levels at the site perimeter persist at levels in excess of 2.5 ppm (or the benzene level persists over 0.5 ppm) over background, work activities will be halted, the source of the vapors identified, and corrective actions taken to abate the emissions until the concentrations drop below the action levels.

Site perimeter dust concentrations will also be monitored continuously. In addition, dust migration will be visually assessed during all work activities. If the downwind dust level is 0.15 mg/m^3 greater than the background level for a 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind dust levels do not exceed 0.15 mg/m^3 above the background level and provided that no visible dust is migrating from the work area.

Typical emission control measures may include:

- Apply water for dust suppression;
- Relocate operations, if applicable; and
- Reassess the existing control measures.

Table 1 Vapor emission response chart



Notes:
ppm – parts per million
mg/m^3 – milligrams per cubic meter
VOCs – volatile organic compounds

Table 2 Emergency contacts and telephone numbers

Fire:	911	
Police:	911	
Ambulance:	911	
AECOM/AECOM Contacts	Keith Stahle Lucas Hellerich Jesse Lloyd	(607) 342-4603 (cellular) (860) 263-5783 (607) 351-9543 (cellular)
NYSEG Contact	Tracy Blazicek	(607) 237-5325 (cellular)

5.0 Odor control procedures

This section outlines the procedures to be used to control odors that may be generated during the RI field activities. The investigation program will be conducted using two principal remedial investigation techniques that may generate odors: test pit excavations and subsurface soil boring completions. The remainder of this section is intended to provide site managers, representatives of NYSDEC and NYSDOH, and the public with information summarizing typical odor control options, and to provide some guidance for their implementation. A description of potential sources of odors and methods to be used for odor control is presented in the following sections.

5.1 Potential sources of odors

Generally, the residuals encountered at former MGP sites are well defined. They are related to residual coal tar-like materials and petroleum, and principally contain VOCs, polycyclic aromatic hydrocarbons (PAHs), and a number of inorganic constituents, including metal-complexed cyanide compounds, and metals. Constituents of MGP tar or petroleum products can produce odor emissions during investigation activities when they are unearthed during the completion of test pits and soil borings. When this occurs, VOCs and light-end SVOCs can volatilize into the ambient air. Some MGP residuals can cause distinctive odors that are similar to mothballs, roofing tar, or asphalt driveway sealer. However, the constituent concentrations generally associated with these odors are typically significantly less than levels that might pose a potential health risk. It is important to note that the CAMP will provide for continual monitoring of VOCs and dust during the fieldwork to monitor for any potential release of constituents which may pose a threat to health.

5.2 Odor monitoring

The field investigation personnel will record observations of odors generated during the implementation of the Work Plan. When odors attributable to the uncovering of impacted media are generated in the work area during intrusive activities such as soil borings or excavation of test pits, observations will also be made at the down-wind limit of the work area in order to assess the potential for off-site odors. The down-wind odor monitoring will be performed in conjunction with the PID and dust monitoring program described in this CAMP.

Upon detection of odors at the work zone perimeter, site controls, starting in the work area, will be implemented. The site controls described in the following sections will be used to assist with odor mitigation. Note that the goal of the Odor Mitigation Plan is to minimize and to prevent, where practicable, the off-site migration of odors. Due to the short distances between any work area and off-site receptors, site controls will be implemented proactively when odors are detected in the breathing zone at any work area.

5.3 General site controls

Several general excavation or drilling procedure site controls that will be implemented include:

- Every effort will be made to minimize the amount of time that impacted material is exposed to ambient air at the site.
- For the test pit excavations, it may be possible to move some amount of soil around within the footprint of the test pit excavation in order to minimize the amount of soil removal and subsequent stockpiling of impacted soil at the ground surface. The use of in-excavation stockpiling of test pit soil will be evaluated on a case-by-case basis, and will be completed only if it does not impede the collection of subsurface soils or the full delineation of the subsurface features being investigated.
- Drill cuttings from the hollow-stem auger borings will be containerized as soon as possible during the completion of each soil boring.

- Loading of excavated debris or soil that has been found by the site manager to be unsuitable material to return to test pits may generate odors. Every effort will be made to complete this work as quickly as possible and to keep these materials covered at all times.
- Meteorological conditions are also a factor in the generation and migration of odors. Some site activities may be limited to times when specific meteorological conditions prevail, such as when winds are blowing away from a specific receptor.

5.4 Secondary site controls

If substantial odors still present an issue following implementation of the above procedures, secondary controls will be enacted. The site manager will work through the applicable list of secondary controls until the perimeter odor issues are resolved. The site manager will work closely with NYSEG and NYSDEC during this task. Final selection of controls will be dependent on field conditions encountered. Secondary controls include the following:

- For stockpiled impacted soil, temporary tarps or polyethylene covers will be used to control odors.
- The placement of portable barriers close to small active source areas (test pits) can elevate the discharge point of emissions to facilitate dispersion and minimize the effect on downwind receptors. The barriers can be constructed using materials such as plastic “Jersey barriers”, or fence poles and visual barrier fabric/plastic. The barriers are placed as temporary two or three-sided structures around active test pit or other intrusive investigation areas, oriented such that the barriers are placed on the upwind and downwind sides of the source. If only one side of the source can be accessed, then the barrier should be placed on the downwind side.
- Two agents that can be sprayed over impacted soil have been determined to be effective in controlling emissions. They include odor suppressant solution (BioSolve™), and Rusmar foam. These agents may be used where tarps cannot be effectively deployed over the source material, or where tarps are ineffective in controlling odors:
  - BioSolve™ can provide immediate, localized control of odor emissions. Information regarding the preparation and use of BioSolve™ is provided in Appendix A.
  - Rusmar foam - Although it is unlikely that it will be necessary, Rusmar foam may be used to cover inactive sources for extended periods of time (up to several days). Rusmar foam creates a uniform, flexible, and impenetrable mechanical barrier that may be utilized to contain odors, volatile organic compounds (VOCs), and dust.

5.5 Record keeping and communication

Similar to readings recorded during the monitoring specified in the CAMP, all odor monitoring results will be recorded in the field log book or other air monitoring forms, and be available for review by the agencies.

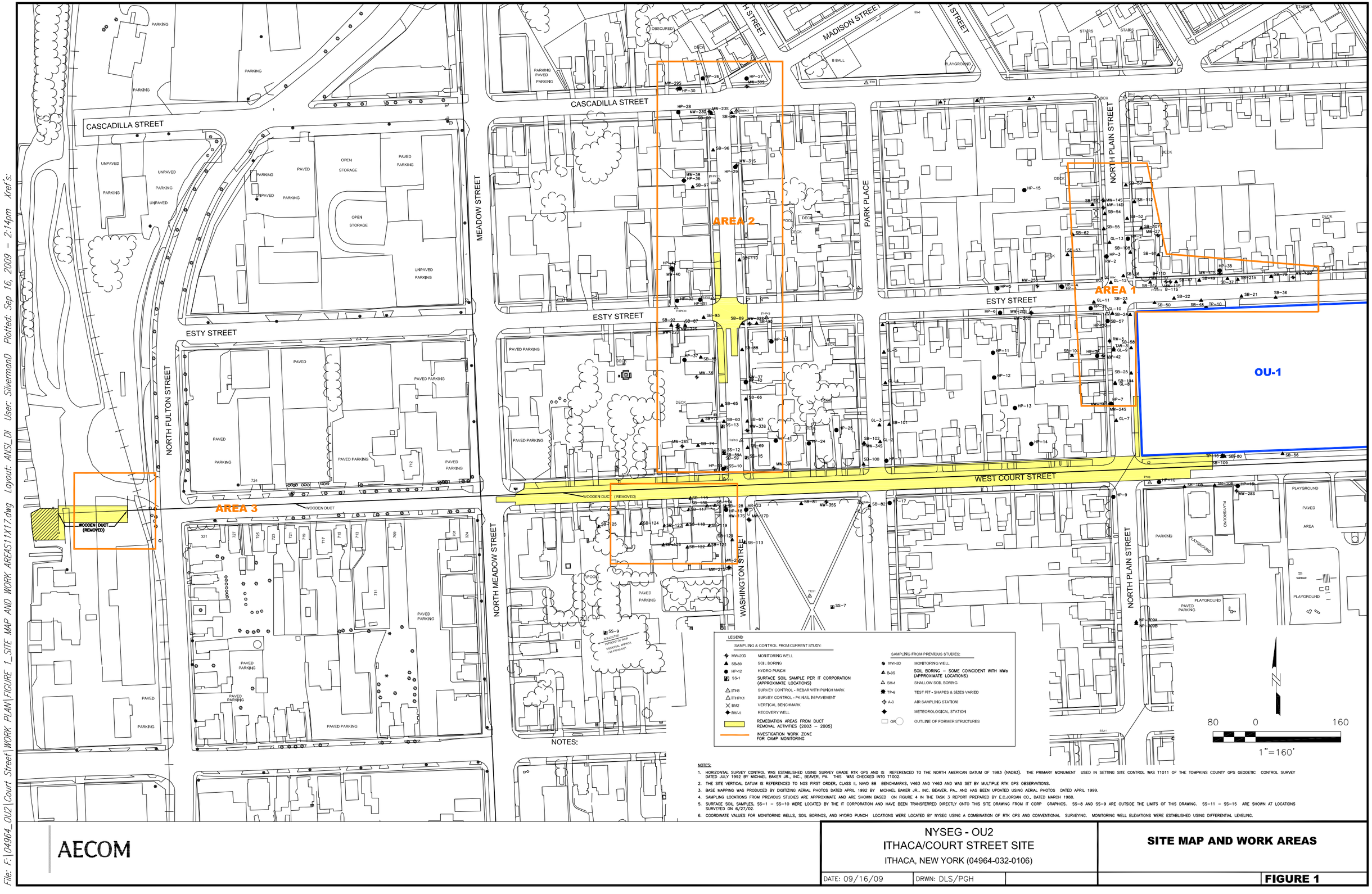
The site supervisor will also provide information on odor monitoring and odor management to residents of the neighborhood should they inquire. In the event that odors persist after these efforts, work will be temporarily discontinued until a mutually agreeable solution with NYSEG, NYSDEC, and NYSDOH staff can be worked out which allows the work to be completed while minimizing the off-site transport of nuisance odors.

6.0 Documentation and reporting

Data generated during perimeter air monitoring will be recorded in field logs and summarized daily in spreadsheets. The electronic measurements from the PIDs and dust meters will be downloaded each day, reviewed, and archived. Exceedances of the action levels, if any, and the actions to be taken to mitigate the situations, will be discussed immediately with the on-site representatives. Summaries of all air monitoring data will be provided to the NYSDEC or the NYSDOH as requested.

AECOM

Figures



NOTES:

1. HORIZONTAL SURVEY CONTROL WAS ESTABLISHED USING SURVEY GRADE RTK GPS AND IS REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83). THE PRIMARY MONUMENT USED IN SETTING SITE CONTROL WAS T1011 OF THE TOMPKINS COUNTY GPS GEODETIC CONTROL SURVEY DATED JULY 1992 BY MICHAEL BAKER JR., INC., BEAVER, PA. THIS WAS CHECKED INTO T1002.
2. THE SITE VERTICAL DATUM IS REFERENCED TO NGS FIRST ORDER, CLASS II, NAVD 88 BENCHMARKS, V463 AND Y463 AND WAS SET BY MULTIPLE RTK GPS OBSERVATIONS.
3. BASE MAPPING WAS PRODUCED BY DIGITIZING AERIAL PHOTOS DATED APRIL 1992 BY MICHAEL BAKER JR., INC, BEAVER, PA., AND HAS BEEN UPDATED USING AERIAL PHOTOS DATED APRIL 1999.
4. SAMPLING LOCATIONS FROM PREVIOUS STUDIES ARE APPROXIMATE AND ARE SHOWN BASED ON FIGURE 4 IN THE TASK 3 REPORT PREPARED BY E.C.JORDAN CO., DATED MARCH 1988.
5. SURFACE SOIL SAMPLES, SS-1 – SS-10 WERE LOCATED BY THE IT CORPORATION AND HAVE BEEN TRANSFERRED DIRECTLY ONTO THIS SITE DRAWING FROM IT CORP GRAPHICS. SS-8 AND SS-9 ARE OUTSIDE THE LIMITS OF THIS DRAWING. SS-11 – SS-15 ARE SHOWN AT LOCATIONS SURVEYED ON 6/27/02.
6. COORDINATE VALUES FOR MONITORING WELLS, SOIL BORINGS, AND HYDRO PUNCH LOCATIONS WERE LOCATED BY NYSEG USING A COMBINATION OF RTK GPS AND CONVENTIONAL SURVEYING. MONITORING WELL ELEVATIONS WERE ESTABLISHED USING DIFFERENTIAL LEVELING.

AECOM

NYSEG - OU2
ITHACA/COURT STREET SITE
ITHACA, NEW YORK (04964-032-0106)

SITE MAP AND WORK AREAS

DATE: 09/16/09 | DRWN: DLS/PGH | **FIGURE 1**

File: F:\04964_OU2\Court Street\WORK PLAN\FIGURE 1_SITE MAP AND WORK AREAS11X17.dwg Layout: ANSI_D1 User: SilvermanD Plotted: Sep 16, 2009 - 2:14pm Xref's:

AECOM

Attachment A

Vapor suppression information

September 2009

BioSolve®
Hydrocarbon Mitigation Technology

...Is Making A Difference!

VAPOR SUPPRESSION / ODOR CONTROL

BioSolve® offers a relatively simple and cost effective method of suppressing Odors and VOC release from soils, during excavation, loading, stockpiling, etc. The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% BSW solution (1 part **BioSolve®** concentrate to 33 parts water) will be adequate to keep vapor emissions within acceptable limits and control fugitive odor problems on contact. Although, some sites may only require a 2% solution, up to a 6% solution may be recommended on sites with elevated levels or particularly difficult/ mixed stream contaminants are present.

The **BioSolve®** solution should be applied evenly to the soil surface in sufficient quantity to saturate the surface area. As a general rule, use 1-3 litres of **BioSolve®** solution to 1 square metre of surface area. (1 gallon of **BioSolve®** per solution will cover approximately 4-sq. yd. of soil surface area) **BioSolve®** is a water-based surfactant that will apply like water.

BioSolve®, in its concentrated form, is a viscous liquid material that must be diluted with water. A fluorescent red tracing dye is present in the formula allowing **BioSolve®** to be detected during application. Once diluted, **BioSolve®** can be applied with virtually any equipment that can spray water. **BioSolve®** will not harm equipment or clog pipes. For large sites, applicators such as water truck, portable agricultural sprayers, foam inductors & pressure sprayers can be used. For smaller jobs, garden sprayers, water extinguishers or a garden hose with a fertiliser attachment on the nozzle can be used effectively. This characteristic makes **BioSolve®** very adaptable and much most convenient to use in almost any situation. **BioSolve®** is equally effective when used with all types of water (soft, hard, salt or potable).

On stockpiled soil or other soil that will be left undisturbed, a single application of **BioSolve®** to the exposed surfaces may last up to 10 to 14 days or more (depending on environmental conditions). **BioSolve®,** when applied, will form a "cap" of clean soil. If the soil is not disturbed, via weather, movement, etc. this "cap" will remain functional. During excavation, loading or other movement of the soil, it may be required to spray an additional amount of **BioSolve®** to the freshly exposed surface area to keep emissions at an acceptable level.

In case of an extremely high level of emissions, or if the soil is heavily contaminated, it may be necessary to increase the strength of the **BioSolve®** solution or apply more solution per square metre to reduce emissions adequately. It is important that the site be monitored regularly and that the **BioSolve®** solution be reapplied if and when necessary to insure that VOC emissions and odors remain under control.

BioSolve® is packaged and readily available in 55 gallon (208 liter) drums, 5 gallon (19 liter) pails and in 4X1 gallon (3.8 liter X 4) cases. Contact The Westford Chemical Corporation® Toll Free @ 1-800-225-3909, via e-mail at info@biosolve.com or your Local BioSolve distributor for pricing.

BioSolve® should only be used in accordance with all regulatory rules and regulations.

SOIL VAPOR SUPPRESSION UTILIZING BIOSOLVE

BioSolve is being utilized by numerous environmental consultants, response contractors, and fire departments to suppress VOC's & LEL's as well as problem odors. BioSolve encapsulates the source of the vapor rather than temporarily blanketing it like a foam or other physical barrier. Vapor reduction is so fast and effective that BioSolve is used to comply with the tough emission standards regulated by each State.

BioSolve offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling… The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% solution of BioSolve will be adequate to keep vapor emissions within acceptable limits. Dilute BioSolve concentrate with water at a ratio of 1 part BioSolve to 33 parts water to make a 3% solution.

The BioSolve solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well, (as a general rule, 1 gallon of BioSolve solution will cover approximately 4 sq. yd. of soil surface area). BioSolve is not a foam, it is a surfactant based product that will apply like water. The solution may be applied with a hand sprayer, high pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the BioSolve solution (6%) or apply more per sq. yd. to reduce emissions adequately. On stockpiled soil or other soil that will be undisturbed, a single application of BioSolve to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable

levels.It is important that the site be monitored regularly and the BioSolve solution be reapplied if/when necessary to insure that vapor emissions remain at or below acceptable standards.

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION®
P.O. Box 798
Westford, Massachusetts 01886 USA

Ref. No.: 2001
Date: 1/1/2002

Phone: (978) 392-0689
Phone: (508) 878-5895
Emergency Phone-24 Hours: 1-800-225-3909

Fax: (978) 692-3487
Web Site: http://www.BioSolve.com
E-Mail: info@BioSolve.com

SECTION I - IDENTITY

Name:	**BioSolve®**
CAS #:	138757-63-8
Formula:	Proprietary
Chemical Family:	Water Based, Biodegradable, Wetting Agents & Surfactants
HMIS Code:	Health 1, Fire 0, Reactivity 0
HMIS Key:	4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant

---

SECTION II - HAZARDOUS INGREDIENTS

Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000 require listing of hazardous ingredients.

This product does not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California's Prop. 65.

SECTION III - PHYSICAL - CHEMICAL CHARACTERISTICS

Boiling Point	: 265°F	Specific Gravity	: 1.00 +/-.01
Melting Point	: 32°F	Vapor Pressure mm/Hg	: Not Applicable
Surface Tension- 6% Solution	: 29.1 Dyne/cm at 25°C	Vapor Density Air = 1	: Not Applicable
Reactivity with Water	: No	Viscosity - Concentrate	: 490 Centipoise
Evaporation Rate	: >1 as compared to Water	Viscosity - 6% Solution	: 15 Centipoise
Appearance	: Clear Liquid unless Dyed	Solubility in Water	: Complete
Odor	: Pleasant Fragrance	pH	: 9.1+/-.3
Pounds per Gallon	: 8.38		

SECTION IV - FIRE AND EXPLOSION DATA

Special Fire Fighting Procedures	: None	Flammable Limit	: None
Unusual Fire and Explosion Hazards	: None	Auto Ignite Temperature	: None
Solvent for Clean-Up	: Water	Fire Extinguisher Media	: Not Applicable
Flash Point	: None		

SECTION V - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -

Small spills, in an undiluted form, contain. Soak up with absorbent materials.
Large spills, in an undiluted form, dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.

Waste Disposal Procedures -

Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

SECTION VI - HEALTH HAZARDS

Threshold Limit Values: Not applicable
Signs and Symptoms of Over Exposure-

Acute : Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.

Medical Conditions Generally Aggravated by Exposure: Unknown
Carcinogen: No
Emergency First Aid Procedures -

Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.
Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion: Get medical attention.
Inhalation: None considered necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection	: Not necessary	Local Exhaust Required	: No
Ventilation Required	: Normal	Protective Clothing	: Gloves, safety glasses Wash clothing before reuse.

SECTION VIII - PHYSICAL HAZARDS

Stability	: Stable	Incompatible Substances	: None Known
Polymerization	: No	Hazardous Decomposition Products	: None Known

---

SECTION IX - TRANSPORT & STORAGE

DOT Class	: Not Regulated/Non Hazardous		
Freeze Temperature	: 28°F	Storage	: 35°F-120°F
Freeze Harm	: None (thaw & stir)	Shelf Life	: Unlimited Unopened

---

SECTION X - REGULATORY INFORMATION

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application, which is not described on the Product label or in this Material Safety Data Sheet, is the sole responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation and Massachusetts Right to Know Law.

Appendix D

Site-Specific Health and Safety Plan

Prepared for:
New York State Electric and Gas




Appendix D

HEALTH AND SAFETY PLAN

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York

August 2009

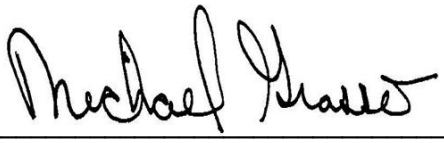
AECOM

Appendix D

HEALTH AND SAFETY PLAN

Remedial Investigation
NYSEG's Ithaca Court St. Former MGP Site
Operable Unit 2
Ithaca, New York

Prepared By: Keith Stahle, Project Geologist



Reviewed By: Michael Grasso, Regional Health and Safety Manager

August 2009

AECOM

Contents

Attachments

List of Figures

1.0 INTRODUCTION

1.1 Health and Safety Plan applicability

This site-specific Health and Safety Plan (HASP) has been developed by AECOM Environment (AECOM). It establishes the health and safety procedures required to minimize potential risk to AECOM and contractor personnel involved with implementing the Remedial Investigation (RI) of the offsite portion (i.e., Operable Unit 2 (OU-2) of the Ithaca Court Street Former Manufactured Gas Plant (MGP) Site located in the City of Ithaca, New York. AECOM is performing this work on behalf of New York State Electric and Gas (NYSEG).

The provisions of this plan apply to AECOM personnel and AECOM subcontractor personnel who may potentially be exposed to safety and/or health hazards related to activities described in Section 3.0 of this document.

This HASP has been written to comply with the requirements of OSHA's Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). All activities covered by this HASP must be conducted in complete compliance with this HASP, and with all applicable federal, state, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply will be excluded from site activities.

This plan will be distributed to each employee involved with the proposed activities at the site, including subcontractor employees. Each employee must sign a copy of the attached health and safety plan sign-off sheet (see Attachment A).

This HASP only pertains to the tasks described in Section 3.0 of this document. A task-specific HASP or addendum to this HASP will be developed at a later date for any other subsequent investigations/remedial activities at the site.

1.2 Health and safety expectations

1.2.1 AECOM safety policy

As a leading global provider of environmental, health, and safety (EHS) engineering and consulting services, AECOM is committed in the conduct of our operations to protecting the environment as well as the health and safety of our employees, clients, subcontractors, suppliers, and the communities which we serve. To demonstrate and support this steadfast commitment, AECOM has adopted nine EHS Guiding Principles. It is the expectation and responsibility of each AECOM employee to understand and fully support these Principles in the performance of all work activities.

1.2.2 Zero accident goal

The safety goal for this project is zero incidents and zero accidents, with work tasks designed to minimize or eliminate hazards to personnel, equipment, the environment and the general public. No individuals shall perform tasks that may endanger their own safety and health or that of others.

1.2.3 Stop work authority

Commitment to safety, health, and environmental excellence requires that all work proceed only after it is safe and environmentally sound. The responsibility for ensuring that this takes place rests with every AECOM employee working at this project location. Effectively meeting these responsibilities depends upon open communication between individuals and their supervisors prior to work beginning, and – in certain cases – after safety, health and/or environmental issues are identified.

The safety and health of onsite personnel will take precedence over cost and schedule considerations for all project work. All AECOM personnel and AECOM contractors have the authority to STOP WORK if they see a potential or actual hazard that may threaten the safety of people or the environment. Upon stopping work, the AECOM Site Safety Officer (SSO) must be immediately notified and provided with information regarding the nature of the safety, health or environmental concern. The SSO should meet with the worker with the intent of resolving the worker's concerns. Once the concerns are resolved to the satisfaction of the worker, work can proceed.

If the concerns are not resolved to the satisfaction of the worker and/or the SSO, work does not proceed. The AECOM Regional Health and Safety Manager (RHSM) will be contacted to obtain assistance in resolving the concerns. Using his/her expertise, safety, health, and environmental rules, regulations, and procedures, the AECOM RHSM will attempt to resolve the matter with all parties involved. Work will not resume until this criterion is met.

1.3 Organization/responsibility

The implementation of health and safety at this project location will be the shared responsibility of the AECOM project manager (PM), the AECOM Regional Health and Safety Manager (RHSM), the AECOM project site safety officer (SSO), other AECOM personnel implementing the proposed scope of work and AECOM's contractors.

1.3.1 AECOM project manager

The AECOM PM (Lucas Hellerich) is the individual who has the primary responsibility for ensuring the overall health and safety of this project. As such, the PM is responsible for ensuring that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Interfacing with NYSEG representatives regarding safety requirements for working within the NYSEG property and the adjacent areas and staging equipment and IDW at the OU1 Site.
- Assuring that all personnel to whom this HASP applies, including AECOM subcontractors, have received a copy of it;
- Verifying that all contractors selected by AECOM to work on this program have completed AECOM's environmental, health and safety questionnaire (AHSQ) form within the past year and have been deemed acceptable for the proposed scope of work;
- Providing the RHSM with updated information regarding conditions at the site and the scope of site work;
- Providing adequate authority and resources to the onsite SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO and RHSM;
- Maintaining regular communications with the SSO and, if necessary, the RHSM; and
- Coordinating the activities of all AECOM subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.

1.3.2 AECOM Regional Health and Safety Manager

The AECOM RHSM (Michael Grasso) is the individual responsible for the preparation, interpretation, and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RHSM. Specific duties of the RHSM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety on this site;

- Recommending appropriate personal protective equipment (PPE) and safety equipment to protect personnel from potential site hazards;
- Conducting accident investigations; and
- Maintaining regular contact with the PM and SSO to evaluate site conditions and new information which might require modifications to the HASP.

1.3.3 AECOM site safety officer

All AECOM geologists and field technicians are responsible for implementing the safety requirements specified in this HASP. However, one field geologist will serve as the SSO. The SSO will be appointed by the PM and will be on site during all activities covered by this HASP. The AECOM SSO will work together with the contractor's SSO to enforce the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies, including all subcontractors, have submitted a completed copy of the HASP receipt and acceptance form;
- Assuring that all personnel to whom this HASP applies have attended, and actively participated in, a pre-entry briefing and any subsequent safety meetings that are conducted during the implementation of the program;
- Maintaining a high level of health and safety consciousness among employees implementing the proposed activities;
- Performing the required air monitoring as described in this HASP;
- Procuring and distributing the PPE and safety equipment needed for this project for AECOM employees;
- Verifying that all PPE and health and safety equipment used by AECOM is in good working order;
- Verifying that AECOM contractors are prepared with the PPE and safety equipment required for this program;
- Stopping work in the event that an immediate danger situation is perceived;
- Notifying the PM of all noncompliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within the established restricted areas to ensure that required safety and health procedures are being followed;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing prior to beginning work and subsequent safety meetings as necessary; and
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.

1.3.4 AECOM and contractor personnel

All AECOM field personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of onsite work;
- Submitting a completed HASP Acceptance Form to the AECOM SSO prior to the start of work;

- Attending, and actively participating in, the required pre-entry briefing prior to beginning onsite work and any subsequent safety meetings that are conducted during the implementation of the program;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSO prior to the start of work;
- Stopping work in the event that an immediate danger situation is perceived;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the AECOM SSO; and
- Complying with the requirements of this HASP and the requests of the SSO.

1.3.5 Contractors

Additionally, subcontractors hired by AECOM are responsible for:

- Reading the HASP in its entirety prior to the start of onsite work;
- Attending, and actively participating in, the required pre-entry briefing prior to beginning onsite work and any subsequent safety meetings that are conducted during the implementation of the program;
- Stopping work in the event that an immediate danger situation is perceived;
- Ensuring, via daily inspections, that their equipment is in good working order;
- Operating their equipment in a safe manner;
- Appointing an onsite safety coordinator to interface with the AECOM SSO;
- Providing AECOM with copies of material safety data sheets (MSDS) for all hazardous materials brought on site; and
- Providing all the required PPE and safety supplies to their employees.

1.4 Management of change/modification of the Health and Safety Plan

1.4.1 Management of change

The procedures in this HASP have been developed based on a review of previous site investigations and the proposed scope of work. Every effort has been made to address the chemical and physical hazards that may be encountered during the implementation of the proposed program. However, unanticipated site-specific conditions or situations may occur during the implementation of this project. Also, AECOM and/or the contractors may elect to perform certain tasks in a manner that is different from what was originally intended due to a change in field conditions. As such, this HASP must be considered a working document that is subject to change to meet the needs of this dynamic project.

AECOM and/or AECOM's contractors will complete a Job Hazard Analysis (JHA) when new tasks or different investigative techniques not addressed in the HASP are proposed. The use of new techniques will be reviewed and if new hazards are associated with the proposed changes, they will be documented on the JHA form. An effective control measure must also be identified for each new hazard. JHA forms will be reviewed by the SSO prior to being implemented. Once approved, the completed forms will be reviewed with all field staff during the daily safety meeting. A blank JHA form is presented as Attachment B.

1.4.2 Health and Safety Plan modification

Should significant information become available regarding potential onsite hazards, it may be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the AECOM RHSM before such modifications are implemented. Any significant modifications must be incorporated into the

written document as addenda and the HASP must be reissued. The AECOM PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the AECOM PM. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

2.0 Site description

2.1 Site location and history

The Court Street site is located in Tompkins County in the City of Ithaca, New York. The location of the site is shown on Figure 1-1. NYSEG's predecessors operated a coal gasification plant at the site from 1853 to 1927. The plant occupied the western portion of the block bound by Esty Street on the north, North Plain Street on the west, and Court Street on the south. The gas plant had two coal sheds, a gas house containing three horizontal retorts, purifiers, two steel gas holders, two underground coal tar storage vessels, a tar separator, and two oil tanks. A subsurface wooden duct system, consisting of two wooden ducts and clay tile lines was formerly used to transport coal tar from the MGP site to the Cayuga Inlet for collection and disposal.

NYSEG acquired the plant in 1929 and operated an electric operation center until 1964, when the property was sold to the Ithaca City School District. In April 2002, the site was divided into two Operable Units to facilitate further investigations at portions of the site while evaluating remedial options at other portions. Operable Unit 1 (OU-1) consists of the former MGP property. OU-1 is bound by steel sheet piling and remediation of the site is currently in progress. Operable Unit 2 (OU-2) consists of any properties outside of the sheet piling that may have been impacted by the migration of MGP materials directly from the site. OU-2 also includes the remaining portions of the wooden duct system and any properties that may have been impacted by potential tar releases from the ducts. As shown on Figure 1-1, OU-2 has been divided into three areas; Area 1, which consists of the offsite properties in the vicinity of OU-1, Area 2, which consists of properties located along Washington Street, and Area 3, which consists of the Cayuga Inlet and any remaining portions of the wooden duct system and associated properties along West Court Street.

Areas 1 and 2 of OU-2 are located within residential areas that consist of residential buildings, grass-covered areas, asphalt-covered areas, and overhead and subsurface utilities. The locations of the subsurface utilities in OU-2 are shown on Figure 1-2. Area 3 of OU-2 is located within a mixed-use zone that includes both residential and commercial properties. To the north of Court Street, Area 3 is occupied primarily by commercial properties while the south side of West Court Street is largely occupied by residential properties.

3.0 Scope of work

3.1 Purpose of program

Although investigation and remedial work has been performed at the site, data gaps remain for the characterization of the site media and impacts in the areas discussed in Section 2. The overall objectives for the RI are to complete the investigation of the site and lay the groundwork for the selection of a site remedy. The specific objectives of the RI include the following:

- To collect additional data to more completely determine the surface and subsurface characteristics of the site;
- To more completely determine the nature and extent of MGP-related residuals that are present at the surrounding areas(OU2) of the Former MGP site (OU1);
- To identify the potential routes of off-site migration from onsite sources of MGP-related residuals;
- To perform an exposure assessment to evaluate the pathways by which a human receptor (either onsite or off-site) may be exposed to a MGP-related residual; and
- To obtain sufficient data to facilitate the selection of remedial actions to address MGP-residuals at the site.

3.2 Specific field tasks

The specific field tasks being implemented under the RI include:

- Excavating two test pits in the footprint of former MGP-related features (wooden duct system) identified during previous investigations. The test pits will attempt to confirm the construction and depth of these structures and the soil conditions in the areas immediately surrounding these features. Staff will not enter excavations that extend greater than four feet in depth;
- Collecting soil samples from the test pits for field screening with a photo-ionization detector (PID) and subsequent laboratory analyses;
- Installing soil borings at various off-site locations. Direct-push drilling methods are anticipated to be used for this project.
- Collecting continuous Macro-Core® or split-spoon samples from each boring for field screening and subsequent laboratory analyses;
- Installing overburden monitoring wells in selected soil borings to evaluate groundwater in areas that are upgradient, cross-gradient and downgradient of the site. Hollow Stem Auger drilling methods will be used to install monitoring wells;
- Developing newly installed wells;
- Gauging newly installed and existing wells for the presence of non-aqueous phase liquids (NAPLs) prior to groundwater sampling;
- Collecting groundwater samples from newly installed and existing wells for laboratory analyses; and
- Surveying the new investigation sample points.

4.0 Chemical hazard assessment and control

4.1.1 Site impacts

The constituents of concern (COC) associated with the former MGP operations include volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), purifier box residuals (potentially containing cyanide complexes or compounds), and certain trace metals associated with historic fill materials including ash, clinkers, coal etc.

4.1.2 Volatile organic compounds

The VOCs associated with MGP residuals include benzene, toluene, ethylbenzene and xylenes. Exposure to the vapors of BTEX above their respective OSHA permissible exposure limits (PELs) may produce irritation of the mucous membranes of the upper respiratory tract, nose and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue and drunken-like behaviors. Prolonged overexposure to benzene vapors has detrimental effects on the blood-forming system ranging from anemia to leukemia.

The PEL for benzene is 1 ppm, as an 8-hour, time-weighted average (TWA). The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a threshold limit value (TLV) of 0.5 ppm. The OSHA PEL for ethylbenzene is 100 ppm. The PEL for toluene is 200 ppm. However, the ACGIH recommends a TLV of 50 ppm for toluene. Xylene is a flammable, colorless liquid with an OSHA PEL of 100 ppm as an 8-hour TWA. Inhalation of xylene vapors above the PEL may result in motor activity changes, irritability and drunken-like behaviors. Xylene vapors are also irritating to the eye.

VOC of Concern	OSHA PEL (8-hr TWA) (ppm)	ACGIH TLV (8-hr TWA) (ppm)
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

4.1.3 Polycyclic aromatic hydrocarbons

Coal gasification byproduct constituents including coal tar contain polycyclic aromatic hydrocarbon (PAH) compounds. PAH compounds are a family of multiple ring aromatic compounds commonly found in fossil fuels and formed from the incomplete combustion of organic materials. Repeated contact with PAH compounds may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultra-violet light. Certain PAHs as a group are considered potential human carcinogens (CaPAH). OSHA regulates PAHs as coal tar pitch volatiles (CTPV) and has established a PEL for CTPV of 0.2 mg/m^3, as an 8-hr TWA.

Of the PAH compounds typically present at MGP sites, naphthalene is typically present at higher concentrations than the other compounds. Naphthalene is easily detected due to its characteristic moth-ball like odor. The inhalation of high concentrations of naphthalene vapor may result in nausea, vomiting, abdominal pain and irritation of the bladder. Prolonged overexposure may result in renal shut down. The OSHA PEL for naphthalene, as an 8-hr TWA, is 10 ppm.

4.1.4 Purifier box residuals

Blue staining is the characteristic associated with the presence of oxide box residuals (ferrocyanide). Therefore, the presence of this material is easily identified during field investigations. The cyanides associated with oxide box residuals are present in a form that is generally unavailable or complexed with metals such as iron, which makes the cyanide more stable. Thus, the reported effects of free cyanide are not applicable. OSHA has not established a PEL for ferro/ferri cyanide compounds. Similarly, the ACGIH has not recommended a TLV for these compounds.

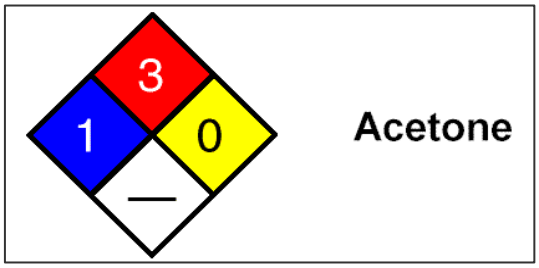
4.1.5 Metals

Lead is typically found at MGP sites and is associated with ash-like materials. In general, the inhalation of metal dusts is irritating to the upper respiratory tract and nasal mucous membranes. Most metal dusts cause dermatitis and/or eye irritation. The early symptoms of lead poisoning, as a result of overexposure (either through ingestion or inhalation) include fatigue, sleep disturbance, headache, aching bones and muscles, digestive irregularities, abdominal pains, and decreased appetite. Chronic overexposures to lead affect the central nervous system and male and female reproductive systems. Lead has also been identified as a fetotoxin. The OSHA PEL for inorganic lead is 50 ug/m^3.

4.2 Hazardous substances brought onsite by AECOM or contractors

A material safety data sheet (MSDS) must be available for each hazardous substance that AECOM or AECOM contractors bring on the property. This includes solutions/chemicals that will be used to decontaminate sampling equipment, equipment fuels, and calibration gases for air monitoring instrumentation.

In addition, all containers of hazardous materials must be properly labeled in accordance with OSHA's Hazard Communication Standard. Either the original manufacturer's label or an NFPA 704M label specific for the material (as shown at the right) is considered to be an acceptable label.



4.3 Chemical exposure and control

4.3.1 Chemical exposure potential

The COCs may have impacted soils and/or groundwater at the areas being investigated.

The VOCs associated with MGP residuals are volatile enough that vapors may be a concern particularly when rotary drilling techniques are used and during the excavation of the test pits at the former MGP features. Where possible, direct-push drilling techniques will be used to advance some of the soil borings to minimize the potential for exposure to VOCs.

PAHs and metals are non-volatile, so it is the dusts of these contaminants that are of concern. Again, the primary task that may generate dusts is test pitting and the auger drilling. The generation of dusts is expected to be minimal when advancing soil borings via direct-push drilling methods.

Direct dermal contact with contaminated soils and groundwater is another possible route of exposure. This exposure route is more of a concern if coal tar NAPL is encountered.

4.3.2 Hazard control

The hazards associated with the implementation of the proposed scope of work can be controlled in several ways, including:

- AECOM will perform air monitoring (Section 6.1) in the worker's breathing zone to determine exposure to VOC vapors during the drilling and test pitting programs. If exposures exceed the action levels, respiratory protection as discussed in Section 7.2, will be donned.
- Inhalation of PAH and metal dusts is not expected to be a concern. However, if dusts are generated, a light mist of water can be applied over the drilling or excavation area to minimize the potential for dust inhalation.
- To avoid direct dermal contact with contaminated media, protective clothing, as described in Section 7.1, will be required when collecting samples or decontaminating equipment that has come in contact with the contaminants of concern.
- Although highly unlikely, exposure to all of the COCs may occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 9.0 address personal hygiene issues that will limit the potential for contaminant ingestion.

5.0 Physical hazards and control

The general procedures in this HASP have been developed based on the proposed investigative activities for the RI. While every effort has been made to address the potential hazards that may be encountered during the implementation of the proposed investigative activities, unanticipated site-specific conditions or situations may occur. Also, AECOM and their selected contractors may elect to perform certain tasks in a manner that is different from what was originally intended due to a change in field conditions. As such, the contractor will complete a JSA when new tasks or different techniques not addressed in the HASP are proposed. The use of new techniques will be reviewed and if new hazards are associated with the proposed changes, they will be documented on the JSA form.

5.1 Access to work areas

The areas addressed by this work plan are located in a mixed residential and commercial area. AECOM and contractors can access the investigation points with the heavy machinery needed to implement the proposed RI via public roadways. Grass covered areas and private driveways may be used to access investigation points located on residential properties. Access Agreements will be in place prior to initiating any field work on these properties.

5.2 Utility hazards

5.2.1 Underground utility hazards

Based on the extensive investigations previously performed at the site, there are known subsurface utilities in the RI area. To identify the locations of the utilities prior to the start of the RI field activities, the following steps will be performed:

- New York law requires that a utility clearance be performed at least two (2) days prior to initiation of any subsurface work. The earthwork and drilling contractor and AECOM will contact DIG SAFELY NEW YORK (1-800-272-4480) to request a mark-out of natural gas, electric, telephone, cable television, water and sewer lines in the proposed work locations. Work will not begin until the required utility clearances have been performed.

Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, the earthwork and drilling contractor and AECOM must exercise due diligence and try to identify the location of any private utilities on the properties being investigated. The contractor and AECOM can fulfill this requirement in several ways, including:

- Obtaining as-built drawings for the areas being investigated from NYSEG and the property owners;
- Visually reviewing each proposed soil boring/well and test pit location with the property owner or knowledgeable site representative;
- Identifying a no-dig zone; or
- Hand digging in the proposed work locations if insufficient data is available to accurately determine the location of the utility lines.

If it is determined that underground utilities are located in the subsurface sampling areas, the sampling locations will be changed to ensure that no utilities are struck during the proposed investigation.

5.2.2 Overhead utility hazards

Prior to drilling, each soil boring location will be visited to evaluate the presence of any overhead utility lines. Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane, etc.) near energized overhead lines shall be operated so that a clearance of at least 10 feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage.

If the required clearance cannot be maintained at any work area at the site, additional precautions must be taken to ensure contact with the overhead lines does not occur. Options include, but may not be limited to, de-energizing the line or placing an insulating barrier over the line. Both of these options will require coordination with the owner of the lines in question.

5.3 Traffic hazards

If any of the proposed activities are being performed in a high traffic area, the following precautions should be followed. All are designed to draw attention to you and to warn other people of your presence:

- Notify the property owner of your work location, dates of work, and the anticipated work times. Suggest the possibility of a detour around the work area.
- Wear an ANSI-approved Class II safety vest.
- Set up traffic cones 50 feet in front of the work area. "Men at Work" signs should also be placed in a conspicuous area to warn others of your presence.

When working on site with heavy machinery, AECOM staff should wear an ANSI-approved Class II safety vest to make themselves more visible to equipment operators. Additionally, all staff working at the site should use the established access paths. Do not take shortcuts through the site which allow you to enter into a work area from a direction that an equipment operator would not expect.

5.4 Drilling hazards

A variety of drilling methods are being used to advance the soil borings. The method selected is dependent upon the location of the particular boring or monitoring well.

5.4.1 Drilling

The drilling rig anticipated for this project will be capable of drilling using auger and direct-push drilling methods. It is anticipated that the majority of the sampling will be performed using Macro-Core® samplers; however, auger methods and split spoon samplers may be utilized as necessary to obtain samples in difficult drilling locations. The auger equipment are located side by side on the truck mounted drilling rig. Use of the drill rig to advance soil borings and install monitoring wells will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.
- The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment.

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.
- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.
- Drillers, helpers, and geologists must secure all loose clothing when in the vicinity of drilling operations.
- Only equipment which has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed.
- No person shall climb the drill mast while tools are rotating.
- No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder which meets the requirements of OSHA standards.
- The wheels of all heavy machinery and support vehicles must be chocked when the machine is placed in position and/or parked for the night.

5.5 Excavation of test pits

Two test pits are planned in and around the wooden duct system identified within Area 3 of OU-2. The test pits will be excavated with a rubber tired or track mounted backhoe or excavator.

5.5.1 Working around heavy equipment

The use of an excavator poses a potential hazard to the support crew working around the equipment. Use of heavy equipment at the site requires all employees working in the exclusion zone to wear ANSI-approved hard hats, steel-toed safety shoes/boots, safety glasses and hearing protection, as well as traffic vests.

AECOM employees will be monitoring excavation activities. This will place the spotter within close proximity to the operating machinery. When working around heavy equipment, AECOM employees should:

- Make sure that the operator is aware of your presence/activities;
- Develop a series of hand signals to facilitate communication with the operator;
- Stay in the operator's line of sight, don't work in his/her blind spot;
- Approach areas where equipment is operating from a direction visible to the operator;
- Be aware of the swing radius of the excavator;
- Do not walk or work underneath loads handled by digging equipment;
- Do not ride in buckets of loaders; and
- Stand away from soil stockpile areas to avoid being struck by any spillage or falling materials.

5.5.2 Test pit/excavation cave-in or collapse

The expected depth of the test pits varies. Due to the potential for cave-in and collapse, all samples collected from the test pits will be done so with a remote sampling device or collected directly from the bucket of the backhoe. This eliminates the need for employees to enter the excavation or test pit.

5.5.3 Open excavations

To the extent possible, all excavations should be backfilled prior to leaving the site. If an excavation must be left open, measures to restrict access may include, but may not be limited to; placing temporary fencing and barriers around the perimeter of the excavation combined with appropriate signage to warn the general public and employees of the hazards of the open excavation.

5.6 Hand and power tool use

A variety of hand and power tools may be used during the proposed investigation. The use of each can pose serious safety hazards to the user.

5.6.1 Hand tools

The greatest hazards posed by hand tools result from misuse and improper maintenance.

- When using hand tools, be sure you have selected the right tool for the job. If a chisel is used as a screwdriver, the tip of the chisel may break or fly off, hitting the user or others.
- Inspect tools for damage such as mushroomed chisel heads or broken hammer handles. If jaws of a wrench are sprung, the wrench may slip. If a wooden handle is loose, splintered or cracked, the head of the tool may fly off.
- Do not use damaged tools.
- Be sure you know how to use the tool you are working with.

5.6.2 Using knives or blades

Geoprobe™ soil samples are contained within an acetate liner that must be cut open in order to retrieve the sample. As such, employees are at an increased risk of cutting themselves since a knife or blade is typically used to open the liner and the liner is often placed on an irregular or unstable work surface (i.e., the back of the Geoprobe™ van or the ground). Additionally, tubing may need to be cut to facilitate groundwater sampling. Tube-cutters are available and should be used to eliminate this hazard. If it is necessary to use knives or blades, follow the safety precautions listed below:

- Keep your free hand out of the way.
- Secure the acetate liner so it won't roll or move while you're cutting.
- Use only sharp blades; dull blades require more force which results in less knife control.
- Pull the knife toward you; pulling motions are easier to manage.
- Don't put your knife in your pocket.
- Use a hooked knife (i.e. linoleum knife) or a utility knife with a self-retracting blade.
- Wear leather or Kevlar gloves when using knives or blades.

5.6.3 Power tools

To prevent hazards associated with the use of power tools, workers should observe the following general precautions:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords away from heat, oil and sharp edges.

- Disconnect tools when not using them, before servicing or cleaning them and when changing accessories such as blades, bits and cutters.
- If a tool is only temporarily being removed from the power source and the cord is not in the immediate control of the user, it is strongly suggested that a cord plug lockout be used to prevent the tool from accidentally being re-plugged in.
- Secure work with clamps or vise, freeing up both hands to operate the tool.
- Avoid accidental starting. Do not hold fingers on the switch button when carrying a plugged-in tool.
- Keep tools sharp and clean for best performance.
- Wear appropriate clothing. Loose clothing or jewelry can become caught in moving parts.
- Keep all guards in place.

5.6.4 Electric tools

When using portable tools that are electrically powered, follow the safety precautions listed below:

- Check to see that electrical outlets used to supply power during field operations is of the three wire grounding type.
- Extension cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO or SJTO.
- NEVER remove the ground plug blade to accommodate ungrounded outlets.
- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings or floors.
- Protect the cord from becoming damaged if the cord is run through doorways, windows or across pinch points.
- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades MUST BE REMOVED from service immediately.
- All portable or temporary wiring which is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD THAT CAUSES A GFCI TO TRIP.
- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.
- Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

5.6.5 Pneumatic tool use

Pneumatic power tools shall be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips shall be securely installed and maintained on impact tools. The manufacturer's safe operating pressure for all fittings shall not be exceeded. Proper PPE as determined by the SSO will be used for all such operations.

5.7 Noise exposure

The use of certain machinery on site may expose the field team to noise levels that exceed the OSHA PEL of 90 dB for an 8-hour day. Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and the perception of auditory signals;
- Interference with the performance of complicated tasks; and
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ.

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: If the noise levels are such that you must shout at someone 5 feet away from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 dB.

5.8 Back safety

Using the proper techniques to lift and move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Use mechanical devices, such as a drum dolly or hand cart, to move objects, such as drums of IDW, which are too heavy to be moved manually.
- Use carts to transport sampling equipment from the access point to the wooded area where soil borings are being installed.
- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not the waist. Let your legs do the lifting.
- Do not twist while lifting.
- Bring the load as close to you as possible before lifting.
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards.

5.9 Slip, trip and fall hazards

5.9.1 Site conditions

On any work area, it is expected that the ground may be uneven. The ground surface may be unreliable due to settling. Surface debris may be present and wet or swampy areas may exist. AECOM staff will be bringing a large amount of sampling equipment into the different work areas. Therefore, it is essential that the team identify a path that is clear of obstructions. While the path of least resistance may be quicker, it may not be safer. For this program, it may be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on site.

Employees should walk around, not over or on top of debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It may be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on site.

5.9.2 Good housekeeping

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip and fall hazards at construction sites. Essential elements of good housekeeping include:

- Orderly placement of materials, tools and equipment;
- Placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish;
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand; and
- Awareness on the part of all employees to walk around, not over or on, equipment that may be stored in the work area.

5.10 Biological hazards

There are biological hazards that need to be considered when working at this site. Each is discussed in detail below.

5.10.1 Mosquito- borne disease - West Nile virus

West Nile encephalitis is an infection of the brain caused by the West Nile virus, which is transmitted by infected mosquitoes. Following transmission from an infected mosquito, West Nile virus multiplies in the person's blood system and crosses the blood-brain barrier to reach the brain. The virus interferes with normal central nervous system functioning and causes inflammation of the brain tissue. However, most infections are mild and symptoms include fever, headache and body aches. More severe infections may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis and rarely, death. Persons over the age of 50 have the highest risk of severe disease.

Prevention centers on public health action to control mosquitoes and on individual action to avoid mosquito bites. To avoid being bitten by the mosquitoes that cause the disease, use the following control measures:

- If possible, stay inside between dusk and dark. This is when mosquitoes are most active.
- When outside between dusk and dark, wear long pants and long-sleeved shirts.
- Spray exposed skin with an insect repellent, preferably containing DEET.

5.10.2 Wasps and bees

Wasps (hornets and yellow-jackets) and bees (honeybees and bumblebees) are common insects that may pose a potential hazard to the field team if work is performed during spring, summer or fall. Bees normally build their nests in the soil. However, they use other natural holes such as abandoned rodent nests or tree hollows. Wasps make a football-shaped, paper-like nest either below or above the ground. Yellow-jackets tend to build their nests in the ground but hornets tend to build their nests in trees and shrubbery. Bees are generally more mild-mannered than wasps and are less likely to sting. Bees can only sting once while wasps sting multiple times because their stinger is barbless. Wasps sting when they feel threatened. By remaining calm and not annoying wasps by swatting, you lessen the chance of being stung.

Wasps and bees inject a venomous fluid under the skin when they sting. The venom causes a painful swelling that may last for several days. If the stinger is still present, carefully remove it with tweezers. Some people may develop an allergic reaction (i.e. anaphylatic shock) to a wasp or bee sting. If such a reaction develops, **seek medical attention at once**.

5.11 Sun exposure

Employees are encouraged to liberally apply sunscreen, with a minimum sun protection factor (SPF) of 15, when working outdoors to avoid sunburn and potential skin cancer, which is associated with excessive sun exposure to unprotected skin. Additionally, employees should wear safety glasses that offer protection from UVA/UVB rays.

5.12 Thermal stress

This investigative program is scheduled to begin in September and extend into the late fall. As such, the hazards of both heat and cold stress are addressed in this HASP.

5.12.1 Heat stress

Types of heat stress

Heat related problems include heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash can occur when sweat isn't allowed to evaporate; leaving the skin wet most of the time and making it subject to irritation. Fainting may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. Heat exhaustion results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Early symptoms of heat-related health problems:

- decline in task performance
- excessive fatigue
- incoordination
- reduced vigilance
- decline in alertness
- muscle cramps
- unsteady walk
- dizziness

Susceptibility to heat StressiIncreases due to:

- lack of physical fitness
- obesity
- lack of acclimation
- drug or alcohol use
- increased age
- sunburn
- dehydration
- infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The effect of personal protective equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain PPE, particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to avoid heat stress

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink fewer fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the project manager, onsite field coordinator, and health and safety officer. Potable water and fruit juices should be made available each day for the field team.

Heat stress monitoring techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method: Check radial pulse rates by using fore-and middle fingers and applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beat/minute, shorten the next work cycle by one-third and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle by one-third.
Cold Stress

Types of cold stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30^{o} F. When fluids around the cells of the body tissue freeze, skin turns white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of cold stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There may be a tingling, stinging or aching feeling in the effected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95^{o} F. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

Methods to prevent cold stress

When the ambient temperature, or a wind chill equivalent, falls to below 40^{o} F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or similar types of synthetic material that wick away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it may become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20^{o} F.

Dehydration occurs in the cold environment and may increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

5.13 Inclement weather

As work continues through the late summer and fall, it is important to have a response plan in place that dictates what actions AECOM employees will take in the event of severe weather, specifically severe thunderstorms.

When a severe thunderstorm is coming, employees will only have a short amount of time to make important decisions. AECOM employees do not have access to consistent and current news information via the television or radio when working in the field. To ensure that onsite staff is alerted to the onset of severe weather, the project team will be issued a battery-operated National Oceanic and Atmospheric Administration (NOAA) weather radio. The radio will be equipped with an alarm that will automatically broadcast any pertinent information from NOAA's National Weather Service.

Via the radio, the field technician will be aware of any severe thunderstorm watches or warnings that have been issued for their work area by the National Weather Service. It is important for field team members to understand the difference between a "watch" and a "warning".

If a severe thunderstorm ***watch*** is issued for your work or travel area, it means that a severe thunderstorm is ***possible***. If a severe thunderstorm ***warning*** is issued, it means that ***a severe thunderstorm has actually been spotted or is strongly indicated on radar and it is time to seek safe shelter immediately***.

Weather broadcasts are typically issued for specific counties, not individual towns. It is important for all field team members to know what county they are performing survey work. Additionally, employees should become familiar with the names of the counties through which they must travel when mobilizing/demobilizing from their assigned work location, in the event that a broadcast is issued for those counties.

If a ***severe thunderstorm watch*** is issued, employees must remain alert for approaching storms and review the procedures for seeking refuge in the event that a warning is issued. If a ***severe thunderstorm warning*** is issued, AECOM employees will take the following measures:

- If you hear thunder, you are close enough to a storm to be struck by lightning.
- Cease all work and seek shelter, either a sturdy building or car, immediately.
- Do not take shelter in small sheds, under isolated tress or in convertible automobiles.
- Avoid trees as they are targets for lightning.
- If in a car, keep the windows up.

If you are caught outside during a thunderstorm and no shelter is available, find a low spot away from trees, fences and poles. Squat low to the ground on the balls of your feet; place your hands on your knees with head between them. Make yourself the smallest target possible and minimize your contact with the ground.

6.0 Air monitoring

6.1 Direct reading instrumentation

Instrument 1 - RaeSystems Mini-Rae 2000 PID with a 10.6 ev lamp

A RaeSystems Mini-Rae 2000 PID (or similar) with a 10.6 ev lamp or equivalent will be used to monitor the breathing zone of personnel during all activities. When the PID indicates sustained (15 minute) breathing zone vapor concentrations in excess of 1 ppm, respiratory protection, as described in Section 7.2 of this document, will be donned. This action level is based on the PEL of benzene and its reported response to the selected instrumentation.

6.2 Personal air sampling

Personal air sampling will not be conducted by AECOM during the activities covered by this HASP.

6.3 Calibration and recordkeeping

Equipment used by AECOM will be calibrated in accordance with the quality assurance plan and AECOM's standard operating procedures. A log of PID readings will be kept in the field notebook. Daily calibration information will also be recorded in the field notebook.

6.4 Community Air Monitoring Plan

AECOM has incorporated the generic requirements of New York State Department of Health (NYSDOH) Community Air Monitoring Plan (CAMP) within the investigation work plan. All the requirements of the CAMP will be implemented by AECOM during the proposed investigations. The CAMP is included in Appendix C of the RI Work Plan.

7.0 Personal protective equipment

PPE will be worn during these activities to prevent onsite personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants. The following table describes the PPE and chemical protective clothing to be worn for general site activities and for certain specific tasks.

7.1 Chemical protective clothing

PPE Item	Excavate Test Pits	Install Soil Borings and Monitoring Wells	Collect Soil Samples from Test Pits and Borings	Develop, gauge and sample existing and newly installed wells
Hard Hat	✓	✓	✓	Unless required by NYSEG
Steel Toed Safety Shoes	✓	✓	✓	✓
Safety Glasses with Sideshields	✓	✓	✓	✓
ANSI-approved Class II Traffic Vest	✓	✓	✓	✓
Nitrile gloves			✓	✓
Kevlar gloves		When handling drill tools		When cutting tubing
Hearing Protection	✓	✓	If machinery is still operating	

7.2 Respiratory protection

7.2.1 General site work

If the PID indicates sustained (15 minute) breathing zone VOC concentrations in excess of 1 ppm or more, Level C respiratory protection will be donned.

Level C specification: Half-mask air-purifying respirator with organic vapor cartridges.

All employees who are expected to don respiratory protection must have successfully passed a fit-test within the past year for the brand, model and size respirator they plan to wear on this program.

7.3 Other safety equipment

The following additional safety items should be available at the site:

- Portable, hand-held eyewash bottles
- First aid kit
- Type A-B-C fire extinguisher (located on machinery)
- Portable phones

8.0 Site control/decontamination

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, hazardous work areas will be clearly identified and decontamination procedures will be required for personnel and equipment leaving those areas.

8.1 Designation of zones

AECOM designates work areas or zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November 1985. They recommend that the areas surrounding each of the work areas to be divided into three zones:

- Exclusion or "Hot" Zone
- Contamination Reduction Zone (CRZ)
- Support Zone

8.1.1 Exclusion zone

Access to the work area is accessible to the public. Therefore formal exclusion zones must be established around each work area. Zones can be demarcated with traffic cones and tape or traffic barriers to prevent members of the general public from entering an active work area.

If an excavation must be left open, its perimeter must be marked with "Caution-Open Test Pit" tape or surrounded with barricade fencing. The tape and fencing must be capable of withstanding current weather conditions and be highly visible to prevent accidental entry into the excavation.

All personnel entering the active work areas must be trained in accordance with the requirements defined in Section 10.2 of this HASP and must wear the prescribed level of personal protective equipment.

8.1.2 Contamination reduction zone

A mini-decontamination zone will be established adjacent to each work area. Personnel will remove contaminated gloves and other disposable items in this area and place them in a plastic bag until they can be properly disposed of. Further information regarding the decontamination of field equipment and machinery is addressed in Section 9.0.

8.1.3 Support zone

At this site the support zone will include the area outside of the exclusion zone.

8.2 General site safety practices

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- The Buddy System will be used at all times by field personnel at the Site. No one is to perform fieldwork alone unless approved by the office Health and Safety Coordinator and/or the PM. The Buddy System includes maintaining visual, voice, and/or radio communication at all times.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone.
- Smoking is prohibited in all work areas. Matches and lighters are not allowed in these areas.
- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the project work plan.

8.3 Tobacco free work site

This facility is a tobacco-free work site. As such, employees will only be permitted to smoke or chew tobacco inside their vehicles.

8.4 Weapons-free site

Possessing firearms or unauthorized weapons on the project premises is expressly prohibited. Therefore, all AECOM employees, sub-contractors and their employees must ensure that they do not bring weapons onto the project premises (including in cars). Weapons include but are not limited to guns, knives and explosives, but exclude knives that are used as tools and that are required for project work.

9.0 Decontamination

9.1 Equipment decontamination

A temporary decontamination area lined with polyethylene sheeting will be constructed on site for use during the decontamination of the drilling rig and test pitting equipment. All drilling equipment including augers, bits, rods, tools, split-spoon samplers and tremie pipes will be cleaned with a high-pressure hot water pressure washing unit before beginning work. All augers, rods and tools will be decontaminated between each drilling location as described above. The back of the rig and equipment will be decontaminated at the completion of the work and prior to leaving the site.

9.2 Sampling tool decontamination

Prior to sampling, all non-dedicated sampling equipment will be washed with potable water and a phosphate-free detergent. Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc. The sampling equipment will then be rinsed with potable water followed by a de-ionized water rinse. Between rinses, equipment will be placed on polyethylene sheeting or aluminum foil, if necessary. Equipment will be wrapped in polyethylene or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

9.3 Personal decontamination

Proper decontamination is required of all personnel before leaving the exclusion zone. Decontamination will occur within the contamination reduction zone. Disposable PPE, such as gloves, will be removed in the decontamination reduction zone and placed in garbage bags for disposal as general refuse.

Regardless of the type of decontamination system required, as a minimum, a container of potable water and liquid soap should be made available so employees can wash their hands and face before leaving the site for lunch or for the day. Employees should always wash their face and hands with soap and water before eating, smoking or drinking.

9.4 Management of investigation-derived wastes

Investigation-derived wastes (IDW) will include decontamination fluids, drill cuttings, development and purge water, PPE and dedicated sampling equipment. Decontamination fluids, drill cuttings and development and purge water will be placed in 55-gallon drums and labeled as “pending analysis – investigation-derived residuals” and placed in a plastic-lined containment area pending characterization and proper disposal. PPE and dedicated sampling equipment will be placed in 55-gallon drums for disposal. All IDW will be placed within a fenced and locked area within OU1 of the site.

10.0 Medical monitoring and training requirements

10.1 Medical monitoring

All personnel performing activities covered by this HASP must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on the site covered by this HASP.

10.2 Health and safety training

10.2.1 HAZWOPER

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120 (e). Each individual must have completed an annual 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any work on the sites covered by this HASP.

10.2.2 First aid and CPR

At least one member of the AECOM field team must be currently trained to provide First aid and CPR.

10.2.3 Pre-entry briefing

Prior to the commencement of onsite activities, a pre-entry briefing will be conducted by the SSO to review the specific requirements of this HASP. Attendance of the pre-entry meeting is mandatory for all personnel covered by this HASP and must be documented on the attendance form provided in Attachment C. HASP sign-off sheets should also be collected at the time of the pre-entry briefing. All documentation should be maintained in the project file.

The pre-entry briefing must be completed for each new employee before they begin work at the site. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project. Specific topics that will be discussed during the pre-entry briefing include:

- Discussion of site history;
- Discussion of work scope;
- Review of the potential hazards associated with contaminants of concern and how these potential hazards will be controlled;
- Review of air monitoring requirements and action limits;
- Review of PPE and engineering control requirements;
- Discussion of the potential physical hazards associated with implementing scope of work;
- Review of emergency egress and hospital location/directions; and
- Review of decontamination procedures.

10.3 Daily safety meetings

Daily meetings will also be held by the SSO to ensure that all workers are prepared for and knowledgeable of that day's scope of work. Safety concerns will also be discussed at these meetings. All AECOM and contractor field employees must be present and sign the attendance sheet.

Any JSAs that were prepared due to a change in work procedure and/or the identification of a new hazard will be discussed during the daily safety meetings.

11.0 Emergency response

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance". According to AECOM policy, AECOM personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). AECOM response actions will be limited to evacuation and medical/first aid as described within this section below. As such this section is written to comply with the requirements of 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include:

- Employee training;
- Alarm systems;
- Escape routes;
- Escape procedures;
- Critical operations or equipment;
- Rescue and medical duty assignments;
- Designation of responsible parties;
- Emergency reporting procedures; and
- Methods to account for all employees after evacuation.

11.1 Employee training

Employees must be instructed in the site-specific aspects of emergency evacuation. Onsite refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

11.2 Alarm system/emergency signals

11.2.1 Immediate work area

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight can not be easily maintained amongst all AECOM personnel because of distance, terrain or other obstructions.

Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. The areas where the investigations are taking place are currently vacant. Therefore, AECOM will bring a portable phone to the site to ensure that communications with the NYSEG operating center and local emergency responders is maintained, when necessary.

11.3 Escape routes and procedures

The escape route from the parcels that comprise the Ithaca Court Street MGP site will consist of leaving the site via the public roadways. The escape routes and assembly areas will be reviewed during the pre-entry briefing. All personnel on site are responsible for knowing the escape route from the site and where to assemble after evacuation. In case of an emergency, all personnel will be directed to meet at the gate of the OU1 site.

11.4 Rescue and medical duty assignments

The phone numbers of the police and fire departments, ambulance service, local hospital, and AECOM representatives are provided in the emergency reference sheet provided at the end of this section. This sheet will be posted in the site vehicle.

In the event an injury or illness requires more than first aid treatment, the SSO will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the onsite project manager and the RHSM.

If the injured employee can be moved from the accident area, he or she will be brought to the CRZ where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done onsite. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.5 Designation of responsible parties

The SSO is responsible for initiating emergency response. In the event the SSO can not fulfill this duty, the alternate SSO will take charge.

11.6 Employee accounting method

The SSO is responsible for identifying all AECOM personnel onsite at all times. On small, short duration jobs this can be done informally as long as accurate accounting is possible.

11.6.1 Near Miss

A *Near Miss Incident* is defined as any undesired event that, under slightly different circumstances (e.g., timing, distance, chance, etc.) could have resulted in personal harm, property damage, an environmental release or any undesired loss of resources. In other words, a *Near Miss Incident* is a situation in which an accident almost occurred. The purpose of reporting, and following up on, Near Miss Incidents is the same as that for incidents that result in injuries, illnesses, property damage or environmental releases: to prevent their reoccurrence. By reporting and following up on Near Miss Incidents, thereby theoretically reducing their frequency, corporations can reduce the frequency of more serious accidents and incidents. All Near Miss Incidents be reported as soon as possible after their occurrence using the process described below.

11.6.2 HSE observation

Situations in which a hazard is identified and corrected before an incident occurs do not necessarily meet the definition of a *Near Miss Incident* and are referred to as *HSE (Health Safety and Environmental) Observations*. Reporting and following up on *HSE Observations* can also provide opportunities for learning and improvement in the same manner as reporting and following up on *Near Miss Incidents*. Therefore, all HSE observations will also be reported.

To facilitate reporting during this project, Near Miss and HSE Observation report pads have been created. Pads will be handed out to field staff during the project kick-off meeting. All reports will be submitted to the PM and RHSM for review and discussion during the follow day's safety meeting.

11.7 Accident reporting and investigation

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An AECOM accident investigation form is presented in Attachment D of this HASP. The injured AECOM employee's supervisor and the RHSM should be notified immediately of the injury.

If a subcontractor employee is injured, they are required to notify the AECOM SSO. Once the incident is under control, the subcontractor will submit a copy of their company's accident investigation report to the AECOM SSO.

Emergency Reference Sheet

EMERGENCY REFERENCES

Ambulance:	911
Fire:	911
Police:	911
NYSDEC Spill Hotline	800-457-7362
Medical Services:	**(607) 274-4321**
	Cayuga Medical Center
	101 Dates Drive – Ithaca, NY

START	1:	Start South on N. PLAIN ST.	440 ft
	2:	Turn RIGHT onto BUFFALO ST.	0.6 mi
	3:	Continue on CLIFF ST./NY-96	2.2 mi
	4:	Turn RIGHT on DATES DR.	259 ft
	5:	Turn LEFT to stay on DATES DR.	0.4 mi
	6:	Slight RIGHT on DATES DR.	0.3 mi
END	10:	End at 101 Dates Drive Ithaca, NY 14850	

Estimated Time: 9 minutes

Estimated Distance: 3.7 miles

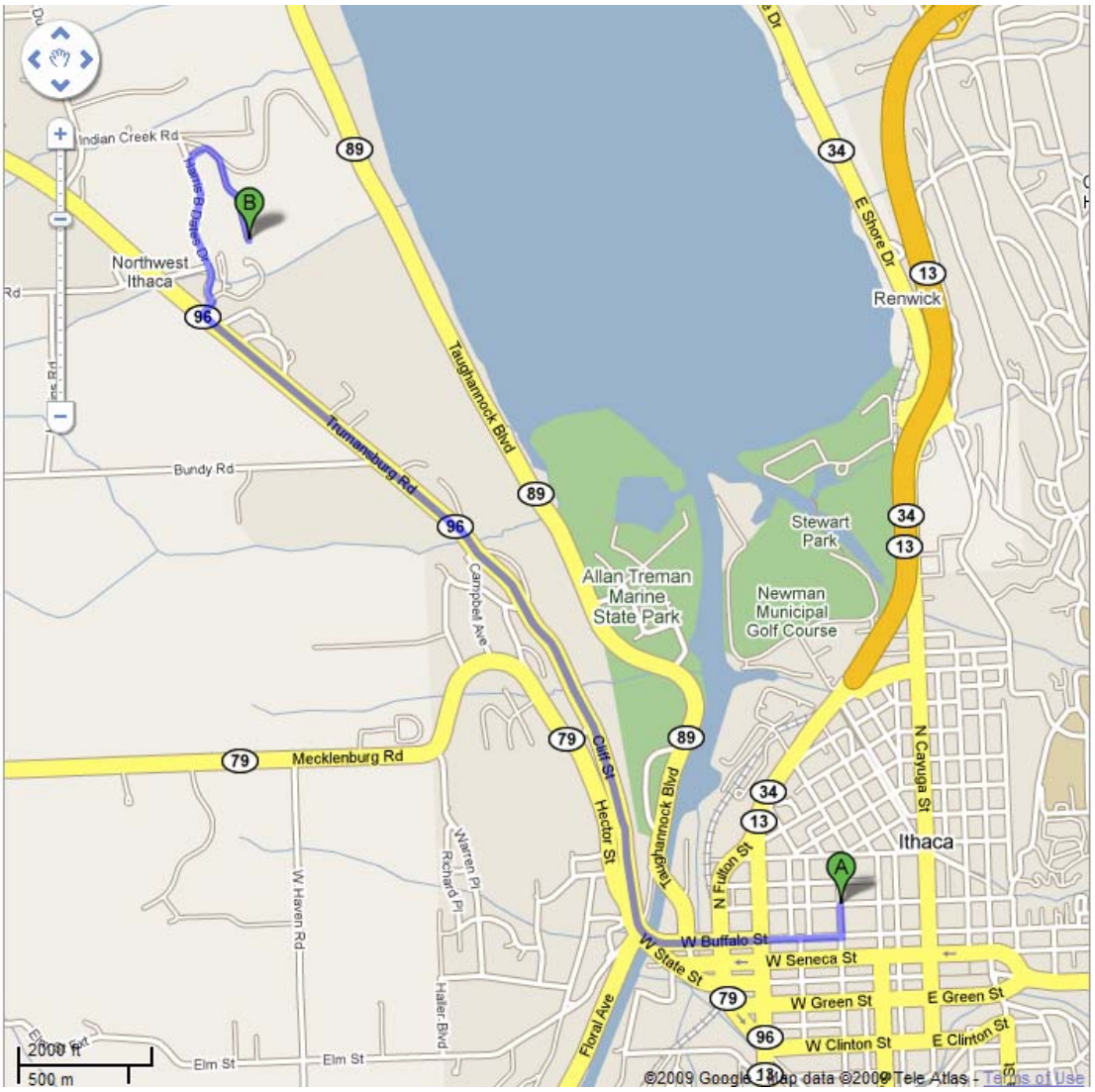
On Site Telephone:	Property is unoccupied. Bring portable communications.
Underground Utility Location Service:	800-962-7962

AECOM Project Representatives:

AECOM/Ithaca, NY -Michael Grasso (RHSM)	607-277-5716
AECOM/Ithaca, NY -Keith Stahle (PM)	607-277-5716
AECOM/Rocky Hill, CT	

-Lucas Hellerich (Consultant) 860-263-5800

Map and Directions from Site to Cayuga Medical Center
101 Dates Drive – Ithaca



Attachment A

Health and Safety Plan Receipt and Acceptance Form

Health and Safety Plan Receipt and Acceptance Form

Remedial Investigation

Ithaca Court Street Former Manufactured Gas Plant Site

Ithaca, New York

I have received a copy of the Health and Safety Plan prepared for the above referenced site, I have read and understand its content and I agree that I will abide by its requirements.

Name	Signature	Company	Date

Attachment B

Job Safety Analysis Form

Job Safety Analysis

JSA Type: ☐ Investigation ☐ O&M ☐Office ☐ Construction ☐ Other	☐ New ☐ Revised	**Date**:
Work Activity:		
Personal Protective Equipment (PPE):		

Development Team	Position/Title	Reviewed By	Position/Title	Date

❶ Job Steps[1]	❷ Potential Hazards[2]	❸ Critical Actions[3]	STOP Stop Work Criteria
		•	•
		•	•
		•	•
		•	•
		•	•
		•	•
		•	•
		•	•

JSA Type: ☐ Investigation ☐ O&M ☐Office ☐ Construction ☐ Other	☐ New ☐ Revised	**Date**:
Work Activity:		
Personal Protective Equipment (PPE):		

Development Team	Position/Title	Reviewed By	Position/Title	Date

❶ Job Steps[1]	❷ Potential Hazards[2]	❸ Critical Actions[3]	STOP Stop Work Criteria
		•	•
		•	•
		•	•
		•	•

1 – Target number of job steps: six to ten

2 – Codes for Potential Hazards:

Caught Between (CBT)	Contacted By (CB)	Caught On (CO)	Fall To Below (FB)	Overexertion (O)	Struck Against (SA)
Caught In (CI)	Contact With (CW)	Exposure (E)	Fall - Same Level (FS)	Release To (R)	Struck By (SB)

3 – Types of Critical Actions: Elimination, Engineering Controls, Safe Work Practice / SOP, Administrative Controls, and/or PPE.

4 – Stop Work Trigger: Condition or situation that would require work to be stopped and hazards re-assessed.

Attachment C

Health and Safety Plan Pre-Entry Briefing Attendance Form

Health and Safety Plan Pre-Entry Briefing Attendance Form

Remedial Investigation

Ithaca Court Street Former Manufactured Gas Plant Site

Ithaca, New York

Conducted by:		**Date Performed:**	
Topics Discussed:	1. Review of the content of the HASP (Required)		
	2.		
	3.		
	4.		

Printed Name	Signature	Representing

Attachment D

Supervisor's Report of Incident Form

AECOM

Supervisor's Report of Incident

1. Seek immediate medical attention if necessary.
2. Employee must report **all** incidents to their supervisor **immediately**.
3. Supervisor calls the Incident, Injury and Near Miss Reporting Line at **(800) 348-5046**.

Region: ☐West ☐ Midwest ☐ Southwest/Mountain ☐ Southeast ☐ Mid-Atlantic ☐ Northeast	District:	Section/Dept Number:
Business Line: ☐ Infrastructure-Water ☐ Infrastructure-Transportation ☐ Infrastructure-Energy & Power ☐ PDD-Facilities ☐ PDD-Design ☐ Environmental		Office Name:
Client Name:		Project Number:
Project Name:		

Section 1 - Organization Information

☐ Injury/ illness (Sections 3, 4, and 7)	☐ Vehicle Incident (Sections 3, 4, 5, and 7)	☐ Property Damage (Sections 3, 4, 6 and 7)	☐Environmental Spill/Release (Sections 3, 4, and 7)
☐ Regulatory Inspection or Notification: (Sections 3, 4,7)			☐ Other (describe)

Section 2 - Type of Incident (SRI Sections to be Completed)

Employee/Claimant Name:		Employee Job Title:	☐ Full-Time Employee ☐ Subcontractor/Subconsultant ☐ Temp Agency Employee ☐ Part-Time Employee ☐ Third Party Employee
Work Phone:	Cell Phone:	Home Phone:	Employee Number:
Date/Time of Incident:		Date/Time Reported to Supervisor:	
Street Address of Incident or approximately:		City:	State/Zip:
Body Part Injured:		Type of Treatment: Medical/hospital or doctor ☐ First Aid Only ☐	
Medical Facility Contact Info: (Name, Address, Phone)			

Section 3 – Contact/Incident Information

Employee Description of Incident: *(use additional paper if necessary)*	
Employee Signature:	**Date and Time:**

Supervisor Description of Incident: (*Supervisor signs in Section 7*) (*use additional paper if necessary*)

Witness Name :	Witness Address:	Witness Phone No.:
Witness Description of the Incident: (*use additional paper if necessary*)		
Witness Signature:		***Date and time:***

Section 4 - Descriptions of Incident *(employee, supervisor and witness statements)*

5a - AECOM Driver Name:		Drivers License #:	State Issued:	Expiration Date:	
Vehicle Year:	Make:	Model:	Color:	License Plate:	State:
VIN Number:					
AECOM Vehicle was: ☐ AECOM Owned ☐ Rented ☐ Leased ☐ Personal Vehicle		**Who was involved?** ☐ AECOM Vehicle *(Section 5a)* ☐ Another Vehicle *(Section 5b)* ☐ Pedestrian ☐ Property			
Use of Vehicle at Time of Incident: ☐ Office Visit ☐ Site Visit ☐ Client Meetings ☐ Field Work ☐ Personal ☐ Other_____			Vehicle Type: ☐ Commercial Motor Vehicle ☐ Non Commercial Motor Vehicle		
5b - Name of Other Driver:		Address:	City:	State/Zip:	
Work Phone:		Cell Phone:			
Date of Birth:	Drivers License #:	State Issued:	Expiration Date:		
Vehicle Year:	Make:	Model:	Color:	License Plate:	State:
VIN Number, Insurance Company Name, Insurance Policy Number:					

Section 5 - Vehicle Incident Information *(fill out for motor vehicle incidents only)*

If *Vehicle Owner* is different from driver then complete owner's contact information	**Owner Name:**	
	Address, City, State, Zip:	
	Work Phone:	Cell Phone:
Authorities contacted? ☐ Yes ☐ No	If so, who responded?	
Citations Issued? ☐ Yes ☐ No	Type of Citation:	Person Cited:

Section 6 - General Liability (*Fill out for property damage only*)

Description of damaged property:	
Where can the property be seen?	
Property Owner Name:	
Address, City, State, Zip:	
Work Phone:	Cell Phone:

Section 7- Signatures

Supervisor

Print Name:	Signature:	Date:	Telephone:

Office/Location Manager

Print Name:	Signature:	Date:	Telephone:

Regional SH&E Manager

Print Name:	Signature:	Date:	Telephone:
Comments:			