

**FIELD ACTIVITIES PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
IRVINGTON RUGS AND CLEANERS
SITE NO. 360175**

WORK ASSIGNMENT NO. D009809-28

Prepared for:

**New York State Department of Environmental Conservation
Albany, New York**

Prepared by:

**MACTEC Engineering and Geology, P.C.
Portland, Maine**

MACTEC: No. 3616216144

March 2022

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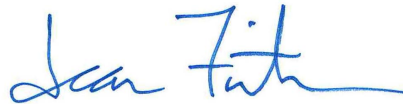
March 2022

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
CSM	Conceptual Site Model
DUSR	Data Usability Summary Report
EWMI	Environmental Waste Minimization, Inc.
°F	degrees Fahrenheit
FAP	Field Activities Plan
FS	Feasibility Study
ft	feet
HASP	Health and Safety Plan
IDW	investigation derived wastes
IRM	Interim Remedial Measure
MACTEC	MACTEC Engineering and Geology, P.C.
µg/L	microgram(s) per Liter
µg/m ³	microgram(s) per cubic meter
mg/Kg	milligram(s) per kilogram
msl	mean sea level
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
QAPP	Quality Assurance Program Plan
RI	Remedial Investigation
SC	Site Characterization
SCO	Soil Cleanup Objective
Site	Irvington Rugs and Cleaners
SOP	Standard Operating Procedure

GLOSSARY OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

SVI	soil vapor intrusion
SVOC	semivolatile organic compound
TCE	trichloroethene
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WA	Work Assignment

1.0 INTRODUCTION

This Field Activities Plan (FAP) has been prepared by MACTEC Engineering and Geology, P.C. (MACTEC) in response to Work Assignment (WA) No. D009809-28 dated March 16, 2021 from the New York State Department of Environmental Conservation (NYSDEC) for the Irvington Rugs and Cleaners Site (Site) in the Town of Greenburgh, New York (Figure 1.1) (NYSDEC, 2021) and in accordance with the July 2020 Superfund Standby Contract between MACTEC and the NYSDEC.

The Site (Site No. 360175) is currently listed as a Class 2 site (i.e., poses a significant threat to the public health or environment) by the NYSDEC. No. D009809-28 was issued to conduct a Remedial Investigation (RI) and Feasibility Study (FS) for the Site.

The classification of the Site stems from the results of the 2020 Site Characterization conducted at the Site by MACTEC (conducted on behalf of the NYSDEC), as well as investigations conducted by the Site owner. This FAP presents a technical scope of work for the RI activities and data collection necessary to prepare the RI and FS Reports.

This FAP is organized into five sections as follows:

- *Section 1.0* – Introduction.
- *Section 2.0* –Site Physical Setting – Describes the physical and geologic and hydrogeologic setting of the Site.
- *Section 3.0* – Conceptual Site Model (CSM) – Presents a working conceptual model to describe how contaminants may have been released into the environment, how they might migrate and who they might affect.
- *Section 4.0* – Scope of Work - Describes the sampling and analysis that will be performed to assess contaminant distribution in groundwater, soil vapor, ambient air indoor air, sub-slab soil vapor and soil.
- *Section 5.0* –References.

1.1 WORK ASSIGNMENT OBJECTIVES

Based on the WA Issuance and discussions with the NYSDEC Project Manager, the objectives of the RI/FS are to:

- map the extent of overburden groundwater contamination above New York State (NYS) Class GA groundwater standards (NYS, 1999);
- evaluate the potential for site-related contaminants to migrate via soil vapor intrusion (SVI) into nearby properties;
- evaluate the need for soil and/or soil vapor interim remedial measure(s) (IRMs); and
- prepare and submit RI and FS Reports for the Site.

1.2 SITE BACKGROUND

The Site background is discussed in the following sub-sections. Background information was primarily based on reports from previous investigations (see Section 1.2.3).

1.2.1 Site Description

The Site is located at 53 Main Street, in the Village of Irvington, Town of Greenburgh, Westchester County, New York (Tax Map and Lot: 2.50-20-11). The Site property consists of approximately 0.06 acres in the historic downtown district.

The property is covered mostly by a two-story building that shares walls with buildings on properties to the east and west of the Site. The southern three quarters of the Site building has a full basement, and the northern one quarter is slab on grade. The area of the Site to the rear (north) of the Site building is paved. The paved portion of the property is accessed from a driveway located on the property to the west.

The site is surrounded by mixed use commercial and residential properties and the surrounding area is serviced by public water and sewer.

1.2.2 Site History

It is not known when the Site was first developed, but the Village of Irvington historic downtown street layout was designed in the 1850s (Irvington Historical Society, 2018). Various buildings were present on the property in the early 1900's, and the southern portion of the current Site building may have been constructed as early as 1905 (Ecosystems Strategies, Inc. [ESI], 2005). It is not known when the Site was first used for dry cleaning services. However, the previous owner of the property, and founder of the Irvington Rugs and Cleaners business, purchased the property in

1965 (according to the Town of Greensburgh property card) and it is assumed dry cleaning services began around this time. The previous owner reportedly stopped active dry cleaning at the property in approximately 1990 (the site was a drop off location only from 1990 until the property sold in 2006); however, an unknown quantity of tetrachloroethene (PCE) was removed from the property around September 2005 (ESI, 2005). The current owner, who purchased the property in 2006, stated that they installed a second-generation hydrocarbon dry cleaning machine that used “Easy Clean” as a solvent. The property continues to operate as a dry-cleaning facility.

1.2.3 Previous Investigations

Several investigations have been conducted at or adjacent to the Site, as described below.

In preparation for the sale of the property in 2006, Phase I and II Environmental Site Assessment activities were performed on the Site by ESI (ESI, 2005 and ESI, 2006a). The assessments identified concentrations of PCE and other halogenated volatile organic compounds (VOCs) in soil, groundwater and soil vapor samples collected beneath the Site’s building foundation and parking area. The assessment concluded that the soils beneath the site parking area were impacted by PCE at concentrations greater than guidance values (maximum concentration of 3.3 milligrams per kilogram [mg/kg] compared to the guidance value at the time [Technical Administration Guidance Memorandum 4043] of 1.3 mg/kg). PCE (600 micrograms per liter [µg/L]) and its breakdown products trichloroethene (TCE) (440 µg/L) and cis-1,2-dichloroethene (cis-1,2-DCE) (1,200 µg/L) were also detected in groundwater at concentrations above NYS standards (5 µg/L for each PCE, TCE and cis-1,2-DCE). PCE was detected in soil vapor collected beneath the Site parking lot and below the slab on grade portion of the Site building at concentrations of 53,800 micrograms per cubic meter (µg/m³), and 1,450 µg/m³, respectively.

Based on these investigations, soil was excavated in April 2006 from the Site parking lot in an area approximately 21 feet (ft) long, 12 ft wide, and 5 ft deep and shipped to a licensed disposal facility. Results of five confirmation soil samples collected were below the current regulatory standards for PCE for the protection of groundwater of 1.3 mg/kg (ESI, 2006b). One groundwater sample was also collected in the vicinity of the excavation in May 2006 and analyzed for VOCs; PCE was the only compound detected; concentration of 28 µg/L (ESI, 2006c).

In 2015 Enviro-Sciences of Delaware, Inc. (Enviro-Sciences) collected two near slab soil vapor and two groundwater samples from 49 Main Street, located adjacent to the site to the west, which were analyzed for VOCs. PCE was detected in the soil vapor samples at a maximum concentration of 1,410 $\mu\text{g}/\text{m}^3$, and in the groundwater samples at a maximum concentration of 160 $\mu\text{g}/\text{L}$ (Enviro-Sciences, 2015). In 2016, 10 indoor air samples, one roof air sample, and one ambient (background) air sample from within 49 Main Street were collected and analyzed. The maximum indoor air concentration detected for PCE was 60.1 $\mu\text{g}/\text{m}^3$ in the basement. Indoor air samples were re-collected in February 2018, with a maximum indoor air concentration for PCE of 15.2 $\mu\text{g}/\text{m}^3$ in Apartment 6, located on the third floor (Enviro-Sciences, 2018).

MACTEC, under contract to the NYSDEC completed a Site Characterization (SC) in 2020 (MACTEC, 2020a). The SC investigation consisted of soil, groundwater, soil vapor, pore water, and surface water sampling. Select Figures and Tables from the SC report are included in Appendix A.

The SC investigation did not identify a soil source at the site. PCE and its breakdown products were not detected in the soil samples collected, with the exception of one detection below SCOs in a sample collected beneath the basement floor of the Site. Although limited soil sampling was conducted for this SC, based on these and previous soil sample results, it was concluded that the soil removal action in the rear of the dry cleaner was sufficient to remediate soils in this area to meet the SCOs for unrestricted use.

The SC identified two separate areas that exceeded the NYS groundwater standards. PCE (21.9 $\mu\text{g}/\text{L}$), TCE (6.4 $\mu\text{g}/\text{L}$), and cis-1,2-DCE (6.2 $\mu\text{g}/\text{L}$) were detected in groundwater at one location, collected from beneath the parking area which was likely the result of the previously identified spills. VOC concentrations decreased to the southwest of this location.

The second area was beneath the buildings at the Site and 49 Main Street. PCE was detected in samples from the sump within the Site building and groundwater from beneath the basement slab at 49 Main Street at concentrations exceeding the GA standard. The highest concentration of PCE was detected in the Site's basement sump (154 $\mu\text{g}/\text{L}$), which is interpreted to be groundwater. The concentrations exceeding standards extends west under the adjacent structure at 49 Main Street.

In addition to PCE and its breakdown products, per- and polyfluoroalkyl substances (PFAS) were detected in groundwater at the Site at concentrations above the NYS standards for PFAS.

The highest detection of PCE in water (425 µg/L) was in a sample collected from an apparent vertical floor drainpipe located at the bottom of a floor drain/sump in the basement of 49 Main Street. Although it is likely that this contamination originated at the Site, the source of PCE was not identified and there did not appear to be any pipes leading into this floor drain/sump. Concentrations of PCE within this pipe were at least an order of magnitude higher than the nearby groundwater sample concentrations.

The SC also identified PCE in the indoor air in both buildings at concentrations greater than the New York State Department of Environmental Health (NYSDOH) guidance value of 30 µg/m³. Although a source of contamination was not identified, the highest air concentrations were detected in a sample collected from within a flux-chamber placed over the floor drain/sump located in 49 Main Street.

2.0 SITE PHYSICAL SETTING

The sections below describe the topography, climate, surface water and groundwater hydrology, and geology in the area surrounding the Site.

2.1 TOPOGRAPHY

The Site is generally flat and is located at an elevation of approximately 90 ft above msl. The topography of the surrounding area slopes down to the west towards the Hudson River which is located approximately 1,300 ft from the Site at an elevation near sea level (United States Geological Survey, 1979).

2.2 CLIMATE

The climate of the area is characterized by moderately warm summers and cold winters. Mean monthly temperatures range from 30.3 degrees Fahrenheit (°F) in January to 74.1°F in July. Average annual precipitation is 51.98 inches. Average annual snowfall is 31 inches per year (National Climatic Data Center, 2010).

2.3 SURFACE WATER HYDROLOGY

The Site is covered by impervious surfaces including the Site building (which occupies the majority of the property) and paved driveways/parking areas. Precipitation is anticipated to flow to nearby streets and into storm water drains which flow west to the Hudson River. Roof drains are also assumed to be connected to the storm water drains.

2.4 GROUNDWATER HYDROLOGY

Groundwater beneath the site and immediate surrounding area is encountered from approximately three to ten ft bgs. Groundwater measurements indicate that groundwater flows west towards the Hudson River. (Interpreted groundwater contours and flow direction are presented on Figure 3.1 in Appendix A).

2.5 GEOLOGY

Field investigations at the Site suggest that overburden in the area is an unconsolidated till which primarily consists of brown sands and silts. United States Department of Agriculture (USDA) Natural Resources Conservation Services Soil Survey identifies the shallow soil at the Site as Urban land-Charlton complex (8 to 15 percent [%]) that is very deep, well-drained soil (USDA, 1994). The native overburden in the area (below the fill) consists of glacial till deposits overlaying the bedrock (Cadwell, 1989). During the investigation bedrock was not encountered (borings were completed to a maximum depth of seventeen ft below grade).

Bedrock below the Site is mapped as Early Cambrian to Late Ordovician Inwood Marble (Fisher et al., 1970). Inwood Marble is characteristically a dolomite marble, calc-schist, granulite and quartzite overlain by calcite marble (Fisher et al., 1970).

3.0 CONCEPTUAL SITE MODEL

The CSM is based on the review of historical data, data collected during the SC, and observations made during the course of the field activities. The CSM is based on information that is currently available and is considered to be a dynamic model taking into consideration sources of contamination, potential receptors, exposure pathways, and exposure points. This CSM is intended to be modified as more data become available and to be referenced while collecting and/or analyzing data in the future. The CSM should be modified when information gleaned from field and/or laboratory data demonstrates the need for its modification.

3.1 CONTAMINANTS OF CONCERN

The SC investigation identified concentrations of VOCs, primarily PCE, in soil, groundwater, soil vapor, and indoor air at concentrations above the applicable standards, criteria, and guidance values. The emerging contaminants PFAS were also identified in groundwater at concentrations above their state standard.

3.2 POTENTIAL CONTAMINANT SOURCE AREAS/POINTS OF ENTRY/MIGRATION PATHS

PCE was previously used at the Site as a dry cleaning solvent. Reported spills of PCE occurred in the previously unpaved parking area to the rear of the Site building. Soil contamination in this area was excavated to meet unrestricted use SCOs, however, contaminants appear to have migrated with infiltrating rainwater to groundwater in this area of the Site. Additionally, based on concentrations identified in the water collected from the basement sump at the Site, it is likely that spills occurred at locations inside the building and migrated to groundwater. Groundwater flows to the west, and PCE was detected in groundwater below the building west of the Site (49 Main Street) at concentrations above NYS groundwater standards.

VOCs in building material, soil, and groundwater can partition to soil vapor and migrate into the indoor air with soil vapor intrusion. PCE was detected within the indoor air at the Site and at 49 Main Street at concentrations above the NYSDOH guidance values for PCE. Screening for PCE was conducted within and below the Site and 49 Main Street using a portable gas chromatograph/mass

spectrometer. Based on this screening, an interior source of PCE contamination (e.g., building material, products, carpets) was not identified, and the source of the PCE in the indoor air appears to be the result of vapor intrusion from sub-slab sources below both the Site and 49 Main Street. Although the primary source appears to be contaminated groundwater, the floor drain/sump on the western wall of 49 Main Street also appears to be a source of indoor air contamination.

4.0 SCOPE OF WORK

This FAP has been developed for the purpose of addressing WA objectives (Section 1.1) and data collected will be used to prepare an RI Report and subsequent FS Report. If deemed necessary, the data will be used to evaluate the need for conducting and implementing an IRM to remediate potential SVI to nearby properties. The components of the scope of work include:

- Geophysical survey to clear borings for utilities, as well as to evaluate potential sub-slab piping at 49 Main Street.
- Installation of temporary microwells to evaluate groundwater flow direction.
- Collection of groundwater samples from existing and temporary wells to evaluate extent of potential groundwater contamination.
- Collection of sump water samples to evaluate concentrations of contaminants in basement water.
- Collection of exterior, off-site soil vapor samples to evaluate the potential for vapor migration of site related contaminants.
- Completion of a horizontal and elevation survey of the temporary microwells.
- Removal of contaminated sediment and water from the dry sump and depression within the basement of 49 Main Street.
- Collection of soils samples from below the dry sump and slab of 49 Main Street to evaluate for potential soil contamination of site related contaminants.
- Collection of soil vapor and indoor air samples at up to five properties, based on exterior soil and groundwater results.

A summary of these field tasks and methodologies are described in more detail in Table 4.1, as well as in the following subsections.

4.1 GENERAL FIELD OPERATIONS

Companion documents to this FAP that will govern the execution of the field exploration activities include MACTEC's Program Quality Assurance Program Plan (QAPP) (MACTEC, 2020b) and Health and Safety Plan (HASP) (MACTEC, 2020c). In addition to these program documents, Appendix B provides the Site-specific HASP. The following Standard Operating Procedures (SOPs), which are found in the QAPP, will be followed during the field work:

1. S2- Water Level Measurement

2. S3- Low Flow Groundwater Sampling
3. S6- PFAS Protocols
4. S8- Chain of Custody Procedures
5. S13- Soil Sampling
6. S14- Field Preservation of Volatile Organic Analytes and Gasoline Range Organics Soil Samples
7. S16- Drill Oversight
8. S17- Direct Push Sampling
9. S20- Heavy Equipment Decontamination
10. S21- Field Equipment Decontamination
11. S22- Monitoring Well-Microwell Installation
12. S23- Monitoring Well Development
13. S25- Soil Vapor Ambient Air Sampling

Field data records to be completed for each task are included in the SOPs listed above.

Subcontractors chosen to support the field activities include:

- Aztech Technologies (standby direct push) from Ballston Spa, New York.
- Lawson Surveying and Mapping (site survey) from Oneonta, New York.
- Utility Survey, Inc./Blood Hound (utility clearance).
- Environmental Waste Minimization, Inc. (EWMI) (transportation and disposal of investigation derived waste [IDW]).
- Pace Analytical/Contest (Laboratory analysis provided under direct contract to the NYSDEC).

4.1.1 Health and Safety

The Site-specific HASP is provided as Appendix B to this document. Based on available Site information, MACTEC anticipates that the fieldwork will be conducted in Level D personal protection equipment. Specific investigation activities, utility clearance procedures, and required level of personal protection are set forth in the Site-specific HASP. Criteria for upgrading or downgrading the specified level of protection are also provided in the Site-specific HASP. Additional health and safety requirements are set forth in the Program HASP (MACTEC, 2020c). Should Site conditions pose a threat to those present on-Site, and/or should Site conditions warrant an upgrade from Level D, as

defined by the HASP, work will stop and the situation will be reevaluated by the NYSDEC and MACTEC.

4.1.2 Laboratory Analysis

Laboratory analysis will be provided under direct contract to the NYSDEC with Environmental Laboratory Approval Program-Certified Pace Analytical. Samples submitted to the laboratory will be analyzed using the methods outlined below. The laboratory will provide NYSDEC Category B deliverables.

For soil samples, the following methods will be used:

- VOCs by United States Environmental Protection Agency (USEPA) Method 8260

For ground water samples, the following methods will be used:

- VOCs by USEPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270
- pesticides by USEPA Methods 8081
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082
- Metals (target analyte list plus mercury) by USEPA Methods 6010/7470/7471
- PFAS by Modified USEPA Method 537

For Soil Vapor and Indoor Air samples, the following methods will be used:

- VOCs by USEPA Method TO-15

4.1.3 Mobilization

Mobilization will include obtaining utility clearances for proposed locations, procurement of subcontractors, and the acquisition and coordination of supplies. The NYSDEC will be responsible for obtaining access to the site as well as off-Site locations and MACTEC will obtain road opening permits from the Village of Irvington.

4.1.4 Access and Clearance

New exploration locations will be placed primarily within the public right-of-ways. MACTEC will acquire a road opening permit from the Village of Irvington. For private property locations, MACTEC will coordinate access with the NYSDEC and respective property owners. MACTEC will also mark proposed boring locations and perform utility clearance by contacting Dig Safely NY and a private Utility Clearance subcontractor. Utility clearance will be completed by Utility Survey, Inc./Blood Hound (a private utility clearance subcontractor) at boring locations in the public right-of-way and will mark/clear a 10-ft radius at each location. Blood Hound will also evaluate potential sub-slab piping at 49 Main Street and the potential path of the pipe identified within the sump to assess whether it connects to the municipal sewer system.

Once appropriate utility clearances have been obtained, the drilling subcontractors to clear the exterior microwell locations for utilities by soft-digging the locations to approximately five ft bgs using an air knife to loosen soil for removal by vacuum or hand.

4.1.5 Decontamination

Sampling methods and equipment for this field program have been chosen to minimize decontamination requirements mitigating potential for cross contamination. Disposable sampling equipment will be used as much as practical to minimize decontamination time and water disposal. Non-disposable sampling equipment will be decontaminated before and after the collection of each sample. Refer to SOP S20 and S21 in the QAPP for decontamination procedures.

Non disposable sampling equipment will be decontaminated by 1) washing the sample collection equipment with potable water and Alquinox, rinsing with potable water, rinsing with deionized water, and then allowing the equipment to air dry, or 2) steam cleaning the equipment and then allowing the equipment to air dry. Drilling equipment will be decontaminated by steam cleaning with potable water prior to each boring, and before leaving the Site. Drilling equipment (i.e. drill rods and casing) will be decontaminated on a temporary decontamination pad constructed at the Site. Decontamination fluid will be containerized for off-site disposal at a licensed facility.

4.1.6 Investigation Derived Wastes

The method of disposing of Investigation Derived Waste generated during this RI will be based upon whether the wastes are considered hazardous or non-hazardous. Used disposable equipment and protective clothing will be double-bagged in polyethylene trash bags and disposed of as non-hazardous refuse. Transport and disposal of these containers will be completed by EWMI and arranged by MACTEC on behalf of NYSDEC. It is anticipated that the removal of an estimated 2 drums of soil and 2 drums of water will be required. IDW will be generated from the borings, groundwater sampling, and basement cleaning and is assumed to be F-listed hazardous waste. United States Department of Transportation approved 55-gallon containers filled during the field investigation will be labelled as “pending analysis” and staged on-site in an area designated by the NYSDEC.

4.2 SITE INVESTIGATION ACTIVITIES

The fieldwork is anticipated to be conducted as described in the following subsections. The fieldwork will be conducted in accordance with the specifications presented in the QAPP (MACTEC, 2020b). Previous water sample results and proposed sample locations for the exterior samples are shown on Figure 4.1. The general laboratory analysis are listed in the sub-sections below, with the sample identifications and laboratory methods described in Tables 4.1 and 4.2.

Field work will also be implemented considering green investigation/remediation principles. This includes minimizing vehicle idling time, using direct push technologies to minimize waste, and minimizing trips to the Site.

4.2.1 Direct Push Microwell Installation and Sampling

To better evaluate groundwater contaminant concentrations and distribution in overburden groundwater, as well as groundwater flow direction downgradient from the Site, up to 10 temporary microwells will be installed at depths up to 20 ft bgs using direct push technology. Proposed microwell locations are shown on Figure 4.1. The microwells will be used for water level measurements and sampling locations. In general, microwells will be constructed with schedule 40 polyvinyl chloride, with 10 foot lengths of 0.01-inch machine slotted well screens. The microwell screens will be set with

approximately two ft of screen above the water table to determine water table elevations and create a potentiometric map. Microwells will be set with the bottom of the well screens set at approximately 20 ft (actual depth will depend on groundwater elevation). Refer to SOP S22 in the QAPP for microwell installation procedures. Once installed, the microwells will be sampled at a low flow rate (e.g., 150 ml/min) using the grab sample techniques. Although newly installed microwells are considered fresh groundwater, one well volume will be purged prior to collecting the sample, if possible (approximately 0.04 gallons per foot in a 1-inch microwell). One round of field parameters will be collected prior to sample collection. Groundwater samples will be analyzed for VOCs (EPA Method 8260) and PFAS (Modified EPA Method 537).

4.2.2 Water Level Measurements

A synoptic round of water levels will be measured from existing monitoring wells and temporary microwells to evaluate groundwater flow direction following SOP S2 in the QAPP.

4.2.3 Groundwater Sampling

Groundwater samples will be collected from the three existing monitoring well/microwell locations using low-flow sampling procedures following SOP S3, as well as the procedures for PFAS following SOP S6.

Field measurements for pH, temperature, specific conductivity, oxidation reduction potential, DO, and turbidity will be collected at each monitoring well during pre-sample purging to evaluate well stabilization, as well as to provide information for evaluating geochemical parameters. Field measurements and monitoring well sampling activities will be documented using a Low Flow Groundwater Data Record.

Purge water will be containerized and stored on-Site for disposal at a licensed facility.

Groundwater samples from permanent monitoring wells will be analyzed for VOCs (EPA Method 8260) SVOCs (EPA Method 8270), pesticides (EPA Method 8081), PCBs (EPA Method 8082), metals (target analyte list plus mercury) (EPA Method 6010/7470/7471), and PFAS (Modified EPA Method 537).

4.2.4 Exterior Soil Vapor Sampling

Ten temporary soil vapor sample points will be installed to 5 ft bgs and co-located within five ft of the temporary microwells. Refer to SOP S25 in the QAPP for general sampling procedures. SOP S25 will be modified by using push point samplers instead of direct push vapor implants. The ¼-inch outside diameter push points with 1-inch screens will be pushed to depths of four to five feet bgs and sealed at the surface with hydrated bentonite or modeling clay. Helium leak testing will be completed along with collecting soil vapor samples for VOC (EPA Method TO-15) analysis by the callout laboratory. A GPS survey of the soil vapor sample locations will be completed.

4.2.5 Site Survey

Upon completion of the installations of the temporary microwells, Lawson Surveying and Mapping will complete a survey of the microwells (based on timing in the field, some proposed locations may be surveyed prior to well installation, with field measurements collected for microwell riser stick up above ground surface to calculate riser elevation from surveyed ground elevation). Horizontal and vertical locations will be presented to MACTEC in excel format to be used with geographic information system software. Horizontal locations will be tied to the NYS Plane Coordinate System using North American Datum of 1983. Vertical elevations of groundwater wells will be tied to msl, using North American Vertical Datum of 1988, and measured to an accuracy of 0.01 foot. Horizontal well measurements will be to an accuracy of 0.1 foot.

4.2.6 Sump Water Sampling

Water samples will be collected from the basement sumps located at the Site and at 49 Main Street for analysis of VOCs. Samples will be collected by dipping the sample vials into the sump water until almost full and topping off the water using the vial caps.

4.2.7 Sampling and Remedial Measures at 49 Main Street

PCE contamination has been identified within the basement of 49 Main Street, both in a sediment trap/dry sump and in silt/water within a larger depression. To mitigate exposure to these contaminants and conduct additional evaluations, the activities described below will be conducted.

Previous sample results and drawings showing the basement configuration are included in Appendix A.

Utility Locate. Utility locate contractor Blood Hound will use geophysics and pipe locating techniques to evaluate the basement slab for potential sub-slab water/drain pipes, focusing on the dry sump to see if there were any pipes that historically discharged to this location. They will also attempt to trace the cast iron pipe within the dry sump to an exterior location.

Dry Sump Cleaning/Sampling. The approximate two-foot by two-foot brick dry sump located along the western wall of the basement was previously identified as containing PCE contamination. If water is present within the 4-inch diameter cast iron stand pipe, one water sample will be collected for analysis of VOCs (Method 8260). Once the sample has been collected, Aztech Technologies will vacuum and power wash sediment from the brick dry sump (max anticipated sediment of 0.5-inches). When the sump has been cleaned, Aztech will attempt to clear the apparently clogged cast iron pipe located within the dry sump utilizing pipe cleaning (e.g., pipe snake) and vacuum technology. If possible, Aztech will also attempt to video the line once clear to evaluate its integrity and also evaluate its potential discharge location (e.g., sanitary sewer, dry well). Removed material will be containerized for off-site disposal.

In addition to cleaning the sump, Aztech will core a hole in the bottom of the sump for the collection of soil samples using hand tools. One soil sample will be collected from the soil immediately below the brick bottom, and a second sample will be collected approximately two ft below the brick bottom. Samples will be scanned with a photoionization detector (PID) and submitted for analysis of VOCs (Method 8260) to assess the presence/absence of VOC contamination. The hole will be backfilled with clean sand and the surface sealed with hydraulic cement upon completion of sampling.

Sub-Slab Sampling. To evaluate soil below the basement slab outside of the sump, up to two locations in the concrete floor will be cored and a soil sample collected below the slab. If piping is identified during the utility locate that leads towards the dry sump, samples will be collected from below this pipe, if possible. If piping is identified that appears to lead towards the Site, that piping will also be targeted for sampling. If elevated PID readings are identified in the soil and

groundwater is present, one groundwater sample may also be collected. Samples will be analyzed for VOCs (Method 8260).

Basement Depression Cleaning. An approximate six foot by eight foot depression was identified on the east side of the basement that occasionally fills with groundwater. Sediment in this depression was contaminated with PCE. Aztech will clean out the depression using vacuum and power washing techniques. If water is present in the depression, one water sample will be collected for VOC analysis (Method 8260) prior to cleaning. Collected material will be containerized for off-site disposal.

4.2.8 Indoor Air and Sub-Slab Soil Vapor Intrusion Sampling

Samples will be collected to evaluate if contaminants of concern from the Site are migrating off-Site in groundwater and creating a potential exposure pathway via vapor intrusion. Indoor air and sub-slab soil vapor samples will be collected from up to five NYSDOH selected properties. Samples will be obtained over an approximate 24-hour period (flow rate will be less than 0.2 liters per minute as required by NYSDOH and collected per the NYSDOH guidance (NYSDOH, 2006).

One sub-slab and one indoor air sample will be collected at each property, along with one ambient air background sample per 24-hour sample period following SOP-S25 in the QAPP. One duplicate sample will also be collected. Samples will be submitted for analysis of VOCs (EPA Method TO-15).

Soil vapor sampling activities will be documented using a Soil Vapor Sampling Record.

4.2.9 Interim Remedial Measure

IRMs are conducted to “prevent, mitigate, or remedy environmental damage or human exposure to contaminants while remedial alternatives are being considered” (NYSDEC, 2010). In addition to the dry sump and depression cleaning described above, a sub-slab depressurization system (SSDS) is planned for 49 Main Street to mitigate vapor intrusion of Site related contaminants. The SSDS will be designed and installed by a licensed radon installer with oversight by MACTEC. The design/installation will follow ASTM E2121 (Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings) and will be performance based to meet a sub-

slab vacuum of 0.004 inches water column. An SSDS installation report will be completed to document the installation.

Additional IRMs may be performed if the NYSDEC determines during the course of the RI that there is a risk to human health or the environment.

4.3 REPORTING

The following describes the report deliverables associated with the RI/FS.

4.3.1 Soil Vapor Intrusion Report

Upon completion of the sub-slab vapor and indoor air sampling, and receipt of the analytical data, MACTEC will prepare a stand alone soil vapor intrusion report. The report will include a figure showing sample locations, copies of the NYSDOH SVI questionnaires for each property sampled, including photographs, and a table of analytical results. A Data Usability Summary Report (DUSR) will be completed based on NYSDEC DER-10 guidance (NYSDEC, 2010) and will be included as an attachment to the report. Laboratory data sheets signed by the validator will also be included as an attachment to the report

4.3.2 Remedial Investigation Report

Upon completion of the field investigations and receipt of analytical data, MACTEC will prepare a draft and final Remedial Investigation Report to summarize the sampling activities, basement cleaning activities, and results.

The presentation of the soil, groundwater, exterior soil vapor, and SVI sampling activities and results will include discussion of the work performed, supporting field documents, tabulated data results, and figures. The tabulated soil data will include comparison to the six New York State Code of Rules and Regulations Part 375 soil cleanup objectives for residential and commercial use. The tabulated groundwater data will include comparison to the Class GA groundwater standards (New York State, 1999). Soil vapor and soil vapor/indoor air results will be reviewed in comparison to the NYSDOH soil vapor intrusion guidance (NYSDOH, 2006) and subsequent guidance values. The report will also include an updated conceptual site model and a conclusions and recommendations section following DER-10 guidance, including soil sample results from the SC.

A DUSR will be completed based on NYSDEC DER-10 guidance (NYSDEC, 2010) and will be included as an attachment to the report. Quality Control limits found in USEPA Region 2 validation guidelines in combination with the referenced analytical methods will be used during the data validation. Upon completion of the DUSR, an EQUIS Electronic Data Deliverable will be submitted.

The information provided in the Draft RI Report will be used to prepare a FS to evaluate remedial alternatives for the Site. MACTEC will address NYSDEC comments and submit a Draft Final RI Report to the NYSDEC and NYSDOH for final review. The Final RI Report will be combined with the Final FS Report and submitted as one document. One electronic copy of the Final RI/FS Report will be sent to the NYSDEC Project Manager, Central Office, Albany. Laboratory and location information will also be submitted in the NYSDEC EQUIS database format. Upon request, MACTEC will forward copies of the report to other state and county agencies.

4.3.3 Feasibility Study Report

Upon completion of the draft RI, a detailed analysis of remedial alternatives and remedy selection will be performed. Per direction of the NYSDEC PM, the FS will be limited to an evaluation of three alternatives, including a “No Action” evaluation and a “pre-release conditions” evaluation.

Components of the FS include:

- Defining Remedial Objectives
- Screening of Remedial Technologies
- Developing and Screening of Alternatives, including an evaluation of green remediation and consideration of DER-31.
- Performing a Detailed Costs Analysis

A draft FS will be submitted to the NYSDEC for review and comments. The final FS Report will be combined with the Final RI Report and will be uploaded electronically to the NYSDEC file transfer service.

5.0 REFERENCES

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FIGURES

Document: P:\Projects\NYSDEC\Contract D007619\Projects\Irvington Rugs and Cleaners\4.0_Deliverables\GIS\MapDocuments\Irvington_Site_Location.mxd
PDF: P:\Projects\NYSDEC\Contract D007619\Projects\Irvington Rugs and Cleaners\4.0_Deliverables\GIS\Figures\Figure 1.1 - Site Location.pdf 11/15/2011 07:48 PM lindsey.belliveau



0 500 1,000
Feet

Map Copyright: © 2013 National
Geographic Society, i-cubed

Prepared/Date: LCB 11/15/21
Checked/Date: AT 11/16/21

NYSDEC Site # 360175
Irvington Rugs and Cleaners
Irvington, New York



Site Location

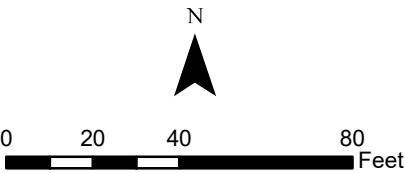
Project 3616216144 Figure 1.1



Prepared/Date: LCB 03/09/22 | Checked/Date: CS 03/10/22

NYSDEC Site # 360175
Irvington Rugs and Cleaners
Irvington, New York

Notes:
1. 5 micrograms per kilograms (ug/L) tetrachloroethene (PCE) isoconcentration line interpreted from 2018/2019 data
2. Water elevations estimated from data collected in December 2018 and January 2019 in feet above mean sea level
3. Imagery - Westchester County color digital orthoimagery (2016) obtained from New York State GIS Clearinghouse at: gis.ny.gov



Proposed Groundwater/Sump
Water, Soil, and Soil Vapor Sample
Locations

Project 3616216144 Figure 4.1

TABLES

Table 4.1: Proposed Field Tasks and Methodology

LOCATION TYPE	DESCRIPTION AND METHODOLOGY	RATIONALE	ANALYTICAL
Utility Clearance	Utility clearance will be completed by a private utility clearance subcontractor at 10 boring locations (for microwells and soil vapor poings) in the public right of way (will mark/clear a 10-ft radius at each location). A Geophysical survey will be completed to evaluate potential sub-slab piping at 49 Main Street, as well as the potential path of the pipe identified within the sump to assess whether it connects to the municipal sewer system.	Clearance will be conducted to minimize the potential to break underground utilities at exterior locations, and to identify potential contaminant migratin pathways below 49 Main Street.	NA
Site Survey	Complete a horizontal and elevation survey of the temporary microwells by a licensed surveyor. Complete a GPS survey of the soil vapor sample locations.	The microwell survey will be used for contouring groundwater and determining groundwater flow direction. The GPS of soil vapor sample locations will be used for plotting on Site figures.	NA
Interior Activities at 49 Main Street	Vacuum and power wash sediment from dry sump. Vacuum and power wash sediment from depression on east side of building. Clear the apparently clogged piping in the dry sump using pipe snake and vacuum.	Mitigate potential exposure pathways within 49 Main Street and evaluate potential migration paths from clogged pipe.	NA
49 Main Street Interior sub-slab soil Samples	Collect two soil samples from below the dry sump. Collect up to two soil samples from below piping that discharges to sump (if identified during GPR survey) to assess presence/absence of VOC contamination.	Samples will be collected to to assess presence/absence of VOC contamination.	Up to 4 soil samples for VOCs. (EPA Method 8260)
Interior Sump Samples	Two sump water samples will be collected from two sumps, one on-site sump and one at 49 Main Street.	Sump water is presumed to be groundwater and samples will be collected to evaluate groundwater concentrations below the two buildings.	Up to 2 water samples for VOCs. (EPA Method 8260)
Exterior Soil Vapor Sampling - Downgradient	Install 10 temporary soil vapor sample points to 5 ft bgs co-located with temporary microwells. One soil vapor sample will be collected from each sample point at approximately 5 ft bgs. Perform helium leak testing.	Samples will be obtained to evaluate the potential for presence of site related contaminants in soil vapor downgradient/cross gradient from the Site.	VOCs (assumes 10 samples plus QC) (EPA Method TO-15)
Temporary Microwell Installation and Sampling	Complete 10 direct push soil borings to approximately 20 ft bgs. Borings will be completed hydraulically downgradient and crossgradient from the site for the installation of temporary groundwater microwells.	Microwells will be completed to evaluate the extent of the groundwater plume downgradient from the Site.	VOCs (10 samples plus QC). Three samples for PFAS (Modified EPA Method 537)
Existing Monitoring Wells Groundwater Sampling	Measure depth to water and collect groundwater samples from 3 existing monitoring wells and the new 10 temporary microwells. Microwells will be sampled via collecting a grab sample. Existing monitoring wells will be sampled using low flow techniques.	Groundwater samples will be obtained to evaluate on-site and off-site groundwater quality. Water levels will be measured to evaluate groundwater flow direction.	3 samples plus QC for VOCs (EPA Method 8260), SVOCs (EPA Method 8270), Pesticides (EPA Method 8081), PCBs (EPA Method 8082), Metals (target analyte list plus mercury) (EPA Method 6010/7470/7471), PFAS (Modified EPA Method 537)
Managing Investigation Derived Waste (IDW)	Coordinate the removal of an estimated 2 drums of soil and 2 drums of water. IDW will be generated from the borings, groundwater sampling, and basement cleaning and is assumed to be F-listed hazardous waste.	Remove waste material from Site.	VOCs.
Soil Vapor Intrusion Sampling	Conduct soil vapor intrusion sampling at up to 5 NYSDOH selected properties. Collect one sub-slab and one indoor air sample at each property, and one ambient air background sample (plus QC).	Evaluate the potential for vapor migration into structures.	VOCs (assumes 11 samples plus QA/QCC) (EPA Method TO-15)

Table 4.1: Proposed Field Tasks and Methodology

LOCATION TYPE	DESCRIPTION AND METHODOLOGY	RATIONALE	ANALYTICAL
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Notes:

bgs = below ground surface

VOC = volatile organic compounds

SVOC = semi-volatile organic compound

PCB =polychlorinated biphenols

QA/QC = quality assurance / quality control

FD =field duplicate, MS/MSD = matrix spike and matrix spike duplicate

PFAS = per and polyfluoroalkyl substances

NA = Not Applicable

Table 2: Proposed Sampling and Analytical Program

Site Type	Media	Property Location	Sample Location Description	Location ID	Sampling Interval (feet BGS)	Sample ID	VOCs Method 8260	SVOCs Method 8270	Pesticides Method 8081	PCBs Method 8082	Metals (Plus Mercury) Method 6010/7470/7471	PFAS Method 537	Air VOCs Method TO-15
Microwells and Existing Monitoring Wells Groundwater Sampling													
Monitoring Well	Groundwater	53 Main	Northwest Corner	DP-003	13	360175-DP003011	1	1	1	1	1	1	
Monitoring Well	Groundwater	49 Main	Northeast Corner	DP-004	15	360175-DP004011	1	1	1	1	1	1	
Monitoring Well	Groundwater	49 Main	East Side	DP-005	15	360175-DP005011	1	1	1	1	1	1	
Monitoring Well	Groundwater	49 Main	East Side	DP-005	15	360175-DP005011D	1	1	1	1	1	1	
Monitoring Well	Groundwater	49 Main	East Side	DP-005	15	360175-DP005011MS	1	1	1	1	1	1	
Monitoring Well	Groundwater	49 Main	East Side	DP-005	15	360175-DP005011MD	1	1	1	1	1	1	
Temporary Microwell	Groundwater	TBD	Crossgradient	DP-008	TBD	360175-DP008	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-009	TBD	360175-DP009	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-010	TBD	360175-DP010	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-011	TBD	360175-DP011	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-012	TBD	360175-DP012	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-013	TBD	360175-DP013	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-014	TBD	360175-DP014	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-015	TBD	360175-DP015	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-016	TBD	360175-DP016	1					1	
Temporary Microwell	Groundwater	TBD	Downgradient	DP-017	TBD	360175-DP017	1					1	
Interior Soil Sampling													
Hand Auger	Soil	49 Main	Floor Drain	HA-001	1	360175-HA001001	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-001	1	360175-HA001001D	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-001	1	360175-HA001001MS	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-001	1	360175-HA001001MD	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-001	2	360175-HA001002	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-002	1	360175-HA002001	1						
Hand Auger	Soil	49 Main	Floor Drain	HA-003	1	360175-HA003001	1						
Interior Building Sump Water Sampling													
Sump	Water	53 Main	Sump	DW-001	2	360175-DW001-1	1						
Sump	Water	49 Main	Sump	DW-002	2	360175-DW002-1	1						
Exterior Soil Vapor Sampling													
Soil Vapor	Soil Vapor	TBD	ROW crossgradient	GV-008	5	360175-GV008005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-008	5	360175-GV008005D							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-009	5	360175-GV009005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-010	5	360175-GV010005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-011	5	360175-GV011005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-012	5	360175-GV012005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-013	5	360175-GV013005							1

Table 2: Proposed Sampling and Analytical Program

Site Type	Media	Property Location	Sample Location Description	Location ID	Sampling Interval (feet BGS)	Sample ID	VOCs Method 8260	SVOCs Method 8270	Pesticides Method 8081	PCBs Method 8082	Metals (Plus Mercury) Method 6010/7470/7471	PFAS Method 537	Air VOCs Method TO-15
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-014	5	360175-GV014005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-015	5	360175-GV015005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-016	5	360175-GV016005							1
Soil Vapor	Soil Vapor	TBD	ROW downgradient	GV-017	5	360175-GV017005							1
Indoor Air, Sub-Slab Soil Vapor Intrusion, and Ambient Air Sampling													
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-004	1*	360175-SV004							1
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-004	1*	360175-SV004							1
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-005	1*	360175-SV005							1
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-006	1*	360175-SV006							1
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-007	1*	360175-SV007							1
Sub-Slab Soil Vapor	Soil Vapor	TBD	Sub-slab	SV-008	1*	360175-SV008							1
Indoor Air	Air	TBD	Indoor Air	IA-004	-5	360175-IA004							1
Indoor Air	Air	TBD	Indoor Air	IA-005	-5	360175-IA005							1
Indoor Air	Air	TBD	Indoor Air	IA-006	-5	360175-IA006							1
Indoor Air	Air	TBD	Indoor Air	IA-007	-5	360175-IA007							1
Indoor Air	Air	TBD	Indoor Air	IA-008	-5	360175-IA008							1
Ambient Air	Air	TBD	Ambient Air	AA-004	-5	360175-AA004							1
Ambient Air	Air	TBD	Ambient Air	AA-005	-5	360175-AA005							1
Ambient Air	Air	TBD	Ambient Air	AA-006	-5	360175-AA006							1
Indoor Air	Additional indoor air samples will be collected as needed; numbering will continue as above based on building ID.												
TOTAL SAMPLES							25	6	6	6	6	16	25

NOTES:

For the interior location IDs, the first three digits indicate the building number: 001 = 53 Main Street; 002 = 49 Main Street

BGS = below ground surface; "-" indicates above ground sample; TBD = To Be Determined in field (based on high PID reading for soils)

Sample ID: 360175 = NYSDEC Site No.; followed by location ID and sample depth (three digits); __ represents the 3 digit sample depth to be determined in field;

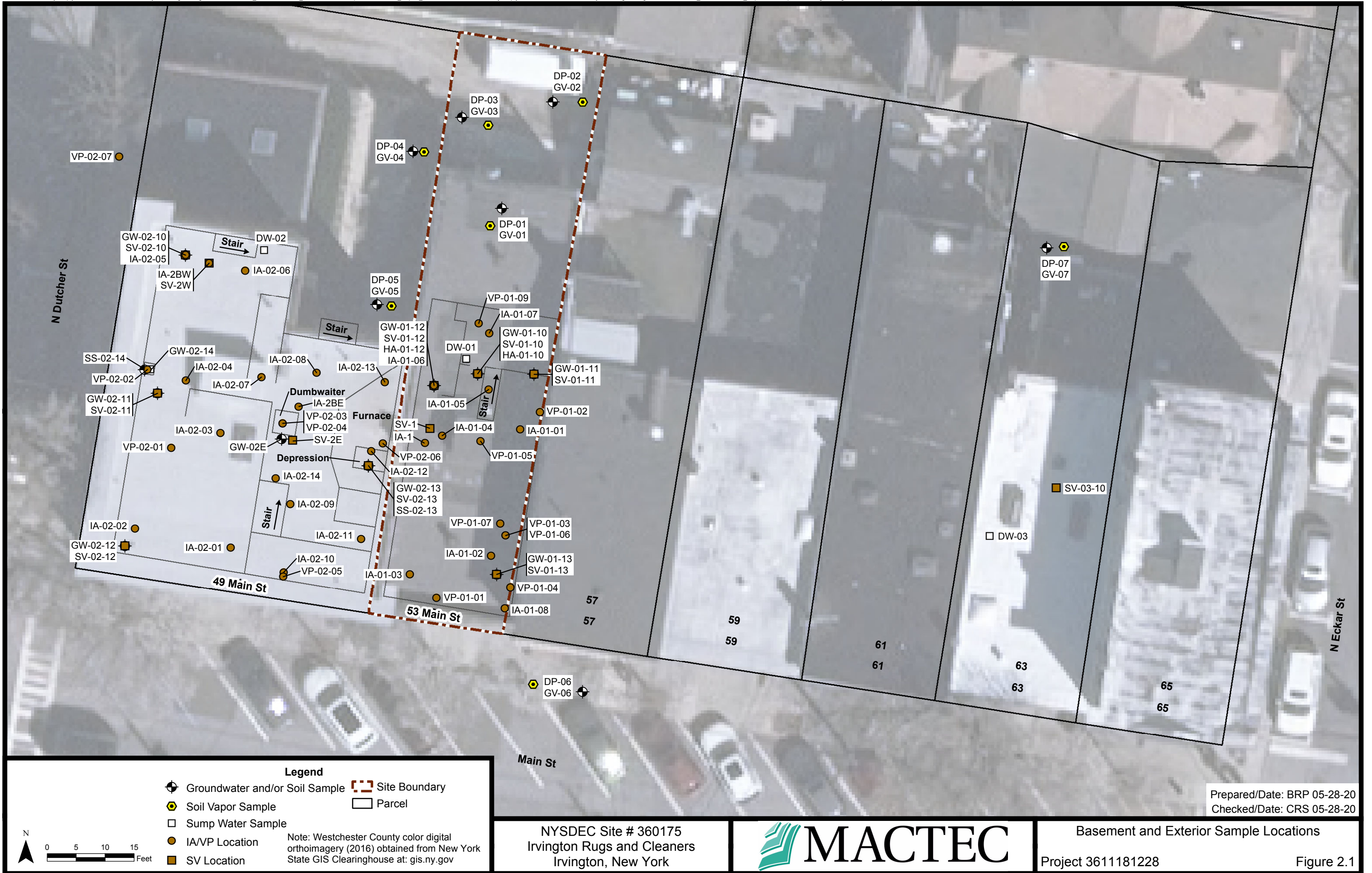
Field Quality Control samples (duplicates, matrix spike, matrix spiked duplicates) will be collected at a frequency of 5% (1:20 samples) and are indicated by a letter at the end of the sample ID (D, MS, MD)

Oxygen and reduction/oxidation potential will be measured during well stabilization.

1* = soil vapor samples will be collected within two-inches of the bottom of the basement concrete slab

APPENDIX A

SELECT SITE CHARACTERIZATION REPORT TABLES AND FIGURES



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VP-02-07

IA-02-05
SV-02-10

IA-2BW
SV-2W

Stair

IA-02-06

VP-02-02

SV-02-11

IA-02-04

IA-02-07

Stair

IA-02-08

IA-02-13

IA-01-06

SV-01-12

IA-01-05

SV-1

IA-1

VP-02-06

IA-02-12

SV-02-13

IA-02-14

IA-02-09

IA-02-11

IA-02-10

VP-02-05

IA-02-01

SV-02-12

IA-02-02

VP-02-01

IA-02-03

VP-02-03

VP-02-04

SV-2E

Dumbwaiter

IA-2BE

Furnace

Depression

Stair

VP-01-09

IA-01-07

SV-01-10

SV-01-11

VP-01-02

IA-01-01

VP-01-05

VP-01-07

VP-01-03

VP-01-06

SV-01-13

VP-01-04

IA-01-08

IA-01-02

IA-01-03

VP-01-01

49 Main St

53 Main St

57

Legend

- IA/VP Location
- SV Location



0 5 10 15 Feet

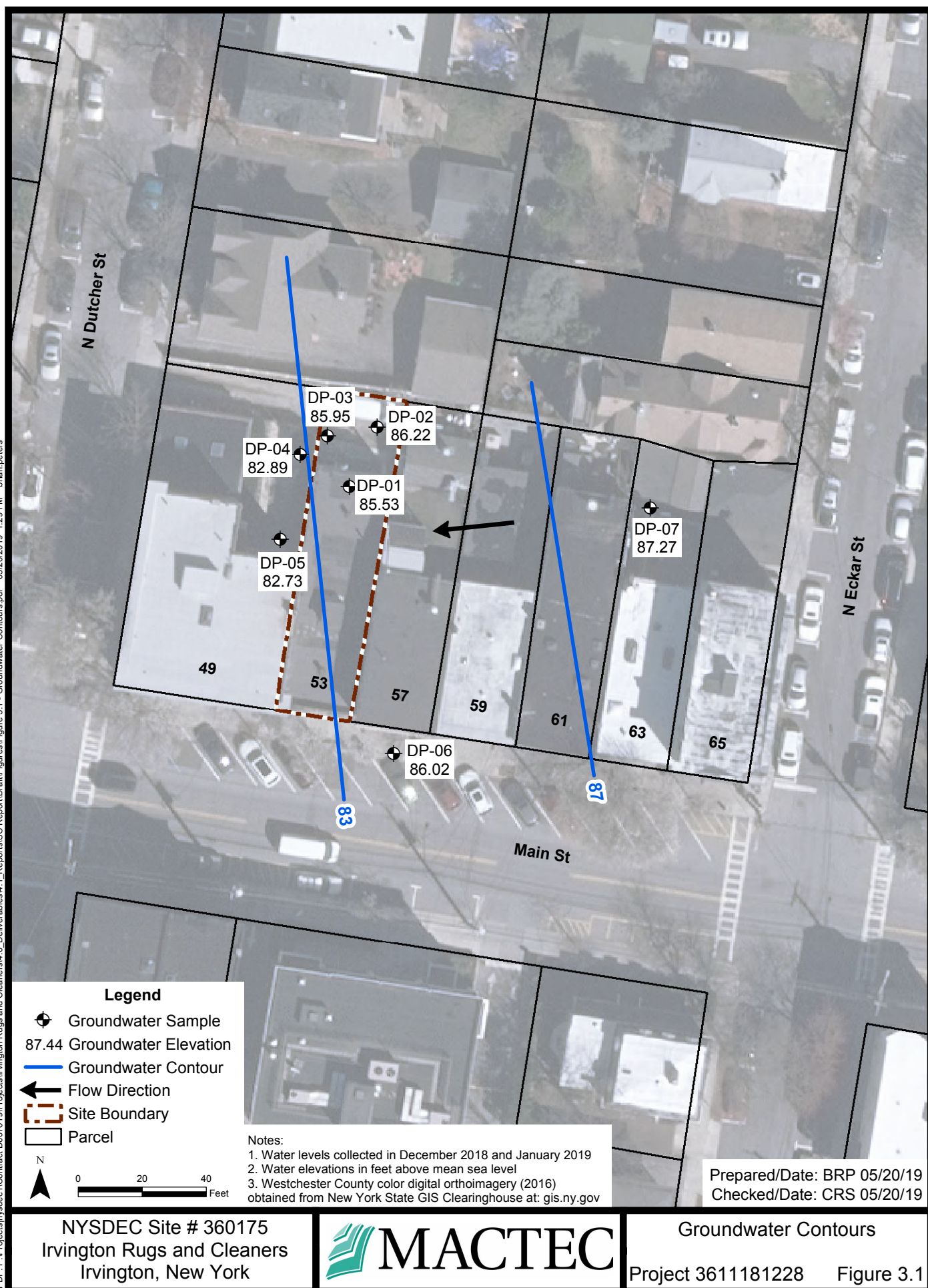
Note: Westchester County color digital orthoimagery (2016)
 obtained from New York State GIS Clearinghouse at: gis.ny.gov

Prepared/Date: BRP 05-28-20
 Checked/Date: CRS 05-28-20

NYSDEC Site # 360175
 Irvington Rugs and Cleaners
 Irvington, New York



Basement IA/VP/SV
 49 and 53 Main St
 Project 3611181228 Figure 2.2

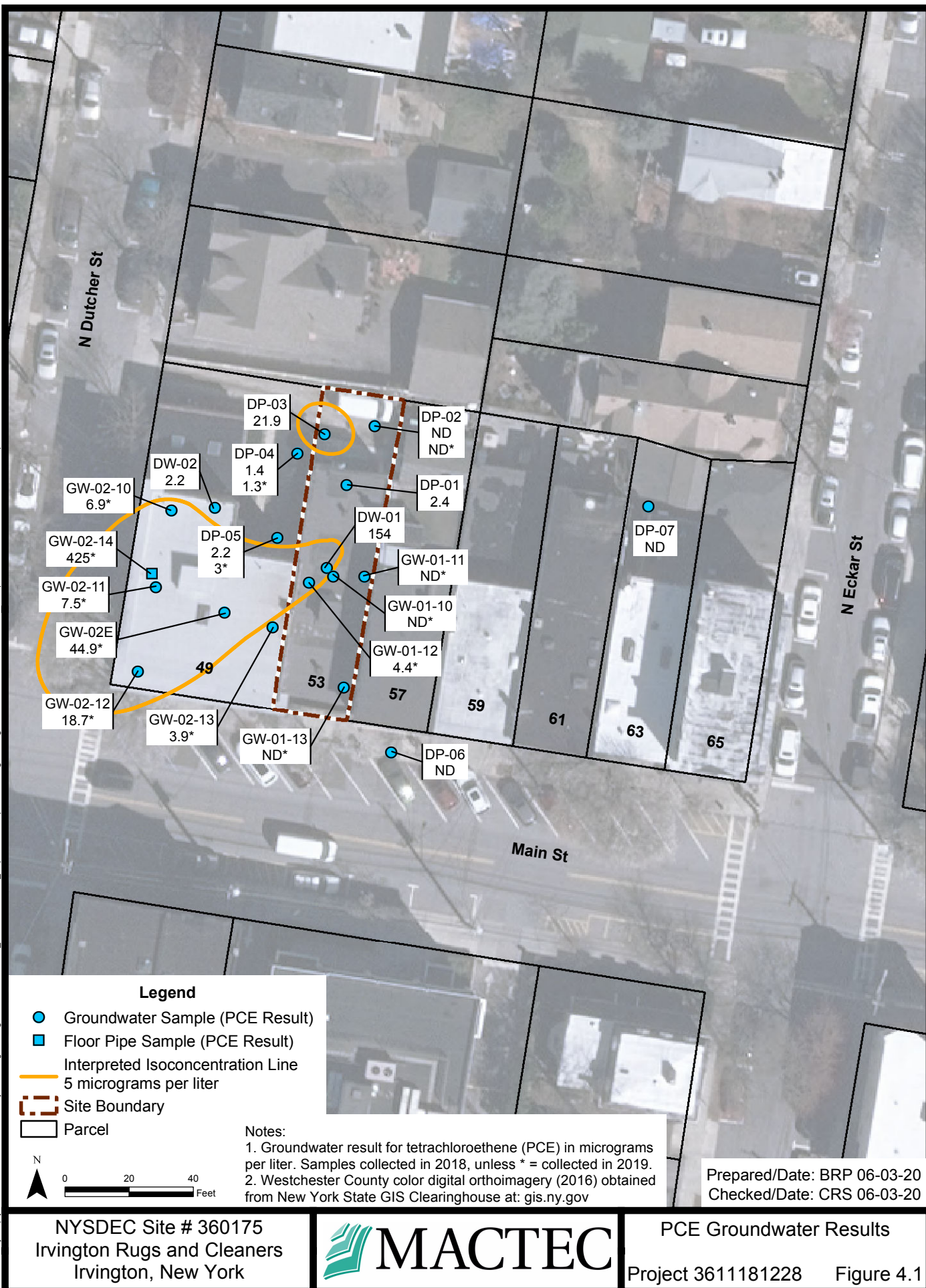


NYSDEC Site # 360175
 Irvington Rugs and Cleaners
 Irvington, New York



Prepared/Date: BRP 05/20/19
 Checked/Date: CRS 05/20/19

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 PDF: P:\Projects\NYSDEC\ContractD007619\Projects\Irvington Rugs and Cleaners\4.0_Deliverables\4.1_Reports\SC Report\Draft\Figures\Figure 4.1 - PCE Groundwater Results.pdf 06-03-2020 7:38 AM brian.peters



Document: P:\Projects\Irrington Rugs and Cleaners\Irrington Rugs and Cleaners\4.0_Deliverables\4.5_Databases\GIS\MapDocuments\Soil_PCE_8.5x11P.mxd
PDF: P:\Projects\Irrington Rugs and Cleaners\4.0_Deliverables\4.1_Reports\SC Report\Draft\Figures\Figure 4.2 - PCE Soil Vapor Results.pdf 05-19-2020 8:30 AM brian.peters



Legend

- IA/VP Location
- SV Location



0 5 10 15 Feet

Notes:

1. Number next to location represents concentrations of Tetrachloroethene in micrograms per cubic meter
2. Results are HAPSITE field screening results, unless *
3. * = fixed laboratory result
4. Samples collected in November 2019, except SV-1, SV-2E and SV-2W collected in February 2019.
5. Westchester County color digital orthoimagery (2016) obtained from New York State GIS Clearinghouse at: gis.ny.gov

Prepared/Date: BRP 05-19-20
Checked/Date: CRS 05-19-20

NYSDEC Site # 360175
Irrington Rugs and Cleaners
Irrington, New York



PCE Soil Vapor Results
Project 3611181228 Figure 4.2

Table 4.1: Soil VOC Results

Location				DP-01	DP-01	DP-02	DP-03	DP-04	DP-05
Sample Depth (ft bgs)				3	3	1	3	6	7
Sample Date				12/20/2018	12/20/2018	12/19/2018	12/19/2018	12/18/2018	12/18/2018
Sample ID				360175-DP001003	360175-DP001003D	360175-DP002001	360175-DP003003	360175-DP004006	360175-DP005007
QC Code				FS	FD	FS	FS	FS	FS
Parameter	UNR	RES	COM	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) (mg/kg)									
1,2,4-Trimethylbenzene	3.6	47	190	0.143	U	0.152	U	0.112	U
1,3,5-Trimethylbenzene	8.4	47	190	0.143	U	0.152	U	0.112	U
Acetone	0.05	100	500	0.143	U	0.152	U	0.112	U
n-Butylbenzene	12	100	500	0.143	U	0.152	U	0.112	U
Naphthalene	12	100	500	0.143	UJ	0.152	UJ	0.112	UJ
Tetrachloroethene	1.3	5.5	150	0.143	UJ	0.17	J	0.112	U

Notes:

Only detected compounds shown: detections in bold

Blank results indicate parameter not analyzed; ND= not detected

Samples analyzed for: VOCs by USEPA Method 8260

ft bgs = feet below ground surface (or below slab)

mg/kg = milligrams per kilogram

Qualifier: U = not detected; J = estimated

QC Code: FS = field sample; FD = field duplicate

Regulatory criteria from NYCRR-Part 375 Soil Cleanup Objectives:

UNR = Unrestricted Use
RES = Residential Use
COM = Commercial Use

NL = not listed/no criteria

Table 4.1: Soil VOC Results

Location				DP-05	DP-06	DP-07	HA-01-10	HA-01-10	HA-01-12
Sample Depth (ft bgs)				16	5	5	2	2	2
Sample Date				12/18/2018	12/19/2018	1/7/2019	11/12/2019	11/12/2019	11/12/2019
Sample ID				360175-DP005016	360175-DP006005	360175-DP007005	360175-HA001-10002	360175-HA001-10002	360175-HA001-12002
QC Code				FS	FS	FS	FS	FD	FS
Parameter	UNR	RES	COM	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) (mg/kg)									
1,2,4-Trimethylbenzene	3.6	47	190	0.106 U		0.104 U		0.121 U	
1,3,5-Trimethylbenzene	8.4	47	190	0.106 U		0.104 U		0.111 U	
Acetone	0.05	100	500	0.106 U		0.104 U		0.111 UJ	
n-Butylbenzene	12	100	500	0.0628 J		0.104 U		0.111 U	
Naphthalene	12	100	500	0.0918 J		0.104 UJ		0.111 U	
Tetrachloroethene	1.3	5.5	150	0.106 U		0.104 U		0.111 U	

Notes:

Only detected compounds shown: detections in bold

Blank results indicate parameter not analyzed; ND= not detected

Samples analyzed for: VOCs by USEPA Method 8260

ft bgs = feet below ground surface (or below slab)

mg/kg = milligrams per kilogram

Qualifier: U = not detected; J = estimated

QC Code: FS = field sample; FD = field duplicate

Regulatory criteria from NYCRR-Part 375 Soil Cleanup Objectives:

UNR = Unrestricted Use
RES = Residential Use
COM = Commercial Use

NL = not listed/no criteria

Table 4.3: Sediment VOC Results (basement 0f 49 Main St)

Location		SS-02-13		SS-02-14	
Sample Date		11/13/2019		11/13/2019	
Sample ID		360175-SS002-13		360175-SS002-14	
Qc Code		FS		FS	
Parameter	Units	Result	Qualifier	Result	Qualifier
Acetone	mg/kg	0.357	J+	0.151	UJ
Tetrachloroethene	mg/kg	0.424		0.622	

Notes:

mg/kg = milligrams per kilogram

Samples analyzed for VOCs by EPA Method 5035A

QC Code: FS = Field Sample

Qualifiers:

U = Not detected greater than the reporting limit

J = Estimated value

Bold = Compound detected in sample

Table 4.4: Groundwater VOC Results

ParameterCriteria		Location		DP-01		DP-01		DP-02		DP-02		DP-03		DP-04		DP-04		DP-05	
		Sample Date		12/20/2018		12/20/2018		12/20/2018		11/12/2019		12/20/2018		12/19/2018		11/13/2019		12/19/2018	
		Sample ID		360175-GW001012		360175-GW001012D		360175-GW002012		360175-GW102008		360175-GW003013		360175-GW004015		360175-GW104010		360175-GW005015	
		Sample Depth (ft bgs)		12		12		12		08		13		15		10		15	
		QC Code		FS		FD		FS		FS		FS		FS		FS		FS	
Parameter		Criteria		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs)																			
Acetone	50*	5	U	2.9	J	5	U	5	U	5	U	1.7	J	5	U	5	U	2.1	J
Chloroform	7	1.1		1.1		1	U	1	U	1	U	1.7		1	U	1	U	1	U
cis-1,2-Dichloroethene	5	1	U	1	U	1	U	1	U	1	U	6.4		1.8		1.8		2.1	
Tetrachloroethene	5	2.4		2.5		1	U	1	U	1	U	21.9		1.4		1.3		2.2	
Trichloroethene	5	1	U	1	U	1	U	1	U	1	U	6.2		1.7		1.3		1.4	

Notes:

Results reported in micrograms per liter (µg/L)
 Only detected compounds shown;
 Samples analyzed by EPA Method SW8260B
 ft bgs = feet below ground surface
 QC Code: FS = Field Sample; FD = Field Sample
 Qualifiers:
 U = Not detected greater than the reporting limit
 J = Estimated value
 values from Technical and Operational
 Guidance Series (TOGS) 1.1.1, "Ambient Water
 Quality Standards and Guidance Values and
 Groundwater Effluent Limitations" (NYSDEC,
 1998).
 * = Guidance Value
 NL = Not Listed
Bold = Compound detected in sample
Highlighted results exceed criteria

Table 4.4: Groundwater VOC Results

Parameter	Criteria	Location		DP-05		DP-05		DP-06		DP-07		GW-01-10		GW-01-11		GW-01-12		GW-01-13	
		Sample Date		11/13/2019		11/13/2019		12/20/2018		1/7/2019		11/12/2019		11/12/2019		11/13/2019		11/12/2019	
		Sample ID		360175-GW105010		360175-GW105010 D		360175-GW006018		360175-GW007015		360175-GW001-10003		360175-GW001-110013		360175-GW001-120043		360175-GW001-130013	
		Sample Depth (ft bgs)		10		10		18		15		3		01		04		01	
		QC Code		FS		FD		FS		FS		FS		FS		FS		FS	
		Result		Qualifier		Result		Qualifier		Result		Qualifier		Result		Qualifier		Result	
Volatile Organic Compounds (VOCs)																			
Acetone	50*	5 U		5 U		5 U		5 U		5 U		5 U		5 U		5 U		5 U	
Chloroform	7	1 U		1 U		2.5		1 U		1 U		1 U		1 U		1 U		1 U	
cis-1,2-Dichloroethene	5	1		1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Tetrachloroethene	5	3		2.9		1 U		1 UJ		1 U		1 U		4.4		1 U		1 U	
Trichloroethene	5	1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	

Notes:

Results reported in micrograms per liter (µg/L)

Only detected compounds shown;

Samples analyzed by EPA Method SW8260B

ft bgs = feet below ground surface

QC Code: FS = Field Sample; FD = Field Sample

Qualifiers:

U = Not detected greater than the reporting lim

J = Estimated value

values from Technical and Operational Guidance Series (TOGS) 1.1.1, "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (NYSDEC, 1998).

* = Guidance Value

NL = Not Listed

Bold = Compound detected in sample

Highlighted results exceed criteria

Table 4.4: Groundwater VOC Results

Location		GW-02E		GW-02-10		GW-02-11		GW-02-12		GW-02-13	
Sample Date		2/27/2019		11/13/2019		11/13/2019		11/13/2019		11/13/2019	
Sample ID		360175-GW002-E		360175-GW002-10003		360175-GW002-11003		360175-GW002-12003		360175-GW002-13002	
Sample Depth (ft bgs)		1		03		03		03		02	
QC Code		FS		FS		FS		FS		FS	
Parameter	Criteria	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs)											
Acetone	50*	5	U	5	U	5	U	5	U	5	U
Chloroform	7	1	U	1	U	1	U	1	U	1	U
cis-1,2-Dichloroethene	5	1	U	13.4		1	U	1	U	1	U
Tetrachloroethene	5	44.9		6.9		7.5		18.7		3.9	
Trichloroethene	5	1	U	15.9		1	U	1	U	1	U

Notes:

Results reported in micrograms per liter (µg/L)

Only detected compounds shown;

Samples analyzed by EPA Method SW8260B

ft bgs = feet below ground surface

QC Code: FS = Field Sample; FD = Field Sample

Qualifiers:

U = Not detected greater than the reporting lim

J = Estimated value

values from Technical and Operational Guidance Series (TOGS) 1.1.1, "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (NYSDEC, 1998).

* = Guidance Value

NL = Not Listed

Bold = Compound detected in sample

Highlighted results exceed criteria

Table 4.8: Sump Water Results

Parameter	Location		DW-01		DW-01		DW-02		DW-02		DW-03		GW-02-14**	
	Sample Date		12/17/2018		11/11/2019		12/17/2018		11/11/2019		12/18/2018		11/13/2019	
	Sample ID		360175-DW001		360175-DW001		360175-DW002		360175-DW002		360175-DW003		360175-GW002-14001	
	Qc Code		FS		FS		FS		FS		FS		FS	
	GA	GV	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by USEPA Method 8260 (ug/L)														
Acetone	NL	50	3.1	J	5	U	2.7	J	5	U	5.9		5	U
Bromodichloromethane	NL	50	1	U	1	U	1	U	1	U	3.2		1	U
Chloroform	7	NL	1	U	1	U	1	U	1	U	42.2		1	U
cis-1,2-Dichloroethene	5	NL	1	U	1	U	6.1	J	15.5		1	U	4.8	
Tetrachloroethene	5	NL	154	J	132		2.2	J	4.3		1	UJ	425	
Trichloroethene	5	NL	1	U	1	U	7.3	J	17.4		1	U	6.3	

Notes:

ug/L = micrograms per liter

U = not detected; J = estimated

FS = field sample

NL = not listed/no criteria

GA = New York State Class GA Groundwater Standards (shaded cell exceeds criteria)

GV = New York State Guidance Values (shaded cell exceeds criteria)

Sump water samples compared to groundwater criteria for comparative purposes only.

DW-01 and DW-02 are interpreted to be installed into groundwater; DW-03 appeared to be part of the sanitary system, and not representative of groundwater.

Table 4.12: November 2019 Off-Site Laboratory SVI Sample Duplicate Results

Parameter	Casno	Location Location ID Sample Date Sample ID QC Code Units	Building 2 (49 Main St)		Building 1 (53 Main St)		Building 3 (63 Main St)	
			IA-02-10		SV-01-13		SV-03-10	
			11/12/2019		11/12/2019		11/13/2019	
			360175-IA002-10		360175-SV001-13		360175-SV003-10	
			FS		FS		FS	
			Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs)								
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	ug/m3	1.1	U	1.1	U	0.77	J
1,2,4-Trimethylbenzene	95-63-6	ug/m3	0.74	U	1.7		1.1	
1,3,5-Trimethylbenzene	108-67-8	ug/m3	0.74	U	1.3		0.69	J
1,3-Dichlorobenzene	541-73-1	ug/m3	0.9	U	1.9		0.9	U
2-Butanone	78-93-3	ug/m3	0.88	U	24		12	
2-Hexanone	591-78-6	ug/m3	1.2	U	2		1.9	
2-Propanol	67-63-0	ug/m3	11		69		53	
4-Methyl-2-pentanone	108-10-1	ug/m3	1.2	U	3.4		1.2	U
Acetone	67-64-1	ug/m3	2.1		19		24	
Benzene	71-43-2	ug/m3	0.64		2.3		1.6	
Carbon disulfide	75-15-0	ug/m3	0.47	U	1.1		1.3	
Carbon tetrachloride	56-23-5	ug/m3	0.63		0.63	J	1.4	
Chloroform	67-66-3	ug/m3	8.3		5.9		14	
Chloromethane	74-87-3	ug/m3	1.1	J+	0.31	U	0.31	U
cis-1,2-Dichloroethene	156-59-2	ug/m3	1.1		0.59	U	0.59	U
Cyclohexane	110-82-7	ug/m3	0.52	U	1.5		0.52	U
Dichlorodifluoromethane	75-71-8	ug/m3	2.9		3		0.74	U
Ethyl acetate	141-78-6	ug/m3	0.54	U	5.9		0.54	U
Ethylbenzene	100-41-4	ug/m3	0.65	U	1.2		1.4	
Heptane	142-82-5	ug/m3	0.61	U	5		0.61	U
Hexane	110-54-3	ug/m3	0.53	U	2.1		0.53	U
Isooctane	540-84-1	ug/m3	0.7	U	2.6		1.2	
Methylene chloride	75-09-2	ug/m3	0.45	J	0.49	J	0.52	U
Tetrachloroethene	127-18-4	ug/m3	110		63		25	
Tetrahydrofuran	109-99-9	ug/m3	0.44	U	15		8.8	
Toluene	108-88-3	ug/m3	1.3		9		4.1	
Trichloroethene	79-01-6	ug/m3	1.7		0.54	J	0.81	U
Trichlorofluoromethane	75-69-4	ug/m3	1.5		1.8		2.1	
Xylene, o	95-47-6	ug/m3	0.65	U	1.3		1.5	
Xylenes (m&p)	179601-23-1	ug/m3	0.52	J	4		4.6	

Notes:

µg/m3 = micrograms per cubic meter

Samples analyzed for VOCs by EPA Method TO-15

QC Code: FS = Field Sample

Qualifiers:

U = Not detected greater than the reporting limit

J = Estimated value

Bold = Compound detected in sample

APPENDIX B

SITE SPECIFIC HEALTH AND SAFETY PLAN

Site: Irvington Rugs and Cleaners Job #/Task # 3616216144.02
 Street Address: 53 Main Street, Irvington, NY
 Proposed Date(s) of Investigation: March 01, 2022 – December 30, 2022
 Prepared by: Amanda Tuttle Date: 11/16/2021
 *Approved by: Jeff Tweeddale Date: 12/20/2022
 Site Description: A former dry cleaner with contaminants of concern consisting of chlorinated solvents. The
 (attach map) property is located in a commercially zoned area and is abutted by residential property to the
 north. The property is relatively flat.
 Comments: Direct-push soil borings, soil, groundwater, and soil vapor/indoor air sampling.
 *Approval also serves as certification of a Hazard Assessment as required by 29 CFR 1910.132

Tasks:

AMEC	Other contractor	Task Description
☒	☐	Groundwater and soil sampling
☒	☐	Sump water sampling
☐	☒	Horizontal and Elevation Survey, GPS Survey
☒	☐	Exterior Soil Vapor Sampling
☒	☐	Indoor air/sub-slab soil vapor sampling
☐	☒	Utility Clearance
☐	☒	Drilling and Direct Push
☐	☒	Disposal of IDW

Dates of Required Training and Medical Surveillance (add additional training topics, as required):

Job duties:	Site Manager	SHSO			
Names:	Amberlee Clark	Lindsey Belliveau			
	Dates	Dates	Dates	Dates	Dates
Medical Surveillance	3/29/2018	10/24/2018			
40-Hour Initial	5/29/2015	10/21/2016			
8-Hour Supervisor ³	7/20/2015	9/12/2017			
8-Hour Refresher	2/09/2018	2/9/2018			
First Aid	5/30/2017	6/7/2017			
CPR	5/30/2017	6/7/2017			
Hazard Communication	10/21/2016	1/29/2016			

² At least one worker must be trained in First Aid/CPR and should received Bloodborne Pathogen Training

³ Required for Site Manager and Site Health and Safety Officer

⁴ **Medical Surveillance Exam A has no respiratory clearance so can only be used for Level D PPE.** . Exam A (basic HAZWOPER), Exam B (respirator & HAZWOPER under 40 years old), Exam C (respirator & HAZWOPER over 40 years old), Exam E (DOT), Exam F (asbestos monitoring), Exam G (lead monitoring) etc.

Known or Suspected Contaminants (include PELs/TLVs):

Contaminants of Concern (COC) (Attach Fact Sheets*)	Maximum Concentrations			PEL/TLV
	Soil (mg/kg)	Soil Vapor (µg/m³)	Water/Groundwater (µg/l)	
PCE	3.3 mg/Kg	53800 ug/m³	600 ug/L	25 ppm
TCE	0.62 mg/Kg	3.6 ug/m³	440 ug/L	10 ppm
Napthalene	0.83 mg/Kg	-	-	10 ppm
1,2-DCE	0.74 mg/Kg	-	1200 ug/L	200 ppm

Vinyl chloride	0.88 mg/Kg	-	2.4 ug/L	1 ppm
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*Workers must be made aware of the signs, symptoms, and first aid for each COC. Information is located on the COC fact sheets.

Air Monitoring Action Levels:

PID/FID Reading ¹	Detector Tube ¹	Dust Meter ¹	LEL ² /O ₂ ¹	Action
Anything above background	<0.5 ppm	N/A	N/A	Continue to monitor with PID. Modified Level D
10 ppm	<0.5 ppm	N/A	N/A	Continue to monitor with PID/DT. Level C.
Anything above background	>0.5 ppm	N/A	N/A	Stop work. Move up wind. Re-evaluate
Above 25 ppm	>0.5 ppm	N/A	N/A	Upgrade to Level B PPE

¹ Sustained readings measured in the breathing zone

² Readings at measured at the source (borehole, well, etc.)

AHAs: Check and attach all that apply (add applicable AHAs not already listed):
Activity Specific AHAs:

☒	Mobilization/Demobilization and Site Preparation
☒	Field Work - General
☒	Field Work - Oversight
☒	Decontamination
☒	Utility Clearance Activities
☒	Groundwater Sampling
☒	Soil Sampling
☒	Drilling Operation Oversight
☒	Geoprobe Oversight
☒	Soil Vapor Sampling
☒	Indoor Air Sampling

Hazard Specific AHAs:

☒	Working with Preservatives (Acids)
☒	Insect Stings/Bites
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	

HAZARD IDENTIFICATION SUMMARY

Complete the checklist for summarizing the hazards identified in the JHAs

Standard Hazards							
☒ Falling Objects	☒ Slips and trips	☒ Pinch points	☒ Rotating equipment				
☒ Falls	☒ Power equipment/tools	☐ Elevated work surfaces	☐ _____				
Eye Hazards							
☐ Particulates	☒ Liquid splashes	☐ Welding Arc	☐ _____				
Hearing Hazards							
☐ None	☒ Impact noise	☐ High frequency noise	☐ High ambient noise				
Respiratory Hazards							
☐ None	☐ Dust/aerosols/particulates	☒ Organic Vapors	☐ Acid Gases	☐ O ₂ deficient	☐ Metals	☐ Asbestos	
Chemical Hazards							
☐ None	☒ Organic solvents	☐ Reactive metals	☐ PCBs				

☒ Acids / bases	☐ Oxidizers	☐ Volatiles/Semi-volatiles	☐ _____
Environmental Hazards			
☐ None	☒ Cold Stress	☒ Heat Stress	☒ Wet location
☒ Bio hazards (snakes, insects, spiders, poisonous plants, etc.)			
☐ Explosive vapors	☐ Confined space	☐ Engulfment Hazard	☐ _____
Electrical Hazards			
☐ None	☒ Energized equipment or circuits	☒ Overhead utilities	☒ Underground utilities
☐ Wet location			
Fire Hazards			
☒ None	☐ Cutting, welding, or grinding generated sparks or heat sources	☐ Flammable materials present	☐ Oxygen enriched location
Ergonomic Hazards			
☒ Lifting	☒ Bending	☐ Twisting	☐ Pulling/tugging
☐ Repetitive motion		☒ Carrying	
Computer Use in the: ☒ Office ☐ Field ☐ _____ ☐ _____			
Radiological Hazards			
☒ None	☐ Alpha	☐ Beta	☐ Gamma/X-rays
☐ Neutron		☐ Radon	
☐ Non-Ionizing			
Other Hazards			
☐			

PPE and Monitoring Instruments

Initial Level of PPE *					
☐ Level D	☒ Modified Level D	☐ Level C	* Cannot use Short Form HASP for Level B or A work		
Standard PPE					
☒ Hard Hat	☒ Safety boots	☒ Safety glasses	☐ Chem. Resistant Boots	☒ High visibility vest	☐ Other: _____
Eye and Face Protection					
☐ Face shield	☐ Vented goggles	☐ Unvented goggles	☐ Indirect vented goggles		
Hearing Protection					
☒ Ear plugs	☐ Ear Muffs	☐ Ear plugs and muffs	☐ Other _____		
Respiratory Protection					
☒ None	☐ Dust mask	☐ Full Face APR	☐ Half Face APR	Cartridge Type: _____	Change Cartridges: _____
Protective Clothing					
☒ Work uniform	☐ White uncoated Tyvek®	☐ Poly-coated Tyvek®	☐ Saranex®		
☐ Boot covers	☐ Reflective vest	☐ Chaps or Snake Legs	☐ Other _____		
Hand Protection					
☐ None	☐ Cotton gloves	☐ Leather gloves	☐ Glove liners	☐ Cut-resistant gloves	☐ Other _____
☒ Outer Gloves: List Type: <u>vinyl or nitrile</u>			☐ Inner Gloves: List Type: _____		

Monitoring Instruments Required*

Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

- When work begins on a different portion of the site.
- When contaminants other than those previously identified are being handled.
- When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling.)
- When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon.)

☐ LEL/O ₂ Meter	☒ PID:	☒ 10.0-10.6 eV Lamp ☐ 11.7 eV Lamp	☐ FID	☐ Hydrogen Sulfide/Carbon Monoxide
☐ Dräger Pump (or equivalent) List Tubes: <u>Vinyl Chloride</u>	☐ Dust Meter: ☐ Respirable dust ☐ Total dust		☐ Other _____	

*Monitoring instruments will be calibrated daily in accordance with manufacturer's instructions. Results will be recorded in the field logbook.

Chemicals Brought to the Site:

List all chemicals brought to the site (e.g., preservatives, decon solutions, calibration gases, gasoline, etc.).

Chemicals (Note: Name listed must match name on label and MSDS)	SDS Attached?
HCL	☒
HNO ₃	☒
METHANOL	☒
ISOBUTYLENE	☒
ALCONOX	☒
LIQUINOX	☒
DEIONIZED WATER	☒
PH 4, PH 7 BUFFER SOLUTION	☒
YSI OXYGEN PROBE ELECTROLYTE SOLUTION	☒
CONDUCTIVITY CALIBRATION SOLUTION	☒
STABLCAL NTU STANDARD SOLUTIONS- 10 NTU, 20 NTU, 100 NTU, 800 NTU	☒

Chemicals will be kept in their original containers. If transferred to another container, aside from days use by one individual, the new container will be clearly labeled with the name of the chemical (product identifier), signal word, hazard statement, pictogram(s), precautionary statement, and name, address and telephone number of the chemical manufacturer, importer or other responsible party.

Work Zones:

The work zones will be defined relative to the location of the work activity. The Exclusion Zone is considered the area within a 10-foot diameter of the sampling location. The Contamination Reduction Zone is considered to be the area within a 20-foot diameter of the sampling location. The Decontamination Zone is to be located upwind of the work area. Work zones will be maintained through the use of:

- ☒ Warning Tape
- ☒ Cones and Barriers
- ☒ Visual Observations

Decontamination Procedures and Equipment:

Note: See Decontamination JHA for further information

Level D Decontamination Procedures

Decontamination Solution:

Detergent and Water

Station 1: Equipment Drop

Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop

Station 2: Outer Boots, and Gloves Wash and Rinse (if worn)	cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 3: Outer Boot and Glove Removal (if worn)	Scrub outer boots, and outer gloves decon solution or detergent water. Rinse off using copious amounts of water.
Station 4: Inner glove removal	Remove outer boots and gloves. Deposit in plastic bag.
Station 5: Field Wash	Remove inner gloves and place in plastic bag.
	Hands and face are thoroughly washed. Shower as soon as possible.

Modified Level D and Level C PPE Decontamination Procedures

Decontamination Solution:	Detergent and Water
Station 1: Equipment Drop	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, etc. on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool-down station may be set up within this area.
Station 2: Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Outer Boot and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4: Canister or Mask (Level C only) Change	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and worker returns to duty.
Station 5: Boot, Gloves and Outer Garment Removal	Boots, chemical resistant splash suit, and inner gloves are removed and deposited in separate containers lined with plastic.
Station 6: Face Piece Removal (Level C only)	Facepiece is removed. Avoid touching face with fingers. Facepiece is deposited on plastic sheet.
Station 7: Field Wash	Hands and face are thoroughly washed. Shower as soon as possible.

Site Communication:

- ☒ Verbal
☐ Two-way radio
☒ Cellular telephone
☐ Hand signals
- Hand gripping throat _____ Out of air, can't breathe
 - Grip partner's wrist or both hands around waist _____ Leave area immediately
 - Hands on top of head _____ Need assistance
 - Thumbs up _____ OK, I am all right, I understand
 - Thumbs down _____ No, negative
- ☐ Horn _____



MACTEC Short Form HASP

- ☐ Siren
- ☐ Other:

EMERGENCY CONTACTS

NAME	TELEPHONE NUMBERS		DATE OF PRE-EMERGENCY NOTIFICATION (if applicable)
Fire Department:	911		
Primary Hospital (Emergency): St. John's Riverside Hospital	(914) 964-4444		
Secondary Hospital (Non-Emergency): Northwell Health-GoHealth Urgent Care	(914) 266-3102		
WorkCare (Early case management)	1-888-449-7787		
Police Department:	911		
	Office	Cell	
Site Health And Safety Officer: Lindsey Belliveau	860-257-5530	860-836-3739	
Client Contact: Justin Starr (NYSDEC)	581-402-9797	585-943-1228	
Project Manager: Chuck Staples	207-828-3571	207-450-9772	
*Eastern Group HSE Manager: Cindy Sundquist	207-828-3309	207-650-7593 (Cell) 207-892-4402 (Home)	
Corporate VP of HSE – Vlad Ivensky	610-877-6144	484-919-5175 (Cell) 215-947-0393 (Home)	
EPA/DEP (if applicable):			
OTHER: Ambulance	911		
Health & Safety Coordinator – Jeff Tweedale	860-805-5883		

*See Incident Flow Chart for additional Group HSE Manager's Contact Information

Emergency Equipment:

The following emergency response equipment is required for this project and shall be readily available:

- ☒ Field First Aid Kit (including bloodborne pathogen kit/supplies)
- ☒ Fire Extinguisher (ABC type) Drilling Contractor to provide during drilling
- ☐ Eyewash (Note: 15 minutes of free-flowing fresh water)
- ☐ Other: _____

EMERGENCY PROCEDURES

- The SHSO (or alternate) should be immediately notified via the on-site communication system. The HSO assumes control of the emergency response.
- The SHSO notifies the Project Manager and client contact of the emergency.
- If the emergency involves an injury to an AMEC employee, the HSE Coordinator or Site Manager are to

implement the AMEC Early Injury Case Management program. See procedures and Flow Diagram below:

- If applicable, the SHSO shall notify off-site emergency responders (e.g. fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the SHSO evacuates the site. Site workers should move to the predetermined evacuation point (See Site Map).
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs (if available), should be donned. If appropriate PPE is unavailable, site workers should evacuate and call in emergency personnel.
- For chemical spills, follow the job specific JHA for spill containment
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and wash affected area. Site worker should shower as soon as possible after incident.
- If the emergency involves toxic gases, workers will back off and reassess. Prior to re-entering the work zone, the area must be determined to be safe. Entry will be using Level B PPE and utilize appropriate monitoring equipment to verify that the site is safe.
- An injured worker shall be decontaminated appropriately.
- Within 24 hours after any emergency response, the Incident Analysis Report (and Vehicle Incident Report if vehicle incident) shall be completed and returned to the Group HSE Manager. Injuries requiring medical treatment beyond first aid (as well as work-related vehicle incidents) will require the employee to submit a post incident drug test.

AMEC Early Injury Case Management Program

NON-EMERGENCY INCIDENT	EMERGENCY INCIDENT
Steps 1 & 2 must be completed before seeking medical attention other than local first aid. 1. Provide first-aid as necessary. Report the situation to your immediate supervisor AND HSE coordinator (all incidents with the apparent starting event should be reported within 1 hour of occurrence). 2. Injured employee:	1. Provide emergency first aid. Supervisor on duty must immediately call 911 or local emergency number; no employee may respond to outside queries without prior authorization. Any outside media calls concerning this incident must be referred immediately to Lauren Gallagher at 602-757-3211. 2. Once medical attention is sought and provided, the supervisor must:
Call WorkCare 24/7 Hotline* (888) II-XPRTS or (888) 449-7787	
WorkCare will assess the situation and determine whether the incident requires further medical attention. During this process, WorkCare will perform the following: • Explain the process to the caller. • Determine the nature of the concern. • Provide appropriate medical advice to the caller. • Determine appropriate path forward with the	WorkCare will be responsible for performing the following: • Contact the treating physician. • Request copies of all medical records from clinic. • Send an email update to the Corporate HSE Department.

caller. • Maintain appropriate medical confidentiality. • Help caller to execute path forward, including referral to the appropriate local medical facility. • Send an email notification to the Corporate HSE Department.	
3. IMMEDIATELY after contacting WorkCare send a brief email notification AND inform verbally (direct contact is required) ONE of HSE corporate representatives See Figure 11.3. 4. Make all other local notifications and client notifications. 5. Local Supervisor, HSE Coordinator, SSHO and any applicable safety committees to complete preliminary investigation, along with the initial Incident Report within 24 hours. 6. Corporate Loss Prevention Manager to complete Worker's Compensation Insurance notifications as needed. 7. Corporate HSE to conduct further incident notifications, investigation, include in statistics, classify, and develop lessons learned materials. * - NOTE: Step 2 is only applicable to the North-American operations and to incidents involving AMEC personnel. High potential near misses, subcontractors' incidents, regulatory inspections, spills and property damages above \$1,000 should be reported immediately, following directions from Step 3.	

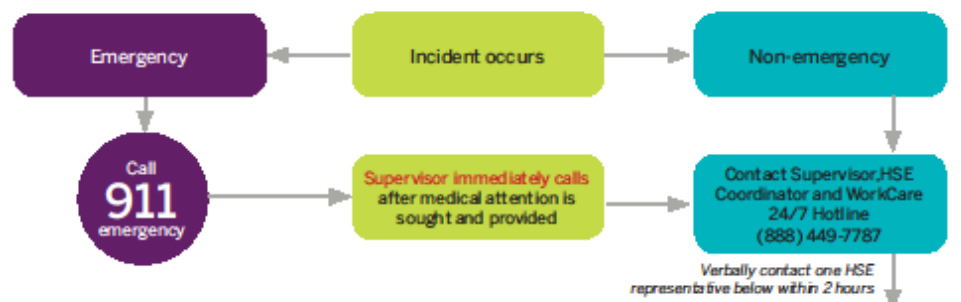
Site Specific Emergency Procedures are as follows:

Drilling contractor required to clear for underground/ aboveground utilities.

INCIDENT FLOW CHART

Incident flow chart

Call immediately



E&I Corporate HSE department contact list

Name/email	Office location	Contact information
Bruce Voss bruce.voss@amecfw.com	Cathedral City, CA	760.202.3737 (office) 951.897.6381 (cell)
Chad Barnes chad.barnes@amecfw.com	Phoenix, AZ	602.733.6000 (office) 480.495.9846 (cell)
Cindy Sundquist cynthia.sundquist@amecfw.com	Portland, ME	207.828.3309 (office) 207.650.7593 (cell) 207.892.4402 (home)
Gabe Sandholm gabe.sandholm@amec.com	Minneapolis, MN	612.252.3785 (office) 206.683.9190 (cell)
John Mazur john.mazur@amec.com	Wilmington, NC	910.444.2978 (office) 910.431.2330 (cell) 910.681.0538 (home)
Lori Dowling lori.dowling@amec.com	Prince George, BC	250.564.3243 (office)
Philip Neville philip.neville@amec.com	Thorold, ON	905.687.6616 (office) 905.380.4465 (cell)
Tim Kihn tim.kihn@amec.com	Edmonton, AB	780.944.6363 (office) 780.717.5058 (cell)
Vladimir Ivensky (can call 24/7) vladimir.ivenky@amec.com	Plymouth Meeting, PA	610.877.6144 (office) 484.919.5175 (cell) 215.947.0393 (home)
Kirby Lastinger kirby.lastinger@amec.com	Lakeland, FL	836-667-2345 x207 (office) 863-272-4775 (cell)

*High potential near misses, subcontractor incidents, regulatory inspections, spills, and property damage should be reported within 60 minutes to one of the above HSE Representatives.
 WITHIN 24 HOURS - Local Supervisor, HSE Coordinator, Project HSE Officer, and any applicable safety committees must complete preliminary investigation, along with the initial Incident Analysis Report Form and forward it to the Corporate HSE Department.

Rev. Feb 15-Hb



FIELD TEAM REVIEW: I acknowledge that I understand the requirements of this HASP, and agree to abide by the procedures and limitations specified herein. I also acknowledge that I have been given an opportunity to have my questions regarding the HASP and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

Name: _____	Date: _____
Name: _____	Date: _____
Name: _____	Date: _____
Name: _____	Date: _____
Name: _____	Date: _____

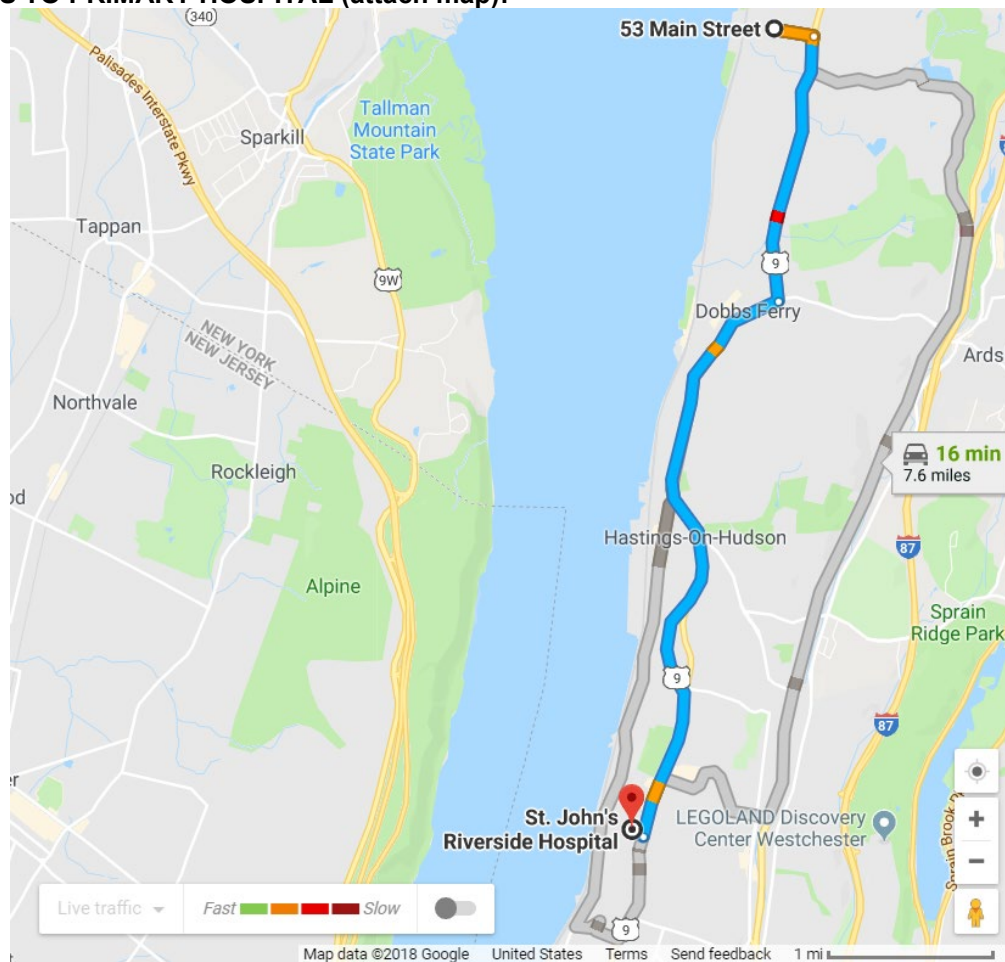
Routes to Emergency Medical Facilities
HOSPITAL (for immediate emergency treatment):

Facility Name: St. John's Riverside Hospital

Address: 967 N Broadway, Yonkers, NY 10701

Telephone Number: (914) 964-4444

Website: riversidehealth.org

DIRECTIONS TO PRIMARY HOSPITAL (attach map):


1. Head east on Main St toward N Eckar St (0.2 mi)
2. Turn right onto Broadway (1.7 mi)
3. Turn right to stay on Broadway (3.7 mi)
4. Turn right- Destination will be on the right

Total: 5.7 mi, ~16min

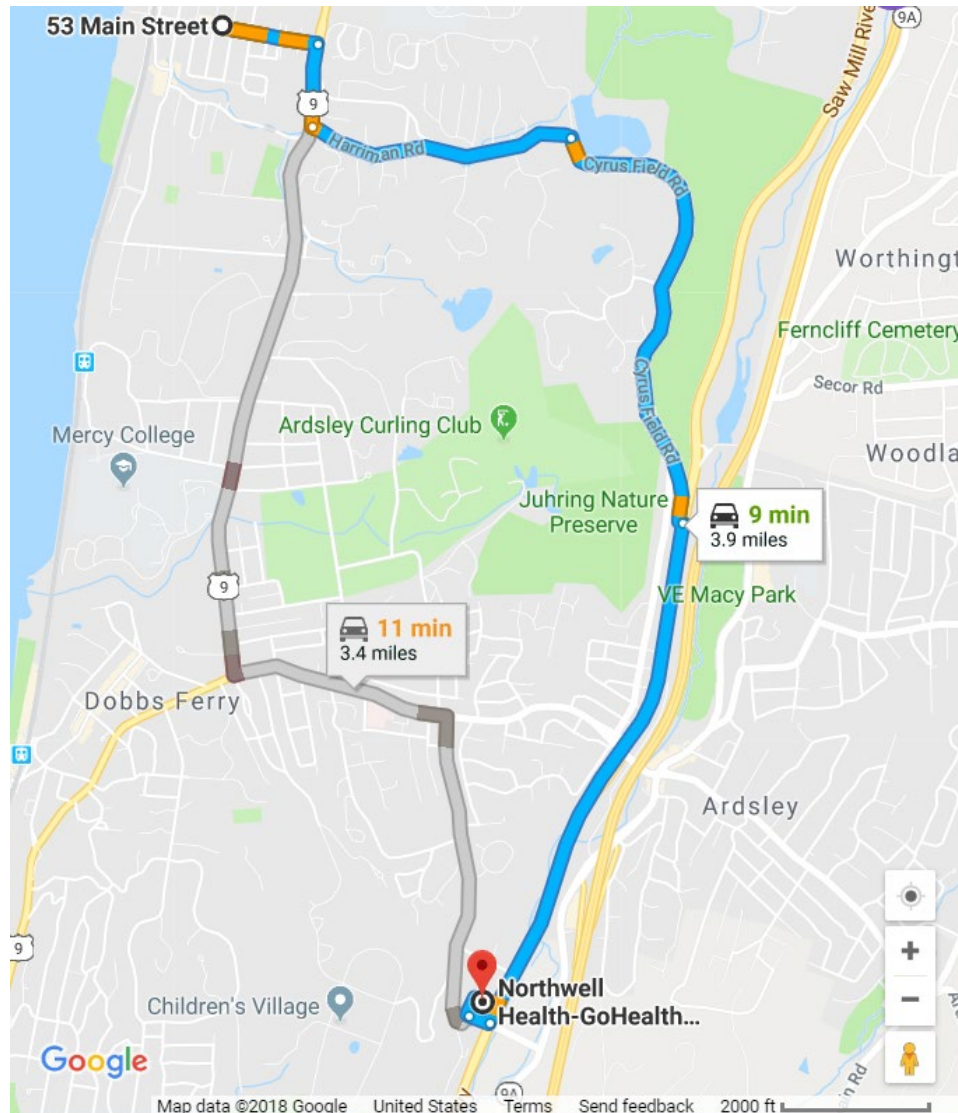
SECONDARY HOSPITAL:

Secondary Hospital: Northwell Health-GoHealth Urgent Care

Address: 650 White Plains Rd, Tarrytown, NY 10591

Telephone Number: (914) 266-3102

Website: <https://www.gohealthuc.com/nyc/westchester/tarrytown?listing=yext>

DIRECTIONS TO SECONDARY HOSPITAL (see attach map):

1. Head east on Main St toward N Eckar St (0.2 mi)
2. Turn right onto Broadway (0.2 mi)
3. Turn left onto Harriman Rd (0.7 mi)
4. Continue onto Cyrus Field Rd (1.3 mi)
5. Turn right onto Saw Mill River Pkwy S (1.4 mi)

6. Turn right onto Lawrence St (285 ft)

7. At the traffic circle, take the 1st exit onto Hamilton St -Destination will be on the right

Check One:

☐ Initial Kickoff Safety Meeting ☐ Regular/Daily Tailgate Safety Meeting ☐ Unscheduled Tailgate Safety Meeting

Date: _____ Site: _____

Site Manager: _____ Site Health and Safety Officer: _____
Print *Print*

Order of Business

Topics Discussed (Check all that apply)

- | | |
|---|--|
| ☐ Scope of Work

☐ Site History/Site Layout
☐ Personnel Responsibilities
☐ Training Requirements

☐ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazard effects)
☐ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
☐ Safe Work Practices
☐ Engineering Controls
☐ Chemical Hazards and Controls
☐ Signs and symptoms of over exposure to site chemicals

☐ Medical Surveillance Requirements

☐ Action Levels

☐ Monitoring Instruments and Personal Monitoring

☐ Perimeter Monitoring, Type and Frequency

☐ PPE Required/PPE Used

☐ Define PPE Levels, Donning, Doffing Procedures | ☐ Decontamination Procedures for Personnel and Equipment
☐ Physical Hazards and Controls (e.g., overhead utility lines)
☐ Anticipated Weather (snow, high winds, rain)
☐ Temperature Extremes (heat or cold stress symptoms and controls)
☐ Biological Hazards and Controls (e.g., poison ivy, spiders)

☐ Site Control (visitor access, buddy system, work zones, security, communications)
☐ Sanitation and Illumination
☐ Logs, Reports, Recordkeeping
☐ Incident Reporting Procedures
☐ Near Misses/Hazard ID including worker suggestions to correct and work practices to avoid similar occurrences
☐ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
☐ General Emergency Response Procedures (e.g., earthquake response, typhoon response, etc.)
☐ Medical Emergency Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
☐ Route to Hospital and Medical Care Provider Visit Guidelines
☐ Site/Regional Emergency Response Procedures (e.g., exposure control precautions, location of first aid kits, etc.)
☐ Hazardous Materials Spill Procedures |
|---|--|

Safety Suggestions by Site Workers: _____

Action Taken on Previous Suggestions: _____

Injuries/Incidents/Personnel Changes since last meeting: _____

Observations of unsafe work practices/conditions that have developed since previous meeting: _____

Location of (or changes in the locations of) evacuation routes/safe refuge areas: _____

Additional Comments: _____

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting

Name (Print)	Company	Signature
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Meeting Conducted by: _____ Title: _____

Print

Signature: _____ Time: _____

Print

PPE Selection Guidelines

When selecting the appropriate PPE for the job, consider the following:

- **Safety glasses** – general eye protection – source of hazard, typically coming from straight on, required at most sites
- **Tinted Safety Glasses** – same as above, but when working in direct sunlight. May need two both tinted and un-tinted if working in both sunlight and shade/overcast skies.
- **Safety goggles** – needed for splash hazard, more severe eye exposures coming from all directions. Non-vented or indirect venting for chemical splash, non-vented for hazardous gases or very fine dust, vented for larger particulates coming from all directions.
- **Face shield** – needed to protect face from cuts, burns, chemicals (corrosives or chemicals with skin notation), etc.
- **Safety boots** – needed if danger of items being dropped on foot that could injure foot
- **Hard hat** – danger from items falling on head – any overhead work, tools, equipment, etc. that is above the head and could fall on head if item fails, or falls off work platform. Typically required at most sites as a general PPE
- **Thin, chemical protective inner gloves** (e.g., thin Nitrile, PVC – do not use latex – many people are allergic to latex) – needed to protect hands from incidental contact with low risk contamination at very low concentrations (ppb or low ppm concentrations in groundwater or soil) or used in combination with outer gloves as a last defense against contamination. Need to specify type
- **Outer gloves** – thicker gloves (e.g., Nitrile, Butyl, Viton, etc.) – used when potential for high concentrations of contaminants (e.g., floating product, percent ranges of contaminant, opening drums, handling pure undiluted chemicals, etc.). Need to specify type.
- **Leather gloves, leather palm, cotton** – good in protecting hands against cuts – no protection from chemicals. May be used in combination with chemical protective gloves.
- **Boot Covers** – when there is contamination in surface soils or working surface in general. When safety boots need protection from contact with contaminants.
- **White (uncoated) Tyveks** – protect clothing from getting dirty, good for protection against solid, non-volatile chemicals (e.g., asbestos, metals) – no chemical protection.
- **Polycoated Tyveks** – least protective of chemical protective clothing. Used when some risk of contamination getting on skin or clothing. Usually, lower ppm ranges of contaminants.
- **Saranex** – Greater protection against contamination than Polycoated Tyveks. Used to protect against PCBs or higher concentrations of contaminants in the soil or groundwater.
- **Other Chemical protective clothing** – if significant risk of dermal exposure, contact H&S to determine best kind.
- **Long sleeved shirts, long pants** – if working in areas with poison ivy/oak/sumac, poisonous insects, etc. and no chemicals exposure. May want to use uncoated Tyveks for work in areas where poisonous plants are known to be to protect clothing.
- **Cartridge Respirator (Level C PPE)** – Need to calculate change schedule (contact Division EH&S Manager for this) to determine length of use. To be able to use cartridge respirators, need to know contaminants, estimate levels to be encountered in the breathing zone, need to ensure that cartridge will be effective against COCs, and need to be able to monitor for COCs using PID, FID, Dräger tubes, etc. If can't do any of these, then Level B PPE is probably going to be needed.
- **High Visibility Vest** – needed for any road work (within 15 feet of a road) or when working on a site with vehicular traffic or working around heavy equipment. Needed if work tasks would take employee concentration away from movement of vehicles and workers would have to rely on the other driver's ability to see the employee in order not to hit them. This includes heavy equipment as well as cars and trucks, on public roads or the jobsite. Not needed if wearing Polycoated Tyveks – as they are already high visibility.
- **Reflective Vest** – see above, but for use at night.
- **Hearing Protection** – needed if working at noise levels above 85 dBA on a time weighted average. If noise measurements are not available, use around noisy equipment, or in general, if you have to raise your voice to be heard when talking to someone standing two feet away.
- **Protective Chaps** – required when using a machete or chain saw or any other cut hazard to legs.

Incident Report Forms

1. Incident Analysis Report (IAR)
2. Vehicle Incident Report (VIR)
3. Ground Disturbance Incident Report(GDR)

Activity Hazard Analysis (AHAs)

Mobilization/Demobilization and Site Preparation
Field Work - General
Field Work - Oversight
Decontamination
Utility Clearance Activities
Groundwater Sampling
Soil Sampling
Drilling Operation Oversight
Geoprobe Oversight
Soil Vapor Sampling
Indoor Air Sampling
Working with Preservatives (Acids)
Insect Stings/Bites

Chemicals of Concern

Tetrachloroethene (PCE)
Trichloroethene (TCE)
Napthalene
1,2, Dichloroethene (1, 2 DCE)
Vinyl chloride (VC)

**Safety Data Sheets (SDS)
Materials Brought to the Site**

MATERIALS	SDS
Alconox	X
Conductivity Standard 1.413 mS/cm	X
Deionized Water	X
Hydrochloric Acid	X
Isobutylene	X
Liquinox	X
Methanol	X
Nitric Acid	X
ORP Standard 240 mV	X
STABLCAL NTU Standard Solutions - <0.1 NTU, 20 NTU, 100 NTU, 800 NTU	X
Sulfuric Acid	X
YSI Buffer Solution pH 4.0	X
YSI Buffer Solution pH 7.0	X

Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation

Date of Analysis: 8/15/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for Site Visit	1A) N/A	1A) Prior to leaving for site - Obtain and review HASP prior to site visit, if possible - Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) - Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current - Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) - If respiratory protection is required/potentially required, ensure that training and fit-testing has occurred within the past year. - Familiarize yourself with route to the site
	1B) Vehicle defects	1B) Inspect company owned/leased vehicle for defects such as: - Flat tires - Windshield wipers worn or torn - Oil puddles under vehicle - Headlights, brake lights, turn signals not working
	1C) Insufficient emergency equipment, unsecured loads	1C) Insufficient emergency equipment, unsecured loads - Ensure vehicle has first aid kit and that all medications are current (if first aid kits are not provided at the site) - Ensure vehicle is equipped with warning flashers and/or flares and that the warning flashers work - Cell phones are recommended to call for help in the event of an emergency - Vehicles carrying tools must have a safety cage in place. All tools must be properly secured - Vehicles must be equipped with chocks if the vehicle is to be left running, unattended. - Ensure sufficient gasoline is in the tank
2. Operating vehicles – general	2A) Collisions, unsafe driving conditions	2A) Drive Defensively! - Seat belts must be used at all times when operating any vehicle on company business. - Drive at safe speed for road conditions - Maintain adequate following distance - Pull over and stop if you have to look at a map - Try to park so that you don't have to back up to leave. - If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary
3. Driving to the jobsite	3A) Dusty, winding, narrow roads	3A) Dusty, winding, narrow roads - Drive confidently and defensively at all times. - Go slow around corners, occasionally clearing the windshield.
	3B) Rocky or one-lane roads	3B) Rocky or one-lane roads - Stay clear of gullies and trenches, drive slowly over rocks. - Yield right-of-way to oncoming vehicles---find a safe place to pull over.
	3C) Stormy weather, near confused tourists	3C) Stormy weather, near confused tourists - Inquire about conditions before leaving the office. - Be aware of oncoming storms. - Drive to avoid accident situations created by the mistakes of others.

Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3D) When angry or irritated	3D) When angry or irritated Attitude adjustment; change the subject or work out the problem before driving the vehicle. Let someone else drive.
	3E) Turning around on narrow roads	3E) Turning around on narrow roads - Safely turn out with as much room as possible. - Know what is ahead and behind the vehicle. - Use a backer if available.
	3F) Sick or medicated	3F) Sick or medicated - Let others on the crew know you do not feel well. - Let someone else drive.
	3G) On wet or slimy roads	3G) On wet or slimy roads Drive slow and safe, wear seatbelts.
	3H) Animals on road	3H) Animals on road - Drive slowly, watch for other animals nearby. - Be alert for animals darting out of wooded areas
4. Gain permission to enter site	4A) Hostile landowner, livestock, pets	4A) Hostile landowner, livestock, pets - Talk to land owner, be courteous and diplomatic - Ensure all animals have been secured away from work area
5. Mobilization/ Demobilization of Equipment and Supplies	5A) Struck by Heavy Equipment/Vehicles	5A) Struck by heavy equipment - Be aware of heavy equipment operations. - Keep out of the swing radius of heavy equipment. - Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times - Employees shall wear a high visibility vest or T-shirt (reflective vest required if working at night). - Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. - Ground personnel will not stand directly behind heavy equipment when it is in operation.
	5B) Struck by Equipment/Supplies	5B) Struck by Equipment/Supplies - Workers will maintain proper space around their work area, if someone enters it, stop work. - When entering another worker's work space, give a verbal warning so they know you are there.
	5C) Overexertion Unloading/Loading Supplies	5C) Overexertion Unloading/Loading Supplies - Train workers on proper body mechanics, do not bend or twist at the waist while exerting force or lifting. - Tightly secure all loads to the truck bed to avoid load shifting while in transit.
	5D) Caught in/on/between	5D) Caught in/on/between Do not place yourself between two vehicles or between a vehicle and a fixed object.
	5E) Slip/Trip/Fall	5E) 1E). Slip/Trip/Fall - Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas. - Drivers will maintain 3 point contact when mounting/dismounting vehicles/equipment. - Drivers will check surface before stepping, not jumping down.



Job Hazard Analysis – HASP Format

Job Title: Mobilization/Demobilization and Site Preparation

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5F) Vehicle accident	5F) Vehicle accident Employees should follow MACTEC vehicle operation policy and be aware of all stationary and mobile vehicles.
6. Site Preparation	6A) Slip/Trip/Fall	6A) Slip/Trip/Fall Mark all holes and low spots in area with banner tape. Instruct personnel to avoid these areas
7. Installation of soil erosion and sediment controls	7A) Overexertion	7A) Overexertion - Workers will be trained in the proper method of placing erosion controls. - Do not bend and twist at the waist while lifting or exerting force.
	7B) Struck by Equipment/Supplies	7C) Struck by Equipment/Supplies - Workers will maintain proper space around their work area, if someone enters it, stop work. - When entering another worker's work space, give a verbal warning so they know you are there.
8. Driving back from the jobsite	8A) See hazards listed under item #3	8A) See safe work practices under item #3

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Minimum Recommended PPE*: hard hat, steel-toed boots, safety glasses

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization/ Demobilization and Site Preparation	1A) See Mobilization/Demobilization and Site Preparation JHA	1A) See Mobilization/Demobilization and Site Preparation JHA
2. Communication	2A) Safety, crew unity	2A) Talk to each other. - Log all workers and visitor on and off the site. - Let other crewmembers know when you see a hazard. - Avoid working near known hazards. - Always know the whereabouts of fellow crewmembers. - Carry a radio and spare batteries or cell phone - Review Emergency Evacuation Procedures (see below).
3. Walking and working in the field	3A) Falling down, twisted ankles and knees, poor footing	3A) Always watch your footing. - Horseplay is strictly prohibited - Slow down and use extra caution around logs, rocks, and animal holes. - Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. - Wear laced boots with a minimum 8" high upper and non-skid Vibram-type soles for ankle support and traction.
	3B) Falling objects	3B) Protect head against falling objects. - Wear your hardhat for protection from falling limbs and pinecones, and from tools and equipment carried by other crewmembers. - Stay out of the woods during extremely high winds.
	3C) Chemical/Toxicological Hazards	3C) Chemical/Toxicological Hazards - See HASP for appropriate level of PPE - Use monitoring equipment, as outlined in HASP, to monitor breathing zone - Read MSDSs for all chemicals brought to the site - Be familiar with hazards associated with site contaminants. - Ensure that all containers are properly labelled - Decon thoroughly prior to consumption of food, beverage or tobacco.
	3D) Damage to eyes	3D) Protect eyes: - Watch where you walk, especially around trees and brush with limbs sticking out. - Exercise caution when clearing limbs from tree trunks. Advise wearing eye protection. - Ultraviolet light from the sun can be damaging to the eyes; look for sunglasses that specify significant protection from UV-A and UV-B radiation. If safety glasses require, use one's with tinted lenses
	3E) Bee and wasp stings	3E) See JHA for Insect Stings and Bites
	3F) Ticks and infected mosquitos	3F) See JHA for Insect Stings and Bites
	3G) Wild Animals	3G) Wild Animals - Avoid physical contact with wild animals - Do not threaten and/or corner animals - Make noise to get the animal to retreat. - Stay in or return to vehicle/equipment if in danger

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3H) Contact with poisonous plants or the oil from those plants:	3H) Contact with poisonous plants or the oil from those plants: - Look for signs of poisonous plants and avoid. - Ensure all field workers can identify the plants. Mark identified poisonous plants with spray paint if working at a fixed location. - Do not allow plant to touch any part of your body/clothing. - Wear PPE as described in the HASP and wear Tyveks, gloves and boot covers if contact with plant is likely - Always wash gloves before removing them. - Discard PPE in accordance with the HASP. - Use commercially available products such as Ivy Block or Ivy Wash as appropriate.
		 POISON IVY <i>(Rhus toxicodendron L.)</i> POISON OAK <i>(Rhus diversiloba)</i> POISON SUMAC <i>(Rhus toxicodendron vernix)</i>
	3I) Back Injuries	3I) Back Injuries - Site personnel will be instructed on proper lifting techniques. - Mechanical devices should be used to reduce manual handling of materials. - Split heavy loads in to smaller loads - Team lifting should be utilized if mechanical devices are not available. - Make sure that path is clear prior to lift.
	3J) Shoveling	3J) Shoveling - Select the proper shovel for the task. A long handled, flat bladed shovel is recommend for loose material - Inspect the handle for splinters and/or cracks - Ensure that the blade is securely attached to the handle - Never be more than 15 inches from the material you are shoveling - Stand with your feet about hip width for balance and keep the shovel close to your body. - Bend from the knees (not the back) and tighten your stomach muscles as you lift. - Avoid twisting movements. If you need to move the snow to one side reposition your feet to face the direction the snow will be going. - Avoid lifting large shoveling too much at once. When lifting heavy material, pick up less to reduce the weight lifted. - Pace yourself to avoid getting out of breath and becoming fatigued too soon. - Be alert for signs of stress such as pain, numbness, burning and tingling. Stop immediately if you feel any of these symptoms.
	3K) Slips/Trips/Falls	3K) Slips/Trips/Falls - Maintain work areas safe and orderly; unloading areas should be on even terrain; mark or repair possible tripping hazards. - Site SHSO inspect the entire work area to identify and mark hazards. - Maintain three points of contact when climbing ladders or onto/off of equipment

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3L) Overhead Hazards	3L) Overhead Hazards ▪ Personnel will be required to wear hard hats that meet ANSI Standard Z89.1. ▪ All ground personnel will stay clear of suspended loads. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. ▪ All overhead hazards will be identified prior to commencing work operations.
	3M) Dropped Objects	3M) Dropped Objects ▪ Steel toe boots meeting ANSI Standard Z41 will be worn.
	3N) Noise	3N) Noise ▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs); all equipment will be equipped with manufacturer's required mufflers. Hearing protection shall be worn by all personnel working in or near heavy equipment.
	3O) Eye Injuries	3O) Eye Injuries ▪ Safety glasses meeting ANSI Standard Z87 will be worn.
	3P) Heavy Equipment (overhead hazards, spills, struck by or against)	3P) Heavy Equipment ▪ All operators will be trained and qualified to operate equipment ▪ Equipment will have seat belts. ▪ Operators will wear seat belts when operating equipment. ▪ Do not operate equipment on grades that exceed manufacturer's recommendations. ▪ Equipment will have guards, canopies or grills to protect from flying objects. ▪ Ground personnel will stay clear of all suspended loads. ▪ Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. ▪ Ground personnel will wear high visibility vests ▪ Spill and absorbent materials will be readily available. ▪ Drip pans, polyethylene sheeting or other means will be used for secondary containment. ▪ Ground personnel will stay out of the swing radius of excavators. ▪ Eye contact with operators will be made before approaching equipment. ▪ Operator will acknowledge eye contact by removing his hands from the controls. ▪ Equipment will not be approached on blind sides. ▪ All equipment will be equipped with backup alarms and use spotters when significant physical movement of equipment occurs on-site, (i.e., other than in place excavation or truck loading). ▪ Inspect rigging prior to each use.

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3Q) Struck by vehicle/equipment	3Q) Struck by vehicle/equipment ▪ Be aware of heavy equipment operations. ▪ Keep out of the swing radius of heavy equipment. ▪ Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. ▪ Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads.
	3R) Struck/cut by tools	3R) Struck/cut by tools ▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or worksurface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools.
	3S) Caught in/on/between	3S) Caught in/on/between ▪ Workers will not position themselves between equipment and a stationary object. ▪ Workers will not wear long hair down (place in pony-tail and tuck into shirt) or jewelry if working with tools/machinery.
	3T) Contact with Electricity/Lightning	3T) Contact with Electricity/Lighting ▪ All electrical tools and equipment will be equipped with GFCI. ▪ Electrical extension cords will be of the "Hard" or "Extra Hard" service type. ▪ All extension cords shall have a three-blade grounding plug. ▪ Personnel shall not use extension cords with damaged outer covers, exposed inner wires, or splices. ▪ Electrical cords shall not be laid across roads where vehicular traffic may damage the cord without appropriate guarding. ▪ All electrical work will be conducted by a licensed electrician. ▪ All equipment will be locked out and tagged out and rendered in a zero energy state prior to commencing any operation that may expose workers to electrical, mechanical, hydraulic, etc. hazards. ▪ All utilities will be marked prior to excavation activities. ▪ All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead powerlines known to be 50 kV or less and 35 feet from all others.) ▪ The SHSO shall halt outdoor site operations whenever lightning is visible, outdoor work will not resume until 30 minutes after the last sighting of lightning.
	3U) Equipment failure	3U) Equipment failure ▪ All equipment will be inspected before use. If any safety problems are noted, the equipment should be tagged and removed from service until repaired or replaced.

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3V) Hand & power tool usage.	3V) Hand & power tool usage ▪ Daily inspections will be performed. ▪ Ensure guards are in place and are in good condition. ▪ Remove broken or damaged tools from service. ▪ Use the tool for its intended purpose. ▪ Use in accordance with manufacturers instructions. ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ See JHA for Power Tool Use - Electrical and Power Tool Use - Gasoline
	3W) Fire Protection	3W) Fire Protection ▪ Ensure that adequate number and type of fire extinguishers are present at the site ▪ Inspect fire extinguishers on a monthly basis – document ▪ All employees who are expected to use fire extinguishers will have received training on an annual basis. ▪ Obey no-smoking policy ▪ Open fires are prohibited ▪ Maintain good housekeeping. Keep rubbish and combustibles to a minimum. ▪ Keep flammable liquids in small containers with lids closed or a safety can. ▪ When dispensing flammable liquids, do in well vented area and bond and ground containers.
	3X) Confined Space Entry	3X) Confined Space Entry ▪ See JHA for Confined Space Entry
4. Environmental health considerations	4A) Heat Stress	4A) Take precautions to prevent heat stress ▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. NOTE: The severity of the effects of a given environmental heat stress is decreased by reducing the work load, increasing the frequency and/or duration of rest periods, and by introducing measures which will protect employees from hot environments. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Allow approximately 2 weeks with progressive degrees of heat exposure and physical exertion for substantial acclimatization. ▪ Acclimatization is necessary regardless of an employee's physical condition (the better one's physical condition, the quicker the acclimatization). Tailor the work schedule to fit the climate, the physical condition of employees, and mission requirements. ▪ A reduction of work load markedly decreases total heat stress. ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.

Job Hazard Analysis – HASP Format

Job Title: Field Work - General

Date of Analysis: 8/15/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices						
	4B) Wet Bulb Globe Temperature (WBGT) Index	4B) WBGT - Curtail or suspend physical work when conditions are extremely severe (see attached Heat Stress Index). - Compute a Wet Bulb Globe Temperature Index to determine the level of physical activity (take WBGT index measurements in a location that is similar or closely approximates the environment to which employees will be exposed). WBGT THRESHOLD VALUES FOR INSTITUTING PREVENTIVE MEASURES <table><tr><td>80-90 degrees F</td><td>Fatigue possible with prolonged exposure and physical activity.</td></tr><tr><td>90-105 degrees F</td><td>Heat exhaustion and heat stroke possible with prolonged exposure and physical activity.</td></tr><tr><td>105-130 degrees F</td><td>Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.</td></tr></table>	80-90 degrees F	Fatigue possible with prolonged exposure and physical activity.	90-105 degrees F	Heat exhaustion and heat stroke possible with prolonged exposure and physical activity.	105-130 degrees F	Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.
80-90 degrees F	Fatigue possible with prolonged exposure and physical activity.							
90-105 degrees F	Heat exhaustion and heat stroke possible with prolonged exposure and physical activity.							
105-130 degrees F	Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.							
	4C) Cold Extremes	4C) Take precautions to prevent cold stress injuries - Cover all exposed skin and be aware of frostbite. While cold air will not freeze the tissues of the lungs, slow down and use a mask or scarf to minimize the effect of cold air on air passages. - Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. - Take layers off as you heat up; put them on as you cool down. - Wear head protection that provides adequate insulation and protects the ears. - Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. - Acclimate to the cold climate to minimize discomfort. - Maintain adequate water/fluid intake to avoid dehydration.						
	4D) Wind	4D) Effects of the wind - Wind chill greatly affects heat loss (see attached Wind Chill Index). - Avoid marking in old, defective timber, especially hardwoods, during periods of high winds due to snag hazards.						
	4E) Thunderstorms	4E) Thunderstorms - Monitor weather channels to determine if electrical storms are forced. - Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) - Suspend all field work at the first sound of thurnder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds. - Only return to work 30 minutes after the after the last strike or sound of thunder						

Relative Humidity (%) furnished by National Weather Service Gray, ME

°F	40	45	50	55	60	65	70	75	80	85	90	95	100
110	136												
108	130	137											
106	124	130	137										
104	119	124	131	137									
102	114	119	124	130	137								
100	109	114	118	124	129	136							
98	105	109	113	117	123	128	134						
96	101	104	108	112	116	121	126	132					
94	97	100	103	106	110	114	119	124	129	135			
92	94	96	99	101	105	108	112	116	121	126	131		
90	91	93	95	97	100	103	106	109	113	117	122	127	132
88	88	89	91	93	95	98	100	103	106	110	113	117	121
86	85	87	88	89	91	93	95	97	100	102	105	108	112
84	83	84	85	86	88	89	90	92	94	96	98	100	103
82	81	82	83	84	84	85	86	88	89	90	91	93	95
80	80	80	81	81	82	82	83	84	84	85	86	86	87

Heat Index
(Apparent
Temperature)

With Prolonged Exposure
and/or Physical Activity

Extreme Danger

Heat stroke or sunstroke
highly likely

Danger

Sunstroke, muscle cramps,
and/or heat exhaustion likely

Extreme Caution

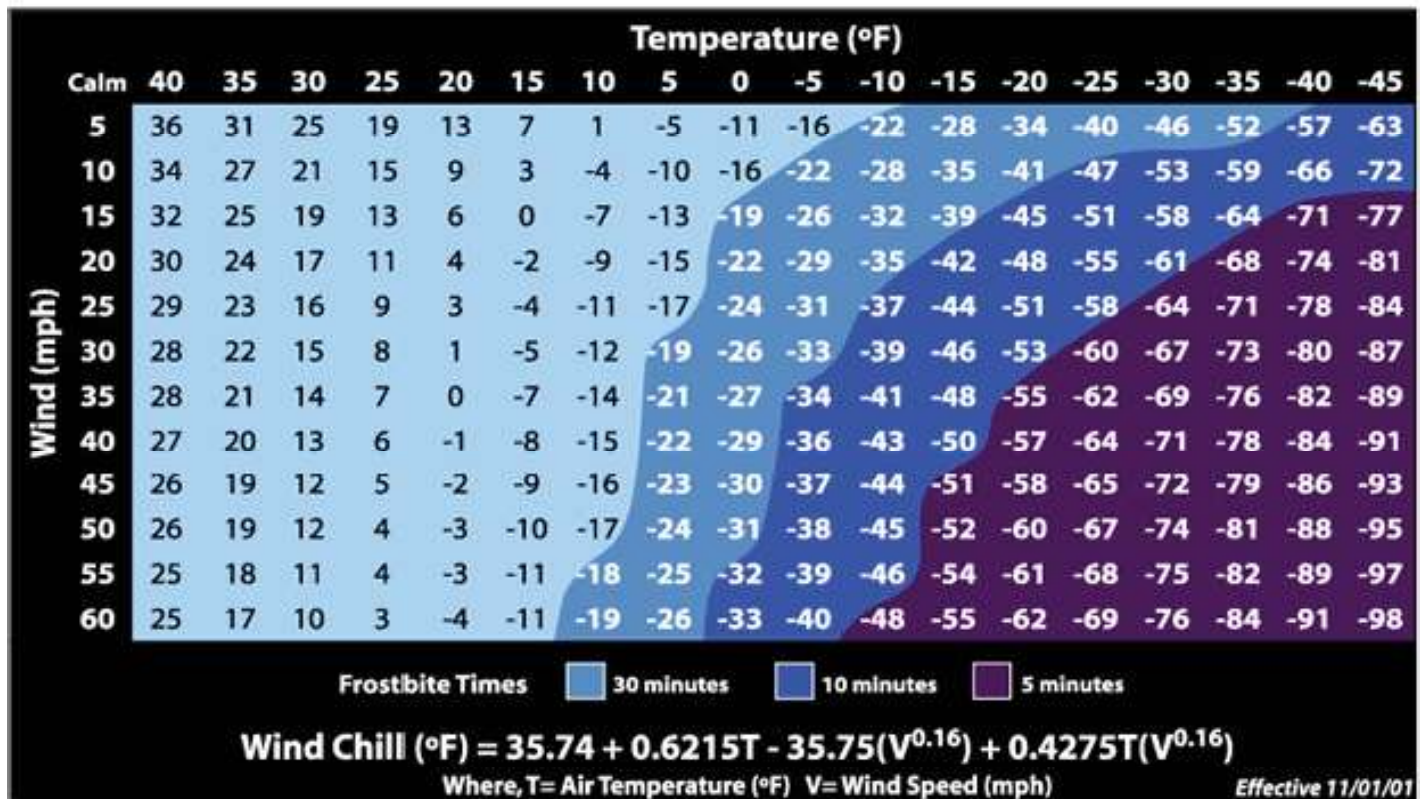
Sunstroke, muscle cramps,
and/or heat exhaustion possible

Caution

Fatigue possible



Wind Chill Chart



AHA - Field Work Oversight Activity Description



Activity/Work Task:	Field Work Oversight	Overall Risk Assessment Code (RAC) (Use highest code)	L	
Project Location:	Olin- Somers Thin Strip	Risk Assessment Code (RAC) Matrix		
Contract Number:	6107160039	Severity	Probability	
Date Prepared:	6/9/16 Date Accepted: 6/9/16		Frequent Likely Occasional Seldom Unlikely	
Prepared by (Name/Title):	Jeff Tweeddale/Senior Scientist	Catastrophic	E E H H M	
Reviewed by (Name/Title):	Libby Bowen/ Senior Scientist II	Critical	E H H M L	
		Marginal	H M M L L	
		Negligible	M L L L L	
This AHA involves the following: Establishing site specific measures for performing oversight on field work on site This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.		Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)		
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible		E = Extremely High Risk
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.		H = High Risk
			M = Moderate Risk	
			L = Low Risk	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE: safety glasses, gloves, steel toe work boots. Hard hat if working with overhead hazards or heavy equipment	Competent / Qualified Personnel: Name – Position/Employer Training requirements: Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect all PPE prior to use

AHA - Field Work Oversight Activity Description



Job Steps	Hazards	Controls	RAC
1. Prepare for site visit	1a) N/A	▪ Obtain and review HASP prior to site visit, if possible ▪ Determine PPE needs – bring required PPE to the site, if not otherwise being provided at the site (e.g., steel toed boots) ▪ Determine training and medical monitoring needs and ensure all required Health and Safety training and medical monitoring has been received and is current ▪ Complete site specific/ client required training ▪ Ensure all workers are fit for duty (alert, well rested, and mentally and physically fit to perform work assignment) ▪ First aid kits shall be available at the work site and on each transport vehicle. ▪ Familiarize yourself with route to the site ▪ Check weather forecast. Pack appropriate clothing and other items (e.g., sunscreen) for anticipated weather conditions ▪ Verify that subsurface utilities have been identified.	L
2. Traveling to the site by vehicle	2a) See AHA for Mobilization, Demobilization and Site Preparation	▪ See AHA for Mobilization, Demobilization and Site Preparation	L
3. Initial arrival—assess site conditions	3a) Communication with subcontractor and other site personnel	▪ Develop communication methods (agree on hand signals, warning alarms) ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazards. ▪ Always know the whereabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone ▪ Hold and document Safety tailgate meetings ▪ Establish work zones, evacuation routes and rally locations.	L

AHA - Field Work Oversight Activity Description



	3b) Insect Bites and Stings	▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects. ▪ Inform crew members if allergic to insects and what to do if you need assistance. ▪ Avoid wearing heavy fragrances. ▪ Carry first-aid and sting relief kits. ▪ Carry identification of known allergies and necessary emergency medication. ▪ Spray clothing with insect repellent as a barrier. ▪ Wear light colored clothing that fits tightly at the wrists, ankles, and waist. ▪ Cover trouser legs with high socks or boots. ▪ Tuck in shirt tails.	L
	3c) Poisonous plants	▪ Wear long sleeves, long pants and boots ▪ Ensure all field workers can identify the plants. Mark identified poisonous plants with high visibility spray paint if working at a fixed location. ▪ Look for signs of poisonous plants and demark area to aid in avoiding plant. ▪ Do not touch any plant part to any part of your body/clothing. ▪ Use commercially available products such as Ivy Block or Ivy Wash as appropriate.	L
	3d) Vermin, leaches, animal borne disease	▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Wear long sleeve shirt and full length pants ▪ Be aware of your surroundings. ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers.	L
	3e) Chemical Hazards	▪ Wear chemical resistant PPE as identified in the HASP ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labeled	L

AHA - Field Work Oversight Activity Description



	3f) Overhead Power Lines	- Identify the location of all overhead power lines at the site. - Maintain clearances depending on voltage - All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV or less). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead power lines known to be 50 kV or less and 35 feet from all others.) - Re-locate work so it is not close to power lines - Avoid storing materials under overhead power lines	L
	3g) Underground Utilities	- All utilities will be marked prior to excavation activities - For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet - Use lineman's gloves when locating underground power lines - Work at adequate offsets from utility locations - Immediately cease work if unknown utility markings are discovered.	L
	3h) Cold Stress	- Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. - Take layers off as you heat up; put them on as you cool down. - Wear head protection that provides adequate insulation and protects the ears. - Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. - Acclimate to the cold climate to minimize discomfort. - Maintain adequate water/fluid intake to avoid dehydration. - Be aware of signs of hypothermia, its prevention, detection and treatment. - Have extra protection available, in case of an emergency such as blankets and heating devices. - Don't work under extremely adverse weather conditions - Stay in tune to current weather and extended forecasts.	L

AHA - Field Work Oversight Activity Description



	3i) Heat Stress	▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.	L
	3j) Lightning and Thunder	▪ Monitor weather channels to determine if electrical storms are forecasted. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thunder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds.	L
	3k) Severe Weather	▪ Watch for clouds and incoming weather. ▪ Monitor weather forecasts. ▪ Train workers about weather and appropriate precautions. ▪ Identify a shelter and a safe place in event of tornado etc	L
	3l) Sun	▪ Keep body protected ▪ Wear sunscreen, wide brimmed hat or hardhat. ▪ Schedule work for cool part of day. ▪ Take breaks in the shade.	L
	3m) High Crime Areas	▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone ▪ Do not work after dark.	L

AHA - Field Work Oversight Activity Description



	3n) Operations conducted at an active facility	▪ Stay well clear of operations being conducted at the facility ▪ Keep alert for moving materials, equipment or vehicles ▪ Determine client specific PPE needs prior to arriving at the site ▪ Determine client specific emergency response procedures and follow as appropriate ▪ Participate in client required safety training ▪ Get copies of Clients MSDSs for any client chemicals that workers may be exposed to. ▪ Provide MSDSs to client for all chemicals brought to the site.	L
	3o) Remote Locations	▪ Carry a two-way radio and know how to use it. ▪ Work in teams. Account for all at the end of the work day. ▪ Make sure someone on crew is certified in first aid. ▪ Carry a first aid kit.	L
	3p) Set up Decon Station	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: ○ Gross boot wash and rinse and removal ○ Outer glove removal ○ Suit removal ○ Respirator removal (if worn). ○ Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.	L
4. Walk around the Site	4a) Poisonous plants	▪ See section 3C above	L
	4b) Vermin, leaches, animal borne disease	▪ See Section 3 D above	L
	4c) Chemical Hazards	▪ See Section 3 E above	L

AHA - Field Work Oversight Activity Description



	4d) Slips/Trips/Falls	- Wear slip resistant footwear preferably laced boots with a minimum 8" high upper and non-skid soles for ankle support and traction. - Pay attention to where you place your feet - Slow down and use extra caution around logs, rocks, and animal holes. - Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. - Site SHSO will inspect the entire work area to identify and mark hazards. - Clear area of trip hazards; mark or barricade those that cannot be moved; - Use caution when walking around excavated areas - Stay back at least 5 feet from excavated areas - Use caution when walking on or around loose soil. - Be aware of surroundings. Avoid muddy areas if possible.	L
5. Oversight during drilling, or construction operations	5a) Heavy Equipment/ Vehicles	- Spotters will be used when backing up trucks and heavy equipment and when moving equipment. - Ground personnel in the vicinity of vehicles or heavy equipment operations will be within the view of the operator at all times. - Ground personnel will be aware of the swing radius and maintain an adequate buffer zone. - Ground personnel will not stand directly behind heavy equipment when it is in operation. - Personnel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. Ground personnel will stay clear of all suspended loads. - Ground personnel will wear high visibility vests - Eye contact with operators will be made before approaching equipment.	L
	5b) Eye Injury	- Wear appropriate safety glasses (tinted for sun). - Watch where you walk, especially around trees and brush with protruding limbs.	L
	5c) Foot Injury	- Wear steel toed boots - Wear insulated steel toed boots during winter - Ensure shoes/boots have good traction - Pay attention to where you place your feet, especially when walking on uneven terrain	L

AHA - Field Work Oversight Activity Description



	5d) Head Injury	- Wear hardhat - Do not walk or work under scaffolding or other elevated work unless there are guardrails and toeboards in place - Flag or mark protruding objects at head level	L
	5e) Chemical Hazards	- See Section 3E above - Wash hands and face prior to consumption of food, beverage or tobacco.	L
	5f) Dust - particulates (respiratory)	- Use dust suppression methods - Stand upwind of point of dust generation	L
	5g) Overhead Power Lines	See Section 3F above.	L
	5h) Underground Utilities	See Section 3G above	L
	5i) Standing/Static Posture	- Change posture on a frequent basis - Stretch prior to any physical activity	L
	5j) Slips/^ Trips/Falls	See Section 4D above	L
	5k) Noise	- Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs). - All equipment will be equipped with manufacturer's required mufflers. - Hearing protection shall be worn by all personnel working in or near heavy equipment. - Hearing protection will be worn when workers need to shout when standing two feet away from each other. - Segregate noisy equipment from the operators - Use sound dampening around noisy equipment	L
	5L) Moving Equipment	- Clear area of obstructions and communicate with all workers involved that drilling is beginning - Do not exceed manufacturer's recommended speed, force, torque, or other specifications. and penetrate the ground slowly with hands on the controls for at least the first foot of soil to minimize chance of auger kick-out - Stay clear of rotating auger - Use long-handled shovel to clear away cuttings when auger has stopped - Do not wear loose clothing - Wear appropriate PPE including leather gloves and steel-toed boots (See HASP)	L

AHA - Field Work Oversight Activity Description



6. Sampling Oversight	6a) Chemical Hazards	▪ See Section 3E above ▪ Wash hands and face prior to consumption of food, beverage or tobacco. ▪ Calibrate meters in a clean, well ventilated area ▪ Store calibration gases in well vented area. Ensure chemical labels and warnings are legible.	L
	6b) Personnel Decontamination	▪ Refer to MSDS for specific hazards associated with decon solutions ▪ Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.), if appropriate (see HASP) ▪ Removal of PPE will be performed by the following tasks in the listed order: ○ Gross boot wash and rinse and removal ○ Outer glove removal ○ Suit removal ○ Respirator removal (if worn). ○ Inner glove removal ▪ Contaminated PPE is to be placed in the appropriate, provided receptacles. ▪ Employees will wash hands, face, and any other exposed areas with soap and water. ▪ Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. ▪ Decon solutions will be disposed of according to the work plan.	L
	6c) Lifting	▪ Good lifting techniques (lift with legs not back) ▪ Mechanical devices (e.g., hand truck, cart, forklift, etc.) should be used to reduce manual handling of materials and drums. ▪ Team lifting should be utilized if mechanical devices are not available. (mandatory for items over 50 lbs) ▪ Split heavy loads in to smaller loads ▪ Make sure that path is clear prior to lift. ▪ Redesign work area to avoid low lifts ▪ Stretch prior to lifting ▪ Maintain a healthy life style and level of physical fitness.	L

AHA - Field Work Oversight Activity Description



	6d) Hand Tools	▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or work surface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools. ▪ Daily inspections will be performed. ▪ Remove broken or damaged tools from service and tag out as defective ▪ No tampering with electrical equipment is allowed (e.g., splicing cords, cutting the grounding prong off plug, etc.) ▪ Do not use excessive force or impact ▪ Do not use tool improperly. Ensure all workers are trained	L
	6e) Slips/Trips/Falls	▪ See Section 4D above.	L

AHA - Field Work Oversight Activity Description



	6f) Struck by Vehicle	▪ Ground personnel in the vicinity of vehicles operations will be within the view of the operator at all times. ▪ Ground personnel will not stand directly behind vehicles when it is in operation ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads. ▪ Try to park so that you don't have to back up to leave. ▪ If backing in required, walk around vehicle to identify any hazards (especially low level hazards that may be difficult to see when in the vehicle) that might be present. Use a spotter if necessary ▪ Place cones in the front and rear of the vehicle ▪ Prior to driving off, walk around vehicle to collect cones and identify any hazards - especially low level hazards that may be difficult to see when in the vehicle. ▪ Set up "Workers in the Road" or similar warning signs and cones to alert traffic. ▪ Use emergency flashers and roof top flashing light (recommended) to alert oncoming vehicular traffic. ▪ Remain alert at all times as to the traffic outside the vehicle. Step to the side of the road when distracted by by-standers. Keep unofficial personnel out of the work area. ▪ Exit vehicle with caution. ▪ Wear High Visibility Vest when outside the vehicle. Utilize vehicle as a shield from oncoming traffic, as practical	L
7. IDW pickup oversight	7a) Foot Injury	▪ See Section 5C above.	L
	7b) Chemical Hazards	▪ See Section 3E above.	L
	7c) Lifting	▪ See Section 6C above.	L
	7d) Slips/Trips/Falls	▪ See Section 4D above	L
8. Return to office/home	8a) See Mobilization/ Demobilization and Site Preparation AHA	See Mobilization/ Demobilization and Site Preparation AHA	L

Job Hazard Analysis - HASP Format

Job Title: Decontamination

Date of Analysis: 5/30/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Establish Decontamination Station	1A) Materials Handling	1A) Materials Handling - Use proper lifting techniques - Use mechanical aids, if available, to move heavy items.
2. Decontamination / Steam cleaning.	2A) Struck by steam/hot water/pressure washing	2A) Struck by steam/hot water - Workers not directly engaged in steam cleaning operations must stay clear. - Workers using steam cleaning equipment must be trained on operation and safety devices/procedures using the owners/operators manual. - Use face shield and safety glasses or goggles, if steam cleaning. - Stay out of the splash/steam radius. - Pressure washer must have dead man switch. - Do not direct steam at anyone. - Do not hold objects with your feet or hands. - Ensure that direction of spray minimizes spread of contaminants of concern. - Use shielding as necessary.
	2B) Exposure to contaminants	2B) Exposure to contaminants - Conduct air monitoring (see HASP). - Wear proper PPE (see HASP). - See MSDSs for hazards associated with the decon solutions used (if other than water alone is used).
	2C) Slips/Trips/Falls	2C) Slips/Trips/Falls - Be cautious as ground/plastic can become slippery - Use boots or boot covers with good traction
3. Vehicle Decontamination	3A) Vehicle traffic in and out of the CRZ	3A) Large Vehicle Traffic - Always wear a hard hat, steel toe boots, and a high visibility vest (unless Tyveks are used and are high visibility). - Vehicle drivers are not to exit the vehicle in the CRZ. - Identify an individual to communicate with vehicle drivers and maintain order - Trucks will be lined with plastic and kept out of direct contact with any contaminated materials during loading. Wear PPE when removing plastic lining from truck beds. - If not in the vehicle, obtain eye contact with the driver, so he is aware of your presence and location in the CRZ. - If you are driving the vehicle, be aware of personnel in the CRZ and maintain communication with the identified personnel.
	3B) Exposure to contaminants	3B) Exposure to contaminants - Use safety glasses or goggles, Polycoated Tyvek (if level of contamination poses dermal hazard or to keep work clothes dry), high visibility vest (if high visibility Tyveks are not used) hard hats, steel toe boots, and gloves while cleaning contaminated materials. - Do not doff PPE until decontamination of the vehicle is complete and a decontamination certificate has been issued by the HSO. - Conduct air monitoring (see HASP). - See MSDSs for hazards associated with the decon solutions (if other than water alone is used).

Job Hazard Analysis - HASP Format

Job Title: Decontamination

Date of Analysis: 5/30/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3C) Slips/Trips/Falls	3C) Slips/Trips/Falls - Be cautious as ground/plastic can become slippery - Use boots or boot covers with good traction
4. Equipment and Sample Decontamination	4A) Chemical exposure when handling contaminated sample jars and equipment	4A) Chemical exposure - Wear PPE as outlined in the HASP. - Refer to MSDS for specific hazards associated with decon solutions - Monitor breathing zone for contaminants - Monitor breathing zone for decon solutions (e.g., methanol, hexane, etc.) if appropriate (see HASP)
	4B) Materials Handling related injuries	4B) Materials Handling related injuries - Use proper lifting techniques when lifting heavy equipment - Use two person lift for heavy coolers
5. Personal Decontamination	5A) Exposure to contaminants	5A) Exposure to contaminants - Avoid bringing contaminated materials via shoes and clothing into the CRZ by examining such prior to exiting the EZ. - Removal of PPE will be performed by the following tasks in the listed order: - Gross boot wash and rinse and removal - Outer glove removal - Suit removal - Respirator removal (if worn). - Inner glove removal - Contaminated PPE is to be placed in the appropriate, provided receptacles. - Respirators will be removed and decontaminated at a specified location within the CRZ by a designated technician, then placed in storage bag. - Employees will wash hands, face, and any other exposed areas with soap and water. - Portable eyewash stations and showers will be available should employees come into direct contact with contaminated materials. - See MSDSs for hazards associated with the decontamination solutions used. - Decon solutions will be disposed of according to the work plan.

AHA – Utility Clearance



Activity/Work Task:	<u>Utility Clearance Activities</u>	Overall Risk Assessment Code (RAC) (Use highest code)					H	
Project Location:		Risk Assessment Code (RAC) Matrix						
Contract Number:		Severity	Probability					
Date Prepared:	8-31-2010		Date Accepted:		Frequent	Likely	Occasional	Seldom
Prepared by (Name/Title):	Kendra Bavor, CSP		Catastrophic	E	E	H	H	M
			Critical	E	H	H	M	L
Reviewed by (Name/Title):			Marginal	H	M	M	L	L
			Negligible	M	L	L	L	L
Notes: (Field Notes, Review Comments, etc.) This AHA involves the following: Establishing site specific measures This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.			Step 1: Review each " Hazard " with identified safety " Controls " and determine RAC (See above) "Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely. "Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.					RAC Chart E = Extremely High Risk H = High Risk M = Moderate Risk L = Low Risk

AHA – Utility Clearance



Job Steps	Hazards	Controls	RAC
1. Pre-planning	1A) Property Access - Animal bites - Dangerous social areas/ violent neighborhoods - Lost - Electrocution	1A) Ensure communications with the property owner. Request pets and animals to be confined during the survey. - Maintain communications via two way radios or cell phones. - Learn animal posturing including how to identify rabid animals. - Contract security as appropriate for safety and equipment theft. - Be prepared with a map and compass as necessary. - Be aware of overhead and underground utilities. Ensure Dig-Safe has been contacted. 1) When working with electrical equipment avoid wet surfaces and exposed connections.	L
	1B) Utilities Not Cleared (damage to utilities, worker injury)	1B) Utilities Not Cleared. - Provide sufficient time and budget to ensure that utilities have been adequately located, prior to the start of up of work. - Contact One Call Utility identifier organization at least 6 days prior to the project start date. - Cite or have subcontractor cite a start date of at least 3 working days prior to actual planned start date (provides window to inspect locations prior to job start-up). - Verify via emails or phone that all utilities have visited the site and marked their respective utilities. - If subcontractor calls One Call organization, require them to forward all e-mail responses from member utilities as they receive them. - If verification cannot be done remotely, send worker to site to inspect ground for markings (cheaper to identify issues prior to mobilization to the site). - Document all phone communications with driller about utility clearance issues and requests (e-mail the conversation highlights or document in a field notebook – it becomes part of the file record) - Call any member utilities that have not responded indicating they have cleared or marked-out utilities. Place the call morning of ticket start date (e.g., 3 days prior to actual start date). Document the phone conversations in notes or e-mails to the file. - If town services (e.g., sanitary sewer, storm sewer, water) aren't listed as a One Call member, contact the town office to schedule mark-out, obtain copies of utility networks, and identify the appropriate town contacts. - If town maps have lateral connections to private lots marked and /or if we are drilling along road right-of way opposite developed properties, identify the locations of the lateral connections. This may mean contacting abutters and asking to look in basements for location of pipes. If possible do this during a site visit prior to field start. If not, it should occur during the first day of work so any issues can be identified and decisions made on the risk of proceeding. Walk all planned locations with the subcontractor, prior to start of excavation/drilling to identify marked utilities and note any uncertainties. Field Lead should call PM and relay any issues. Document this inspection in the field book and note subcontractor's responses to any MACTEC concerns.	H

AHA – Utility Clearance



	1C) Locating Utilities on Private Property	1C) Locating Utilities on Private Property - Hire private utility locator company - Locate underground utilities by ground penetrating radar, electromagnetic, deep metal detector, pipe transmitter, vibracator, etc - Review locations with property owner, member of operations and maintenance. - Check as built drawings when available. Be aware possible drawing error or construction drawings may not be representative of actual locations. - Use field clues such as manhole covers, repaved areas, depressions, disturbed areas, signs and postings, etc. as indications of access to utilities or recently installed/moved utilities.	M
	1D) Lack of Reliable Data on Utility Locations	1D) Lack of Reliable Data on Utility Locations - If the surveys are not providing reliable data, plan to use non-destructive means to drill/excavate e.g., soil vacuum, water jet, air knife and/or hand tools. - Use caution and proper PPE when using hand tools (hand augers, posthole diggers, shovels, steel rods, etc.). 2) Involve the Project Manager, Technical Lead and/or Office Manager to make a decision to proceed or move the location	L
	1E) Working Near Live Utilities	1E) Working Near Live Utilities - If live utilities are known to be present near drilling/excavation location, if possible, move drilling/excavation to another location. - Lockout/Tagout utilities, if possible. Use non-destructive means to drill/excavate (see # 1D) until safe to proceed.	H
	1F) Slips/Trips/Falls	1F) Slips/Trips/Falls - Keep work area free of excess material and debris - Remove all trip hazards by keeping materials/objects organized and out of walkways - Keep work surfaces dry when possible - Wear appropriate PPE (see HASP) including non-slip rubber boots if working on wet or slick surfaces - Install rough work surface covers where possible - Stay aware of footing and do not run	L
	1G) Heat/Cold Stress	1G) Heat/Cold Stress - Take breaks if feeling faint or overexerted - Consume adequate food/beverages (water, sports drinks) - If possible, adjust work schedule to avoid temperature extremes	L
2. Walking Around Site Identifying Utility Clearances.	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation	2A) Biological Hazards: Insects, Snakes, Wildlife, Vegetation - Inspect work areas when arrive at site to identify hazard(s) - Use insect repellent if observe mosquitoes/gnats - Survey site for presence of biological hazards and maintain safe distance - Wear appropriate PPE including leather gloves, long sleeves and pants, and snake chaps as warranted by site conditions	M

AHA – Utility Clearance



	2B) Traffic (including pedestrian)	2B) Traffic (including pedestrian) ▪ Notify attendant or site owner/manager of work activities and location ▪ Use cones, signs, flags or other traffic control devices ▪ Wear appropriate PPE including high visibility clothing such as reflective vest ▪ Inspect area behind vehicle prior to backing and use spotter	M
	2C) Back strain due to lifting, pulling or tugging equipment	2C) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques	M

AHA – Utility Clearance



Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (1/2 face respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection)	Competent / Qualified Personnel: Name – Position/Employer See HASP Training requirements: List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling

Date of Analysis: 9/21/06

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization	1A) See JHA Mobilization/Demobilization/Site Preparation	1A) See JHA Mobilization/Demobilization/Site Preparation
2. General Site Hazards	2A) See JHA Field Work - General	2A) See JHA Field Work - General
	2B) Chemical exposure	2B) Chemical Exposure Read HASP and determine air monitoring and PPE needs.
3. Calibrate monitoring equipment	3A) Exposure to calibration gases	3A) Exposure to calibration gases - Review equipment manuals - Calibrate in a clean, well ventilated area
4. Opening the well cap, taking water level readings	4A) Contact with poisonous plants or the oil from poisonous plants	4A) Contact with poisonous plants or the oil from those plants: - Look for signs of poisonous plants and avoid. - Ensure all field workers can identify the plants. Mark identified poisonous plants with spray paint if working at a fixed location. - Wear PPE as described in the HASP. - Do not touch any part of your body/clothing. - Always wash gloves before removing them. - Discard PPE in accordance with the HASP. - Use commercially available products such as Ivy Block or Ivy Wash as appropriate.
	4B) Contact with biting insects (i.e., spiders, bees, etc.) which may have constructed a nest in the well cap/well.	4B) Contact with stinging/biting insects - Discuss the types of insects expected at the Site and be able to identify them. - Look for signs of insects in and around the well. - Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." - If necessary, wear protective netting over your head/face. - Avoid contact with the insects if possible. - Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. - Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.
	4C) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated groundwater/ soil); liquid splash; flammable atmospheres.	4C) Exposure to hazardous substances - Wear PPE as identified in HASP. - Review hazardous properties of site contaminants with workers before sampling operations begin - Immediately monitor breathing zone after opening well to determine exposure and verify that level of PPE is adequate – see Action Levels in HASP - Monitor headspace in well. After the initial headspace reading (if required by the Work Plan), allow the well to vent for several minutes before obtaining water level and before sampling. - When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.
	4D) Back strain due to lifting bailers or pumps and from moving equipment to well locations	4D) Back strain - Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. - Use proper lifting techniques

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling

Date of Analysis: 9/21/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4E) Foot injuries from dropped equipment	4E) Foot Injuries - Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. - Do not carry more than you can handle safely - Wear Steel toed boots
5. Collecting water samples	5A) Fire/Explosion/Contamination hazard from refueling generators	5A) Fire/Explosion/Contamination hazard from refueling generators - Turn the generator off and let it cool down before refueling - Segregate fuel and other hydrocarbons from samples to minimize contamination potential - Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited - See JHA for Gasoline use
	5B) Electrocution	5B) Electrocution - A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. - Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. - Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water - Do not stand in wet areas while operating power equipment - Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. - When unplugging a cord, pull on the plug rather than the cord. - Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	5C) Exposure to contaminants	5C) Exposure to Contaminants - Stand up wind when sampling - Monitor breathing zone with appropriate monitoring equipment (see HASP) - Wear chemical resistant PPE as identified in HASP - See section 4C) under Safe Practices above
	5D) Infectious water born diseases	5D) Infectious water born diseases - Wear chemical resistant gloves and other PPE – as identified in HASP - Prevent water from contacting skin - Wash exposed skin with soap and water ASAP after sampling event - Ensure that all equipment is adequately decontaminated using a 10% bleach solution
	5E) Exposure to water preservatives	5E) Exposure to water preservatives - Work in a well ventilated area, upwind of samples - Wear chemical resistant PPE as identified in HASP - When preserving samples always add acid to water, avoid the opposite. - See JHA Working with Preservatives
	5F) Slips/trips/falls	5F) Slips/trips/falls - Ground can become wet/muddy, created by spilled water - Place all purged water in drums for removal - Wear good slip resistant footwear
	5G) Repetitive Motion and other Ergonomic Issues	5G) Ergonomic Issues - Use mechanical means where possible to raise and lower equipment into well. - Alternate raising and lowering equipment between field sampling team members, and alternate bailing the well. - Use safe lifting techniques.

Job Hazard Analysis - HASP Format

Job Title: Groundwater Sampling**Date of Analysis:** 9/21/06

Key Work Steps	Hazards/Potential Hazards	Safe Practices
6. Sample Processing	6A) Contaminated water	6A) Contaminated water ▪ Wear appropriate PPE as identified in HASP ▪ Decontaminate outside of bottles ▪ Prevent water from contacting skin ▪ Work in well ventilated area – upwind of samples ▪ Waste will be returned to the operation office for storage and disposal
7. Shipping Samples	7A) Freeze burns, back strain, hazardous chemical exposure, sample leakage	7A) Freeze burns, back strain, hazardous chemical exposure, sample leakage ▪ Wear appropriate chemical resistant gloves as identified in HASP. ▪ Wear leather or insulated gloves when handling dry ice. ▪ Follow safe lifting techniques – get help lifting heavy coolers. ▪ Samples that contain hazardous materials under the DOT definition, must be packaged, manifested and shipped by personnel that have the appropriate DOT HAZMAT training.

Job Hazard Analysis - HASP Format

Job Title: Soil Sampling

Date of Analysis: 5/1/07

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for sampling event	1A) Chemical exposure	1A) Chemical Exposure Read HASP and determine air monitoring and PPE needs.
2. Mobilization	4A) See JHA Mobilization/Demobilization/Site Preparation	2A) See JHA Mobilization/Demobilization/Site Preparation
3. General Site Hazards	3A) See JHA Field Work - General	3A) See JHA Field Work - General
4. Carrying equipment to site location	4B) Back or muscle strain	4A) Back or muscle strain - Use proper lifting techniques when lifting pumps or generators - Use mechanical aids if available - Use 2 person lift for heavy items
5. Calibrate monitoring equipment	5A) Exposure to calibration gases	5A) Exposure to calibration gases - Review equipment manuals - Calibrate in a clean, well ventilated area
6. Preparing sampling location	6A) Contact with poisonous plants or the oil from poisonous plants	6A) Contact with poisonous plants or the oil from those plants: - Look for signs of poisonous plants and avoid. - Wear PPE as described in the HASP. - Do not touch anything part of your body/clothing. - Always wash gloves before removing them. - Discard PPE in accordance with the HASP.
	6B) Contact with biting insects (i.e., spiders, bees, etc.)	6B) Contact with stinging/biting insects - Discuss the types of insects expected at the Site and be able to identify them. - Look for signs of insects in and around the well. - Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." - If necessary, wear protective netting over your head/face. - Avoid contact with the insects if possible. - Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. - Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.
	6C) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated soil); flammable atmospheres.	6C) Exposure to hazardous substances - Wear PPE as identified in HASP. - Review hazardous properties of site contaminants with workers before sampling operations begin - Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. - When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.
	6D) Back strain due to lifting or moving equipment to sampling locations	6D) Back strain - Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. - Use proper lifting techniques

Job Hazard Analysis - HASP Format

Job Title: Soil Sampling

Date of Analysis: 5/1/07

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6E) Foot injuries from dropped equipment	6E) Foot Injuries - Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. - Do not carry more than you can handle safely - Wear steel toed boots
7. Collecting soil samples	7A) Working around drill rigs	7A) See JHA - Drilling
	7B) Encountering underground or overhead utilities	7B) Have all utilities located.
	7C) Fire/Explosion/Contamination hazard from refueling generators	7C) Fire/Explosion/Contamination hazard from refueling generators - Turn the generator off and let it cool down before refueling - Segregate fuel and other hydrocarbons from samples to minimize contamination potential - Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited - See JHA for Gasoline use
	7D) Electrocution	7D) Electrocution - A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. - Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. - Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water - Do not stand in wet areas while operating power equipment - Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. - When unplugging a cord, pull on the plug rather than the cord. - Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	7E) Exposure to contaminants	7E) Exposure to Contaminants - Stand up wind when sampling - Monitor breathing zone with appropriate monitoring equipment (see HASP) - Wear chemical resistant PPE as identified in HASP - See section 4C) under Safe Practices above
	7F) Exposure to preservatives	7F) Exposure to preservatives - Work in a well ventilated area, upwind of samples - Wear chemical resistant PPE as identified in HASP - Review MSDSs
	7G) Slips/trips/falls	7G) Slips/trips/falls - Ground can become wet/muddy - Wear good slip resistant footwear
	7H) Lifting Injury	7H) Lifting injury - Use proper lifting techniques when carrying quantities of samples - Use proper ergonomics when hand digging for samples
	7I) Eye injury	7I) Eye Injury Wear eye protection when using picks or similar devices to loosen soil
	7J) Fire	7J) Fire - When using gas powered auger, maintain fire watch whenever fueling or otherwise handling gasoline - See JHA - Gasoline

Job Hazard Analysis - HASP Format

Job Title: Soil Sampling

Date of Analysis: 5/1/07

Key Work Steps	Hazards/Potential Hazards	Safe Practices
8. Soil sampling using floor corer	8A) Back injury	8A) Back Injury - Use proper lifting techniques when moving floor corer and generator - Use mechanical aids if available - Use two person lift for heavy items.
	8B) Electric Shock	8B) Electric Shock - Use electric cords free from defects - Keep cords out of water - Ensure all electrical equipment is properly grounded - Use GFCI
	8C) Hearing	8C) Hearing Wear hearing protection
	8D) Fire	8D) Fire - When using generator, maintain fire watch whenever refueling or otherwise handling gasoline - See JHA - Gasoline
	8E) Contamination	8E) Contamination - Use appropriate PPE for the contaminants of concern (see HASP). - Minimize sample contact - Label sample in accordance with procedures - Monitor breathing zone levels.

Job Hazard Analysis - HASP Format

Job Title: Soil Vapor and Sub-Slab-Indoor Air Sampling

Date of Analysis: 11/1/2007

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves-nitrile, flashlight/lamp

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization	1A) See JHA Mobilization/Demobilization/Site Preparation	1A) See JHA Mobilization/Demobilization/Site Preparation
2. General Site Hazards	2A) See JHA Field Work - General	2A) See JHA Field Work - General
	2B) Chemical exposure	2B) Chemical Exposure Read HASP and determine air monitoring and PPE needs.
3. Calibrate monitoring equipment	3A) Exposure to calibration gases	3A) Exposure to calibration gases - Review equipment manuals - Calibrate in a clean, well ventilated area
4. Access Residence or outdoor location	4A) Tripping hazards	4A) Observe floors/stairs for potential tripping hazards
	4B) Back strain	4B) Watch back when carrying equipment into residence
	4C) Chemical Hazard	4C) Be careful when identifying residential chemicals Wear PPE as described in the HASP.
5. Drill Hole in basement floor or exterior location	5A) Electrocution	5A) Electrocution - A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. - Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. - Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water - Do not stand in wet areas while operating power equipment - Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. - When unplugging a cord, pull on the plug rather than the cord. - Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	5B) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated Soil Vapor).	5B) Exposure to hazardous substances - Wear PPE as identified in HASP (steel-toed boots, safety glasses, nitrile gloves and a flashlight or lamp). - Review hazardous properties of site contaminants with workers before sampling operations begin - Immediately monitor breathing zone using a PID after drilling hole to determine exposure and verify that level of PPE is adequate – see Action Levels in HASP
	5C) Back strain due to lifting and from moving equipment	5C) Back strain - Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. - Use proper lifting techniques
	5D) Foot injuries from dropped equipment/drill bit	5D) Foot Injuries - Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. - Do not carry more than you can handle safely - Watch feet when drilling and hold drill firmly - Wear Steel toed boots



Job Hazard Analysis - HASP Format

Job Title: Soil Vapor and Sub-Slab-Indoor Air Sampling

Date of Analysis: 11/1/2007

Key Work Steps	Hazards/Potential Hazards	Safe Practices
6. Collecting sample	6A) Burn Hazard/fire Hazard	6A) Burn Hazard/ Fire Hazard from Melting Wax - Place hot plate in safe location away from flammable material - Be careful with exposed skin when working around hot plate and hot wax. - Pour wax with spoon and avoid splatter.
	6B) Cutting Hazard	6B) Be careful with sharp knives when cutting tubing
	6C) Exposure to contaminants	6C) Exposure to Contaminants - Monitor breathing zone with appropriate monitoring equipment (see HASP) - Wear chemical resistant PPE as identified in HASP - See section 5B) under Safe Practices above
7. Collecting sample	7A) Pinching Hazard	7A) Pinching Hazard from attaching regulators/tubing Be careful when using wrenches to attach regulator and or tubing to cans to not pinch fingers

AHA - - Indoor Air Sampling

Activity/Work Task:	Indoor air Sampling	Overall Risk Assessment Code (RAC) (Use highest code)	M
Project Location:		Risk Assessment Code (RAC) Matrix	
Contract Number:		Severity	Probability
Date Prepared:	3/11/2016 Date Accepted:		
Prepared by (Name/Title):	Kendra Bavor, CSP	Frequent	Likely
Reviewed by (Name/Title):		Occasional	Seldom
		Unlikely	
Notes: (Field Notes, Review Comments, etc.) This AHA involves the following: Establishing site specific measures This AHA is not an exhaustive summary of all hazards associated with the Site. Refer to the site HASP for additional requirements. Contractor to follow general site safety controls for Slips Trips and Falls, Biological hazards, cuts lacerations and pinch points, and emergency procedures.		Catastrophic	E
		Critical	E
		Marginal	H
		Negligible	M
		Step 1: Review each " Hazard " with identified safety " Controls " and determine RAC (See above)	
		"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely. RAC Chart	
		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible E = Extremely High Risk	
		Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA. H = High Risk	
		M = Moderate Risk	
		L = Low Risk	

AHA - - Indoor Air Sampling

Job Steps	Hazards	Controls	RAC
1. Mobilization	1A) See JHA Mobilization/Demobilization/Site Preparation	1A) See JHA Mobilization/Demobilization/Site Preparation	M
2. General Site Hazards	2A) See JHA Field Work - General	2A) See JHA Field Work - General	
	2B) Chemical exposure	2B) Chemical Exposure Read HASP and determine air monitoring and PPE needs.	
3. Calibrate monitoring equipment	3A) Exposure to calibration gases	3A) Exposure to calibration gases - Review equipment manuals - Calibrate in a clean, well ventilated area	
4. Access Residence or indoor location	4A) Tripping hazards	4A) Observe floors/stairs for potential tripping hazards	
	4B) Back strain	4B) Watch back when carrying equipment to the sample location. - Use mechanical aids when possible for bulky large or heavy items, if mechanical aids are not available, use two person lifts for heavy items. - Use proper lifting techniques	
	4C) Chemical Hazard	4C) Be careful when identifying chemicals Wear PPE as described in the HASP.	
	5A) Foot injuries from dropped equipment/drill bit	5B) Foot Injuries - Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. - Do not carry more than you can handle safely - Watch feet when drilling and hold drill firmly - Wear Steel toed boots	
5. Collecting sample, set up pumps or sample equipment	6A) Exposure to contaminants	6A) Exposure to Contaminants - Monitor breathing zone with appropriate monitoring equipment (see HASP) - Wear chemical resistant PPE as identified in HASP - See section 5B) under Safe Practices above	
6. Collecting sample	7A) Pinching Hazard	7A) Pinching Hazard from attaching regulators/tubing/ pump clips. Be careful when using wrenches to attach regulator and or tubing to cans to not pinch fingers	

AHA - - Indoor Air Sampling

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
PPE (1/2 face respirator with P-100 cartridge, Hard Hat, safety glasses, gloves, steel toe work boots, high visibility safety vest, hearing protection) Calibration gas Sample instrument	Competent / Qualified Personnel: Name – Position/Employer Training requirements: List specific certification (as applicable) Site Specific HASP Orientation Toolbox safety meeting Task kick-off meeting	Daily inspection of equipment per manufacturer's instructions. Tag tools that are defective and remove from service. Inspect power cord sets prior to use. Inspect all PPE prior to use

Job Hazard Analysis - HASP Format

Job Title: Working with Preservatives (Acids)

Date of Analysis: 5/30/06

Minimum Recommended PPE*: Safety glasses/goggles, nitrile gloves,

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Opening the box of ampoules	1A) Cuts or punctures with a knife	1A) Cuts or punctures with a knife Use appropriate techniques when handling a knife. Always cut away from you.
	1B) Broken ampoules in the box. Cuts from the broken glass.	1B) Broken ampoules in the box. Cuts from the broken glass. - Wear safety goggles and protective gloves. - Dispose of the preservative and broken glass by approved methods.
	1C) Broken ampoules in the box. Breathing fumes.	1C) Broken ampoules in the box. Breathing fumes. - Wear safety goggles and protective gloves. - Always work in a well-ventilated area.
2. Breaking top of glass ampoule	2A) Cuts from the broken glass.	2A) Cuts from the broken glass - Wear safety goggles and protective gloves. - Use a paper towel to wrap ampoule in to snap the top or use an ampoule breaker. - Always point the ampoule away from you when you snap off the top.
	2B) Skin contact chemical burns.	2B) Skin contact chemical burns. - Wear safety goggles and protective gloves. - Fumes may come into contact with the perspiration on your skin and rehydrate to form an acid. - If your skin itches, flush affected area for 15 minutes with water.
	2C) Eye contact	2C) Eye contact - Wear safety goggles. - If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.
	2D) Breathing fumes	2D) Breathing fumes HNO₃ and HCL have high vapor pressure. Always work in a well-ventilated area.
3. Adding acid to sample	3A) Chemical reaction	3A) Chemical reaction Wear safety goggles and protective gloves. Acid may react with high alkaline sample and fizz (releases CO₂).
	3B) Eye contact	3B) Eye contact - Wear safety goggles. - If acid splashes in the eyes, flush eyes for 15 minutes with water. Seek medical advice.
	3C) Skin contact chemical burns.	3C) Skin contact chemical burns. Wear safety goggles and protective gloves.
4. Ampoule disposal	4A) Cuts from the broken glass.	4A) Cuts from the broken glass. - Wear safety goggles and protective gloves. - Place used ampoules in an empty, non-reactive container in the field and bring it back to the office. Dispose of the preservative and broken glass by approved methods.