REMEDIAL INVESTIGATION WORK PLAN

BCP Site # C734145

Loucks Road Extension
Town of Dewitt
Onondaga County, New York

Prepared by:

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REVISION	DATE	SUMMARY OF REVISION
01	February 2019	Update soil sampling requirements at well locations; 1,4-dioxane detection limit; emerging contaminant results input to EQuIS; update CPP contacts; add temporary barrier to HASP; exemption of CAMP when utilizing hand tools for soil sampling

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COMMON ACRONYMS AND ABBREVIATIONS

AAI – All Appropriate Inquiries
ACM – Asbestos-Containing Material
AST – Aboveground Storage Tank
ASTM – American Society for Testing Materials International
BER – Business Environmental Risk
bgs – Below Ground Surface
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CESQG – Conditionally Exempt Small Quantity Generator
CFR – Code of Federal Regulations
CP-51 – (NYSDEC) Commissioner's Policy #51 (Soil Cleanup Guidance)
CREC – Controlled Recognized Environmental Condition
DEC – Department of Environmental Conservation
EDR – Environmental Data Resources (Company)
ESA – Environmental Site Assessment
FOIA/FOIL – Freedom of Information Act/Law
GIS – Geographic Information Systems
GWS – Groundwater Standard
HREC – Historical Recognized Environmental Condition
LBP – Lead-Based Paint
LQG – Large Quantity Generator
N/A – Not Applicable
NRCS – Natural Resource Conservation Service
NYSDEC – New York State Department of Environmental Conservation
PAH – Polycyclic Aromatic Hydrocarbons
PCB – Poly-Chlorinated Biphenyls
pCi/L – Picocuries per Liter
ppb – Parts Per Billion
ppm – Parts Per Million
RCRA – Resource Conservation and Recovery Act
REC – Recognized Environmental Condition
RSCO – Restricted Soil Cleanup Objective
SCO – Soil Cleanup Objective
SQG – Small Quantity Generator
SVOC – Semi-Volatile Organic Compound
TOGS – Technical & Operational Guidance Series 1.1.1 (NYSDEC)
USDA – United States Department of Agriculture
USEPA – United States Environmental Protection Agency
USGS – United States Geological Survey
UST – Underground Storage Tank
VOC – Volatile Organic Compound

1.0 SITE AND PROJECT BACKGROUND

1.1 SITE LOCATION AND DESCRIPTION

The Site is comprised of two parcels totaling 12.47 acres:

- Parcel ID# 017.-06-01.1 (8.97 acres)
- Parcel ID# 017.-06-01.5 (3.50 acres)

1.1.1 Location

The center of the Site is situated at approximately 43° 6' 18.97" latitude and -76° 4' 3.072" longitude.

As shown in Figure 1, the Loucks Road Extension Brownfield Area (Site) is located in a rural-suburban area bordered by Canada Drive and a package distribution facility to the north, the Collamer Cemetery to the southeast, Vollmer's Farm Market (greenhouses) to the south, and Loucks Road Extension and dwelling units to the west.

1.1.2 Site Features

The Site is currently undeveloped. It is mostly covered by weeds, shrubs, and a few trees and wooded areas. A portion of Loucks Road crosses and separates approximately ten percent of the Site from the remaining ninety percent.

The Site is mostly flat and thickly vegetated by numerous weed and shrub species ranging two to eight feet in height depending on plant species and season. There are some areas (primarily in the southern portion) that are forested with trees ranging from approximately one inch to one foot in trunk diameter. See Section 2.1.1 regarding the cutting of trees.

1.1.3 Current Zoning and Land Use

The Site is zoned Industrial, except for the portion bordering the intersection of Loucks Road Extension and Collamer Road (NYS Route 298), which is zoned Business Transitional. Although properties located nearby are zoned Industrial, Business Transitional, and Residential, they are currently utilized for residential, commercial, industrial, public service area, and agricultural purposes.

1.2 OWNERSHIP AND USE

The earliest recorded use of the property was the C. Nichols dairy farm in 1889. No property use records were identified from 1889 to 1961. From 1961 to 1990, the Site supported a dairy farm / farmstead, field crops, a pasteurized milk plant, and a sand quarry (Waite Dairy, Inc.).

In 1990 the property was sold to 100 Collingwood Corporation (a sister company to WBP), and the farming/quarry operations ceased. The Site remained unused until April 2008, when the Site was cleared and graded, and limited improvements (roadways, storm sewers, and retention pond) were constructed. WBP assumed title to the Site in 2009.

The Site is currently owned by Woodbine Business Park, Inc., who is the party accepted into the Brownfield Cleanup Program as a Volunteer. Within this Remedial Investigation Work Plan, Woodbine Business Park, Inc. will hereby be referred to as "Owner", "WBP", or "Volunteer".

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The Site is currently vacant, but has been developed with underground utilities, roads with concrete gutters, storm conveyance, and sidewalks.

The northern portion of the Site is slated for manufacturing, warehousing, or transportation purposes; while the southern portion of the Site (at the corner of Loucks Road Extension and Collamer Road / NYS Route 298) is intended to support a commercial business, such as a restaurant or other business establishment that can take advantage of the corner location. As such, it is planned that the northern portion will be cleaned to Restricted Industrial Use standards, while the southern portion will be cleaned to Restricted Commercial Use standards. Note that the northern portion of the Site will be cleaned to a mix of High-Occupancy and Low-Occupancy standards, as defined by the USEPA. The areas cleaned to each of these USEPA standards will be determined upon development of Remedial Alternatives.

1.3 GEOLOGIC SETTING

A United States Geologic Survey (USGS) map of the area (Syracuse East Quadrangle, 2010) indicates that the Site is at an elevation of approximately 430 - 460 feet above mean sea level (see Figure 1). The northern and southern portions of the Site are both generally flat, but at different elevations. The middle portion of the site slopes from north to south at a 10% grade

Surficial deposits consist of lacustrine sands (Surficial Geologic Map of New York, Finger Lakes Sheet). Thickness of this material is variable but generally 12-20 feet thick. Nearby deposits consist of lacustrine silts and clays.

The Natural Resources Conservation Service maps soils in the project area as Colonie loamy fine sand, 0-6% slopes. These soils were formed in sandy glaciofluvial materials consistent with the materials identified on the surficial geology map. They are somewhat excessively well drained and deep, with a water table at a depth greater than 80 inches. Minor units mapped in the project area include Lockport and Brockport silty clay loams and Arkport very fine sandy loam.

During prior on-site investigative activities (up to 2.5' bgs), soil moisture was observed to fluctuate depending upon time of year and location across the Site. The soil tended to be a tan sandy loam, particularly sandy on the southern portion of the Site, with some areas of darker coloration in the forested areas.

Bedrock at the site is mapped as Skaneateles Formation shales including the Butternut, Pompey, and Delphi Station shale members and Mottville sandstone member (Bedrock Geology of New York, Finger Lakes Sheet).

Groundwater investigations have not been performed at the Site. Neither the depth of groundwater, nor the direction of groundwater flow, are currently known, but will be measured / calculated during remedial investigation activities (see Section 2.2.1).

1.4 SITE ENVIRONMENTAL HISTORY

This section makes extensive use of the term "surface soil". In this context, the term "surface soil" is defined as the top two inches of soil beneath the vegetative cover.

1.4.1 Discovery of PCB Contamination

A Phase I Environmental Site Assessment (ESA) was commissioned by the Volunteer prior to development of the Park (limited to infrastructure improvements). The ESA report was completed by Beardsley Design Associates in October 2009. The ESA report stated that the prior uses of the Park

were limited to agriculture (field crops) with a small sand quarry along Collamer Road. The report did not identify Recognized Environmental Conditions (RECs) originating at the Park (potential arsenic impacts originating from the adjacent cemetery were noted).

In early 2013, Woodbine was informed that PCBs were allegedly detected in surface soil samples collected at the location of a former topsoil pile on the Park (Soil Pile #1) that was created during site development activities. The samples were collected by Certified Environmental Services, Inc. (CES), on behalf of RH Law, Inc. ("RH Law") in November 2012 without the prior knowledge or consent of Woodbine. Laboratory analysis of the four composite surface soil samples collected by CES revealed Aroclor-1248 concentrations ranging from 78 to 199 ppm (parts-per-million). No other Aroclors were detected.

In April 2013, AECC duplicated the CES sampling event (see Figure 2A), and the PCB Aroclor-1248 was detected in all four of the samples collected, ranging in concentration from 6.32 to 34.4 ppm. No other Aroclors were detected.

Upon receipt of the laboratory results, AECC called the New York State Spill Hotline on behalf of Woodbine, and Spill File Number 13-00433 was assigned.

1.4.2 Prior On-Site Investigations

General Summary of Work

Since the discovery of the PCB contamination, the Volunteer has performed extensive sampling of surface soils and soil piles (plus a limited number of "depth" samples up to 2.5' below grade) in order to determine the nature and extent of PCB contamination at the Site.

Since neither the EPA nor NYSDEC had an applicable guidance for sampling frequency on large parcels, AECC followed a modified grid sampling frequency as presented in the "Guidance for Evaluation Residual Pesticides on Lands Formerly Used for Agricultural Production" published by the Oregon Department of Environmental Quality (DEQ), the exceptions being that none of the samples were composited and no subsurface samples were collected during the initial rounds of sampling. In accordance with the guidance, the required number of samples for parcels of this size resulted in sampling points that were 200-feet on-center.

Due to extensive vegetative growth and size of the site, AECC utilized GPS technology to locate sampling points in the field. First, AECC uploaded sample location coordinates from the planned sample grid (in AutoCAD format) into a handheld GPS device (Trimble Geo6000XH). AECC then used the GPS device to locate the uploaded sample location coordinates in the field.

The surface soil samples were collected at 4 to 6 inches below grade (soil immediately beneath the vegetative layer). AECC first broke the surface adjacent to each sampling location using a long-handled digging shovel, and then pried to lift / loosen the soil from beneath the sample location. Disposable plastic trowels were then used to collect the soil sample, which was immediately placed in a laboratory-provided glass jar.

All samples were placed in coolers and transported under proper chain-of-custody to Spectrum Analytical, Inc. (now Eurofins Spectrum Analytical, Inc., and hereafter referred to as "Spectrum"), an ELAP and NVLAP certified laboratory. The samples were analyzed for PCBs via USEPA SW-846 Method 8082 (PCB Aroclors) with Soxhlet preparation. Duplicate samples were collected at a rate of approximately one duplicate for every 20 samples, and were submitted to Life Science Laboratories, Inc. (hereafter referred to as "LSL") under separate chain-of-custody.

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On-Site Investigations

On October 7, 2014, AECC personnel performed surface soil sampling in accordance with the Oregon DEQ modified grid layout. A total of thirty (30) surface soil samples (identified as SS-37 thru SS-66) were collected. In addition, four (4) samples adjacent to Loucks Road Extension (separate from the grid layout) were collected as a part of this sampling event (these samples are identified as Road 1 through Road 4).

Since laboratory analysis revealed that several of the samples collected during the October 7, 2014 event contained PCB concentrations greater than 10 ppm, AECC personnel performed additional surface soil sampling at locations interspersed within the prior grid layout in an effort to more accurately determine the extent of PCB contamination. This supplemental sampling included the following:

- 12 samples (SS-67 through SS-78) were collected on October 29, 2014
- 17 samples (SS-79 through SS-95) were collected on December 2, 2014.
- 5 samples (SS-98 through SS-101, and SS-106) were collected on December 15, 2014

Also on December 15, 2014, AECC personnel collected soil samples from depth at four locations in an effort to begin determining a vertical profile of the PCB contamination. Samples were collected from 1.5 and 2.5 feet bgs at locations CS-1, SS-53, SS-83, and SS-87.

The locations of on-site samples, including a summary of laboratory analysis results, are presented on Figure 2A.

Off-Site Investigations

Woodbine informed AECC that some of the stockpiled soil originated from the area around the existing retention pond on Woodbine Business Park (approximately 1,000 feet northeast of the Loucks Road Extension site). As a result, AECC personnel collected 4 grab soil samples (Pond-01 through Pond-04) from the berm surrounding the retention pond at the northeast corner of the Site on May 31, 2013. No PCBs were detected in any of the samples collected from the berms.

In order to “clear” the easterly adjacent parcel for development (known as the 17-Acre WBP Development Parcel), on July 17, 2013, AECC personnel collected 36 grab surface soil samples (SS-1 through SS-36) in accordance with the Oregon DEQ modified grid layout.

Of the 36 soil samples collected, three (SS-02, SS-11, and SS-30) contained detectable concentrations of PCBs (concentrations ranged from 0.03 to 0.07 ppm). On October 9, 2014, AECC personnel collected 11 “confirmatory” samples around these three locations to determine if the original “hits” were anomalies in the otherwise “clean” eastern portion of the Site, or if they were part of larger areas of contamination. The sampling plan consisted of the collection of four grab samples around each original sample location (except that only three samples were collected in the vicinity of SS-02, due to the proximity of Soil Pile #3). The confirmatory samples were located at the cardinal directions 20 feet from the original sample locations.

Soil samples SS-96 and SS-97 were collected on the easterly adjacent 17-Acre WBP Development Parcel on December 2, 2014.

On December 15, 2014, four additional soil samples (SS-102 to SS-105) were collected on a parcel located on the northern side of Canada Drive in order to determine if PCB contamination existed to the north of the of the 17-Acre WBP Development Parcel.

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The locations of on-site samples, including a summary of laboratory analysis results, are presented on Figure 2B.

Soil Piles

Two soil piles that were created during site development activities currently exist at the Park: a large soil pile located on-Site along Loucks Road Extension (Soil Pile #2), and a small soil pile located off-Site southeast of the Canada Drive cul-de-sac (Soil Pile #3). Note that Soil Pile #1 had already been removed from the Site (deposited at the RH Law facility, and remediated under a separate Self-Implementing Cleanup Plan (EPA Article No. 7012 3460 0002 1650 5477).

On May 31, 2013, AECC personnel collected ten grab soil samples (SP2-01 through SP2-10) from Soil Pile #2 (see Figure 2A), and six grab soil samples (SP3-01 through SP3-06) from Soil Pile #3. All soil samples were collected from approximately 12-18 inches below the soil pile surface.

On December 29, 2014, AECC personnel collected an additional two composite soil samples (SP3-07 and SP3-08) from various depths within Soil Pile #3.

On August 26, 2016, in order to determine if the soil pile could be used as backfill at another Brownfield site, AECC personnel collected additional samples from Soil Pile #3 in accordance with NYSDEC Commissioner's Policy 51 (CP-51) protocols for a soil pile with a volume between 500-800 cubic yards:

- six grab samples (SP3-09 through SP3-14) for analysis of VOCs
- two composite samples (SP3-15 and SP3-16) for analysis of SVOCs, metals, pesticides, herbicides, and PCBs

Findings and Conclusions

The results of the surface soil sampling reveal widespread PCB contamination, generally decreasing in concentration from a "hot spot" located near the center of the Site. Concentrations within the "hot spot" are approximately 100-200 ppm PCB, with a maximum concentration of approximately 4,400 ppm in one location.

Another area of elevated PCB concentrations (approximately 50-100 ppm PCB) appears to be near roadsides in the northern section of the Site. This observation could be associated with the use of on-site soils to backfill trenches after storm sewers were installed. Outside of the "hot spot" and roadway areas, the Site generally contains soils with PCB concentrations that exceed the Unrestricted Use SCO, but are less than the Industrial Use RSCO.

Soils collected at depth (1.5 and 2.5 feet below grade, respectively) at 4 locations generally showed an order of magnitude decrease in PCB concentrations with each additional foot of depth.

PCBs were either not detected or were detected at concentrations below the Unrestricted SCO within all but two off-site samples. These two samples were located on the 17-Acre WBP Development Parcel that borders the Site to the east. Soil Sample SS-02A exhibited a PCB concentration of 2.39 ppm, which slightly exceeds the Commercial SCO of 1 ppm. Soil sample SS-11d (a duplicate sample) exhibited a PCB concentration of 0.26 ppm, which is less than the Commercial SCO of 1 ppm. It should be noted that the "original" SS-11 sample exhibited a PCB concentration of 0.05 ppm, which is less than the Unrestricted SCO.

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PCBs were either not detected or were detected at concentrations below the Unrestricted SCO within 5 of the 10 samples collected in Soil Pile #2. Of the remaining 5 samples, 4 exhibited PCB concentrations above the Commercial Use RSCO of 1 ppm, but below the allowed 25 ppm Industrial Use RSCO. Sample SP2-08 exhibited a PCB concentration of 25.673 ppm, which is slightly above the allowed 25 ppm Industrial Use RSCO. Note that the final fate of the soils in this pile will be determined by the results of sampling and analysis (see Section 2.2.3), but the current intent is to use the soils as backfill, when and where feasible. This option will be further explored during the development of Remedial Alternatives.

Although the laboratory results from Soil Pile #3 revealed that the soil met the CP-51 criteria for use as fill, the Client ultimately decided to use virgin gravel for the cover at the intended site since it was cheaper to transport and place. Therefore, this pile currently exists at the end of the Canada Drive cul-de-sac (off site), and may be used as backfill during remedial activities at the Loucks Road Extension Site.

Woodbine did not test for petroleum, chlorinated solvents, other VOCs, other SVOCs, metals, or pesticides since these contaminants were not expected to be of concern based on past use and original sampling/analysis performed by the land development contractor. Likewise, groundwater and soil gas were not tested as they were not expected to be impacted.

1.4.3 Historical Aerial Photographs

AECC overlaid the results of the surface soil sampling on top of several historic aerial photographs (from 1938 to 2011) to determine if a potential source of the PCB contamination could be identified (see Exhibits EX-1 and EX-2).

It does not appear that the PCB “hot spot” contamination is associated with a specific prior land use or facility operation, as the PCB “hot spot” appears to reside within an area historically used for field crops. However, there does appear to be a correlation between the separate cropland areas depicted in 1938, 1951, and 1966, and the general area where PCBs were commonly detected (which is now the northern portion of the Brownfield Area). Adjacent fields to the east (17-Acre Development Parcel) and south (Lot 4 of the Brownfield Area) generally appear to be uncontaminated.

2.0 WORK PLAN

The objective of this Work Plan is to describe the steps associated with the Remedial Investigation (RI) activities to further characterize soils and groundwater in specific areas both on and off the subject property. The previous assessments and investigations conducted by AECC serve as the basis for conducting the RI activities as described in the following section of this Work Plan. The purposes of the RI activities are to further delineate the limits of impacted soil and groundwater that were identified during previous environmental investigations, and to further assess the potential for off-site migration of constituents from the Site.

See the Sampling and Analysis Plan presented as Section 3.0 for additional details.

2.1 GENERAL PROTOCOLS

2.1.1 Site Preparation

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Once the sample locations are accepted by the NYSDEC, the coordinates of the locations will be determined and flagged in the field.

In order to access certain sample locations, trees may need to be cut, especially in the southern portion of the Site. Since trees greater than 3 inches Diameter at Base Height (DBH) are considered roosting habitat for bat species, the removal of any trees greater than 3 inches DBH will occur during winter months to avoid impacts to bats.

2.1.2 Soil Screening Methods

Visual and instrument-based soil screening will be performed by a qualified environmental professional when advancing borings, test pits, etc. into known or potentially contaminated material.

When applicable, soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal, material that requires testing, and material that can be returned to the subsurface.

2.1.3 Investigation-Derived Waste Management

Investigation-Derived Waste (IDW) is expected to be placed in sealed drums or containers. However, in case material needs to be stockpiled, the following protocols will be followed:

- Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

- Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

- Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

2.1.4 Materials Excavation and Load Out

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all containerized / stockpiled material.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete.

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Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

2.1.5 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

2.1.6 Materials Disposal Off-Site

All soil/fill/solid waste excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will provided to NYSDEC. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

2.1.7 Materials Re-Use On-Site

No re-use of IDW is anticipated during the Remedial Investigation.

2.1.8 Fluids Management

All liquids to be removed from the site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, but will be managed off-site.

2.1.9 Backfill From Off-Site Sources

Backfill is not expected to be necessary during the Remedial Investigation. However, in case backfill needs to be imported, the following protocols will be followed:

- All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with NYSDEC provisions prior to receipt at the site.

- Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

- All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are the Commercial Use RSCOs listed in the table presented in 6NYCRR375-6.8(b). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

- Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

2.1.10 Stormwater Pollution Prevention

Since the area being disturbed during the Remedial Investigation will not exceed 1 acre in size, a Storm Water Pollution Prevention Plan (SWPPP) that conforms to the requirements of NYSDEC Division of Water guidelines and NYS regulations is not necessary. However, the following "Best Management Practices" will be followed if sediment is observed leaving the Site:

- Barriers, silt fencing, or hay bales will be installed and inspected once a week and after every storm event. All necessary repairs shall be made immediately.

- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

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- Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

2.1.11 Contingency Plans

If underground tanks or other previously unidentified contaminant sources are found during the investigation, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a comprehensive list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Remedial Investigation report.

2.1.12 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include covering odorous soils with polyethylene sheeting or similar tarp/cover. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the qualified environmental professional, and any measures that are implemented will be discussed in the Remedial Investigation report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

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2.1.13 Dust Control Plan

Based on the nature of the proposed work, it is not expected that the Remedial Investigation activities will result in dust generation that would require suppression. However, should conditions be observed during the work that suggest that off-site migration of dust is occurring or may potentially occur, the following dust mitigation provisions will be implemented:

- Dust suppression will be achieved through the use of a dedicated on-site water truck. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel will be used on highly trafficked areas to provide a clean and dust-free road surface.

- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

2.1.14 Noise

The contractor shall ensure compliance with local noise control ordinances.

2.2 REMEDIAL INVESTIGATION (RI) ACTIVITIES

2.2.1 On-Site Comprehensive Soil and Groundwater Investigations

The purpose of the "comprehensive" soil and groundwater investigation is to determine the extent of contamination at the Site.

To this end, a total of ten borings will be advanced at the Site (see Figure 3). Soil samples for "comprehensive" analysis (VOCs, SVOCs, metals, PCBs, pesticides, herbicides, and 1,4-Dioxane as described in Section 3.2.7) will be collected from each of these borings at the following depths:

- Inorganics and SVOCs: 0"-2" and 2"-12" below the vegetative cover
- VOCs 2"-6" below the vegetative cover

In addition, monitoring wells will be installed in four of the ten borings (see Figure 3) to allow for the collection of shallow groundwater samples for comprehensive analysis and to determine the shallow groundwater depths and flow direction. At these four boring/well locations, inorganics, SVOCs, and VOCs will be sampled at the groundwater interface in addition to the depths listed above.

One groundwater sample will be collected from each well for the analyses of VOCs, SVOCs, metals, PCBs, pesticides, and herbicides. In addition, two wells (the hydraulically upgradient and downgradient wells) will be sampled for analysis of 1,4-Dioxane and Polyfluoroalkyl Substances (PFAS).

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If sampling and analysis of soils and/or groundwater reveals concentrations of contaminants above applicable standards (Part 375 Restricted Industrial Use and Restricted Commercials Use standards for soils and TOGS 1.1.1 standards/guidelines for groundwater), WBP and the NYSDEC will negotiate a supplemental sampling plan to include the sampling of additional boring and/or well locations, if deemed necessary. If contaminants commonly associated with dense non-aqueous phase liquid (DNAPL) plumes (ex - chlorinated solvents) are detected in shallow groundwater at concentrations above applicable TOGS 1.1.1 standards, the supplemental sampling plan will include the installation and sampling of deep wells. Deep groundwater depths would be measured (and flow direction determined) if deep groundwater wells are installed.

2.2.2 On-Site PCB Soil Investigations

A total of 22 prior surface samples revealed PCB concentrations above 1 ppm (in addition, analysis of a duplicate of sample SS-75 also revealed a PCB concentration above 1 ppm). Of these 22 sample locations, 12 are located in an area designated as Area of Concern #1 (AOC-1), while the remaining 10 are scattered throughout the Site.

In order to determine the extent of PCB contamination in soils, AECC will collect soil samples from:

- the 10 prior surface soil sampling locations that revealed PCB concentrations above 1 ppm, and were not located within AOC-1,
- AOC-1, and
- AOC-2.

Note that if the results of the comprehensive sampling and analysis identifies additional concerns, AECC and WBP will consult with the NYSDEC to determine potential additions to the scope proposed below.

The sampling will be based on a grid pattern (see specific location details below, and Figures 4 and 5). The central location will be labeled as point “X”, and surrounding grid blocks will be labeled according to their directional components (ex - N1E1). At each proposed sample location, AECC will collect and analyze grab soil samples at 0”-2” below the vegetative cover and at 2”-12” below the vegetative cover.

For each location, if the laboratory results reveal that the PCB concentrations are equal to or less than 1 ppm, the sampling will proceed no further. If the laboratory results reveal that the PCB concentration in 2”-12” soil sample is greater than 1 ppm, the soil sample from the next interval of depth (12”-24”), will be analyzed.

If the laboratory results reveal that the PCB concentration for a particular location/depth is greater than 1 ppm (or 3.2 ppm at depths greater than four feet below the vegetative cover), the adjacent soil sampling grids (see below) in all horizontal directions will be analyzed to develop a horizontal extent of contamination, along with the soil sample from the next interval of depth.

This iterative process will continue until a PCB concentration of equal to or less than 1 ppm (or 3.2 ppm at depths greater than four feet below the vegetative cover) is obtained in both horizontal and vertical extents. If the laboratory results reveal that the PCB concentration for a particular location along the border of the grid is greater than the applicable standard, the grid will be extended horizontally and vertically until a PCB concentration of equal to or less than the applicable standard is obtained.

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If 1 ppm endpoints are not encountered after two iterations of sampling/analysis, WBP may negotiate a revised sampling plan with the NYSDEC / USEPA (larger Areas of Influence, etc.), address the contamination as part of an IRM or during Remedial Actions, or establish Institutional and/or Engineering Controls that will be based on the intended use of contaminated area (limiting use to Low Occupancy, etc.).

If sampling grids extend off-site, any associated sampling will be performed as part of a separate off-site investigation (i.e. – off-site sampling will not occur at the same time as on-site sampling). See Section 2.2.4.

The scope of investigation for specific locations is detailed below:

Individual Prior Sample Locations (Outside of AOC-1)

Previous investigations revealed that 10 surface soil sample locations (SS-37, SS-38, SS-41, SS-42, SS-45, SS-49, SS-52, SS-59, SS-69, and SS-89) exhibited PCB concentrations greater than 1 ppm (see Figure 3). AECC will use a GPS device to locate these sample locations. AECC will prepare a 3x3 sampling grid centered over the former sample location. Each section (area of inference) of the grid will be 10 feet square (100 SF). AECC will collect the series of samples from the center of each grid section / area of inference.

AOC-1 (PCB Hot Spot)

AECC will prepare a 78,400 square-foot (SF) sampling grid over the PCB Hot Spot as depicted on Figure 4. Due to the size of the AOC, each section (area of inference) of the 7x7 grid will be 40 feet square (1,600 SF). AECC will collect the series of samples from the center of each grid section / area of inference.

AOC-2 (Former Soil Pile #1 Area)

As depicted on Figure 5, AECC will prepare an approximate 40,000 square-foot (SF) sampling grid over the area where Soil Pile #1 was formerly located, as limited by Canada Drive and the existing Soil Pile #2. Due to the size of the AOC, each section (area of inference) of the 5x5 grid will be 40 feet square (1,600 SF). AECC will collect the series of samples from the center of each grid section / area of inference.

2.2.3 On-Site Soil Pile Sampling (AOC-3)

The volume of the existing soil pile at the Site (Soil Pile #2) is estimated to be approximately 3,100 cubic yards (CY). According to NYSDEC Commissioner's Policy 51 (CP-51) protocols, a soil pile of this size requires 13 grab samples and 5 composite samples (each comprised of between 3-5 discrete samples) to be collected. The grab samples are to be analyzed for VOCs, while the composite samples are to be analyzed for SVOCs, metals, PCBs, pesticides, and herbicides.

AECC is proposing an alternative sampling plan (in lieu of the 40 CFR 761 Subpart R protocols) that is based, in part, on the NYSDEC preference that samples be collected from various depths and layers within the pile (as opposed to purely random selection of sample locations), and that each composite sample be created from no more than five grab samples. Therefore, AECC is requesting an exemption from the sampling requirements of 40 CFR 761 Subpart R, and proposes the following alternative "hybrid" sampling plan:

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To collect composite samples, the soil pile will be virtually separated into five distinct sections (see Figure 6). Using a random number generator at each step below, the locations along the x and y axis will be determined for each of three sample locations in each section. Each of the three samples will be collected from the mid-point of the depth of the applicable section, and split in two: one discrete soil sample (for compositing) and one grab sample (for VOC analysis). Each of the 15 grab samples (for VOC analysis) collected throughout the five sections will be immediately placed in laboratory-provided sample containers, while the discrete samples collected from each of the five sections will be placed in dedicated bowls (one for each section) and mixed with a spoon. The single composite sample for each section will then be placed in laboratory-provided sample containers for the remaining analyses.

It is our professional opinion that the above methodology will adequately characterize the soil pile to both NYSDEC and USEPA satisfaction. The methodology exceeds the applicable NYSDEC CP-51 standards, and whereas the protocols at 40 CFR 761 Subpart R call for a 3-step process to create a single composite sample from eight discrete samples, the data collected by the above methodology will be based on five composite samples derived from a total of 15 discrete samples.

When Soil Pile #2 is moved (either off-site or utilized for backfill on-site), AECC will consult with NYSDEC and USEPA at that time to prepare an applicable sampling grid over the area where the pile was located (anticipated to be similar to the sampling plan for AOC-2).

2.2.4 Off-Site Investigation Activities

Based on the results of the on-site investigations, AECC will consult with the NYSDEC to determine the scope of an off-site investigation, including sample locations and appropriate analytical methodologies.

2.2.5 Soil-Vapor Intrusion Evaluation

If the comprehensive sampling and analysis identifies VOCs or SVOCs as a concern, AECC will consult with the NYSDEC to either determine the scope of a soil vapor sampling event, or confirm that the Remedial Action or Site Management Plan will include a soil vapor mitigation system for any buildings constructed on the Site.

2.3 QUALITATIVE HEALTH RISK ASSESSMENT

In an effort to assess potential site impacts on human health and the environment, a qualitative human health risk assessment will be completed. This risk assessment will include a contaminant exposure and toxicity assessment.

The results of this focused qualitative risk assessment will be used to develop an overall characterization of risk to humans and the environment. The focused risk assessment will assess the following aspects, based on current and historic site specific analytical data:

- Identification of potential receptors
- Contaminant identification and selection of indicator compounds and chemicals of concern
- Exposure assessment to identify actual or potential exposure pathways and the extent or amount of exposure
- Toxicity assessment and dose response information
- Risk characterization of the potential risks or adverse health or environment effects for each of the exposure scenarios

2.4 DATA USABILITY

A data usability review effort will be completed for the analytical data generated as part of the investigation, consistent with NYSDEC-DUSR Guidance for this type of project. As part of this effort, a general evaluation of field records and analytical data will be performed to assess whether the data are accurate and defensible.

2.5 REPORT PREPARATION

An Emerging Contaminant Investigation Report will be prepared and submitted to the NYSDEC.

In addition, upon completion of the RI activities and following receipt of laboratory analysis of the soil and groundwater samples collected from the site, AECC will prepare a report summarizing the RI activities and the results of the laboratory analyses. The RI sections of the report will identify or otherwise address the amount, concentration, persistence, mobility, state, and other relevant characteristics of the contaminants identified at the site.

Electronic data deliverables (EDDs) for each report will also be submitted in EQuIS format.

2.6 PROJECT SCHEDULE

WBP proposes the following project schedule. Note that due to the iterative nature of the investigation work and the required coordination between State and Federal agencies, additional time to obtain approvals and complete each phase of the field work may be necessary. In such a case, WBP will inform NYSDEC of the impact to the project schedule.

Submit Remedial Investigation Work Plan.....December 2018
End 30 Day Comment Period..... January 2019
DEC Approval of Remedial Investigation Work Plan ..... January 2019
Removal of Trees >3" DBH (as necessary).....February-March 2019
"Comprehensive" Investigation (Borings / Wells).....Spring 2019
Investigation at Individual Locations (PCB Soils)..... Spring / Summer 2019
AOC-1 PCB Hot Spot Investigation .....Summer / Fall 2019
AOC-2 Former PCB Soil Pile Investigation.....Summer / Fall 2019
Submit Emerging Contaminant Investigation Report ..... October 2019
AOC-3 Existing Soil Pile Investigation / Off-Site Investigation ..... Spring / Summer 2020
Submit Draft Remedial Investigation Report..... Fall 2020
Significant Threat Determination / Fact Sheet .....Winter 2020
DEC Approval of Remedial Investigation Report……..…..Winter 2020
Submit Alternatives Analysis / RAWP (with Self-Implementing Cleanup Plan) .....Spring 2021
End 45 Day Comment Period.....Spring 2021
Approval of RAWP / Self-Implementing Cleanup Plan..... Summer 2021
Submit Fact Sheet Announcing Start of Remediation..... Summer 2021
Begin Remediation..... Fall 2021
Submit Environmental Easement Package ..... Fall 2021
Submit Draft Site Management Plan .....Winter 2021
Submit Executed Environmental Easement Package.....Winter 2021
DEC Approval of Site Management Plan.....Spring 2022
Environmental Easement Recorded.....Spring 2022
Complete Remediation..... Summer 2022
Submit Draft Final Engineering Report.....Summer / Fall 2022
Submit Fact Sheet Announcing Final Engineering Report..... Fall 2022
DEC Approval of Draft Final Engineering Report..... Fall 2022
Submit Final Engineering Report .....Winter 2022
Certificate of Completion.....Winter 2022
Fact Sheet Describing Institutional/Engineering Controls.....Winter 2022

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3.0 SAMPLING AND ANALYSIS PLAN

This Sampling and Analysis Plan discusses the sampling procedures and methods to be used on the project for the collection of soil and groundwater samples, the procedures and methods to be followed by the laboratory, and Quality Assurance / Quality Control procedures that will assure the accuracy and precision of the data collection during the project.

3.1 FIELD SAMPLING PLAN

As described in Section 2.2, the RI activities will include the advancement of soil borings, collection of surface and shallow soil samples, collection of soil pile samples, and the installation and sampling of groundwater monitoring wells.

Sample locations will be marked with wood or metal stakes or flags (on soil) or spray paint (on asphalt) and clearly labeled. Soil and groundwater samples that are collected for laboratory analysis will be delivered to the laboratory on a daily basis during the RI activities. The soil and groundwater sampling procedures are described in more detail below.

3.1.1 Sampling Objective

Field sampling at the site will be designed to obtain representative samples of environmental media in an effort to assess the impact that the site may have upon human health and the environment. The field sampling plan will include media sampling for groundwater, surface soils, and shallow and deep subsurface soils. The goal of this investigation is to establish the nature and extent of contamination at the site.

3.1.2 Soil Sampling Procedures

Soil sampling at the site will be conducted in accordance with various AECC SOPs as identified in the individual sections and provided in Appendix A. In general, the following steps will be followed for the collection of soil samples.

Surface and Shallow Soil Sampling – AECC SOP #101

Spoons, scoops, and trowels are of similarly designed construction and will therefore be used in accordance with the following procedures, unless an alternate method is described. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Don PPE as per the project HASP.
2. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
3. Prepare surface for sampling. Loosen soils by use of a long-handled shovel or pitchfork outside of the perimeter of the sample location.
4. Remove the bulk of the vegetated layer (plants and roots).
5. Use a disposable trowel to collect a representative sample of soil immediately beneath the vegetative layer.

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6. The soils shall be screened with a PID to identify the presence or absence of volatile organic vapors. Soils shall be visually characterized with respect to color, grain size, consistency and moisture status. Each distinct layer shall be described using the Modified Burmister classification system.

7. If sampling for VOCs is required, collect this sample portion first.

8. If a specific depth interval has been targeted, collect soils from that depth into a collection pan.

9. If more soil is needed to meet sample volume requirements, additional soil may be collected from an immediately-adjacent location.

10. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.

11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.

12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.

13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.

14. Log the samples in field notebook, chain of custody and other required documentation.

15. Handle samples for shipment to the laboratory.

16. Decontaminate sampling tools prior to reuse.

17. Investigation-derived waste (IDW) should be properly contained before leaving the area.

18. In order to eliminate surface hazard and/or the creation of a preferred path for contaminant migration, backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible.

Sampling procedures for hand augers and push probes are detailed in SOP #101.

Shallow Boring Sampling – AECC SOP #101

At increased depths, the effectiveness of spoons, scoops, and trowels decreases. Hand augers and similar equipment may be suitable methods for collecting soil samples at these shallow depths. Mechanical methods such as split-spoon or direct-push sampling can also be performed (see related sections below). Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Don PPE as per the project HASP.

2. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.

3. Prepare surface for sampling – remove vegetation or surface debris as necessary.

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4. Push downward and turn the bucket/hand auger in a clockwise direction until bucket becomes filled with soil. Usually a 6 to 12-inch core of soil is obtained each time the auger is inserted.

5. Empty and repeat until the top of the interval of interest is encountered. Soil from above the interval that requires sampling and analysis can be emptied onto plastic sheeting for description / classification. The soils shall be screened with a PID to identify the presence or absence of volatile organic vapors. Soils shall be visually characterized with respect to color, grain size, consistency and moisture status. Each distinct layer shall be described using the Modified Burmister classification system.

6. Using a clean/decontaminated bucket auger, insert the auger into the bottom of the hole so that it is positioned above the interval of interest. A smaller diameter bucket may be necessary to prevent the auger from being contaminated by passing through the overburden soils.

7. Turn the bucket/hand auger so that the bucket fills with soil from the interval of interest.

8. Once filled, the auger should be removed from the ground and emptied into the soil collection pan. If a VOC sample is required, the sample should be taken directly from the auger bucket using a clean/decontaminated teaspoon or spatula and/or directly filling the sample container from the auger.

9. Repeat the process until the desired sample interval has been thoroughly penetrated with extracted soils placed into the collection pan.

10. Except for VOC sample fractions, the remainder of the soil sample should be collected into the collection pan.

11. Homogenize the soil in the collection pan by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.

12. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.

13. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled.

14. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.

15. Log the samples in field notebook, chain of custody and other required documentation

16. Handle samples for shipment to the laboratory.

17. Decontaminate sampling tools prior to reuse.

18. Investigation-derived waste (IDW) should be contained before leaving the area.

19. In order to eliminate surface hazard and/or the creation of a preferred path for contaminant migration, backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible.

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Subsurface Soils Sampling via Direct-Push / Geoprobe – AECC SOP #105

Hand augers and similar equipment may become cumbersome at increasing depths. Therefore, a mechanical method such as direct-push sampling may be warranted. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Don PPE as per the project HASP.

2. Decontaminate sampling tools and components that may come in contact with soil during sampling activities.

3. Assemble the sampling tube including the liner, discrete sample tooling (if appropriate), sand-basket (if appropriate), and cutting shoe.

4. Prepare the surface for direct-push sampling. Direct push tooling can generally penetrate several inches of asphalt and/or crushed stone surface materials.

5. The direct-push rig operator will thread on a push/drive cap on the top of the device and push the sample tube into the ground.

6. The direct-push rig operator removes the push/drive cap, replaces it with a pull-cap and pulls sampler from the ground with the machine hydraulics.

7. The sample tube is then opened, to allow the soil-filled liner to be removed so that it can be cut open by the project geologist/scientist/engineer to allow for soil classification/description, field-screening, sampling for laboratory analysis, etc.

8. The sampling tube and components that contact soil during the sampling process are decontaminated, re-assembled, with a new, disposable liner and the process is repeated. The advancement of the sampling tube to depth is achieved through the addition of drive-rods, each of which is typically the same length as the sampling tube (commonly 3, 4, or 5 feet in length).

9. Upon completion of the borehole, the hole is backfilled with soil cuttings or hydrated granular bentonite, or is completed as a piezometer or monitoring well.

Upon extraction of the liner from the direct-push sampling tube, the liner must be opened so as to expose the soils for visual classification/description, field screening and/or sampling for laboratory analysis. This is accomplished through the use of a liner cutting system, typically comprising a liner holder, and a liner cutter. The liner holder is a trough-like device that holds the liner securely in place so that it can be cut open.

The liner cutter is a tool affixed with two parallel hook-shaped blades that is drawn along the liner to cut a lengthwise opening in the liner for easy access and viewing of the sampled material. Liner cutters come in one-handle and two-handle varieties.

a) Place the soil-filled liner into the soil holder. Be sure that the liner holder is placed on a solid surface such as a sturdy work table, tailgate, etc.

b) Install the liner in the liner holder. Adjust the stop on the liner holder to secure the liner tightly in the holder.

c) Wearing leather work gloves, grasp the cutter by the handle(s) (avoid accidental contact with the blades) and place the cutter on the liner. The liner holder will usually have a bent bar that secures the liner in place, which provides resistance against the draw of the liner cutter. Begin the cut at the end of the liner opposite this bar. Be sure that blades are positioned just beyond the end of the liner to initiate the cut.

d) With slight downward pressure on the cutter, draw the cutter slowly and smoothly along the liner. If excessive force is required to open the liner, the cutter blades may be dull and should be replaced immediately.

e) When the cutter has been drawn the entire length of the liner, the cut section of the liner may be removed to access the sampled material.

f) The soils shall be screened with a PID to identify the presence or absence of volatile organic vapors. Soils shall be visually characterized with respect to color, grain size, consistency and moisture status. Each distinct layer shall be described using the Modified Burmister classification system.

g) If sampling for VOCs is required, collect this sample portion first.

h) Except for VOC sample fractions, the remainder of the soil sample from the interval of interest should be collected into the collection pan.

i) If more soil is needed to meet sample volume requirements, additional soil may be collected from an immediately-adjacent location.

j) Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.

k) Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.

l) Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.

m) Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.

n) Log the samples in field notebook, chain of custody and other required documentation.

o) Handle samples for shipment to the laboratory.

When using direct-push methods for collecting soil samples for VOC analysis, the drilling subcontractor shall not retrieve more than one subsequent sampler from the subsurface while the project geologist/scientist collects samples from a previous interval.

Subsurface Soils Sampling via Split Spoon Sampling – AECC SOP #104

Hand augers and similar equipment may become cumbersome at increasing depths. Therefore, a mechanical method such as split-spoon sampling may be warranted. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Don PPE as per the project HASP.

2. The drilling contractor advances the hollow-stem augers to the required depth for sampling. A temporary center plug shall be used in the lead auger to prevent the auger from becoming filled with drill cutting during advancement.

3. At the top of the interval to be sampled, the driller stops the auger, disconnects the auger from the drill rig's drive head, and retrieves the temporary center plug.

4. The drilling subcontractor will lower the split-spoon attached to a length of center rods to the bottom of the borehole.

5. The top of the center rods are attached to a 140 pound slide-hammer (or similar).

6. The slide hammer is repeatedly raised via rope and cathead and dropped to drive the split-spoon sampling device into the ground.

7. The hammer is disconnected from the center rod and the center rod and split spoon is retrieved from the augers.

8. The split-spoon is then disarticulated to allow for soil classification/description, field-screening, sampling for laboratory analysis, etc.

9. The drilling contractor re-installs the temporary center plug and advances the auger to the top of the next interval to be sampled.

10. Steps 2 through 8 are repeated until the termination depth of the borehole is reached.

11. Upon completion of auguring and sampling, the borehole can be backfilled or completed as a piezometer or monitoring well.

Sampling soils from split-spoon for environmental laboratory analysis shall be conducted as described:

a) Once the split-spoon sampler has been opened, materials from the split-spoon can be removed using clean decontaminated/disposable spoons or spatulas.

b) The soils shall be screened with a PID to identify the presence or absence of volatile organic vapors. Soils shall be visually characterized with respect to color, grain size, consistency and moisture status. Each distinct layer shall be described using the Modified Burmister classification system.

c) If sampling for VOCs is required, collect this sample portion first.

d) Except for VOC sample fractions, the remainder of the soil sample from the interval of interest should be collected into the collection pan.

e) If more soil is needed to meet sample volume requirements, additional soil may be collected from an immediately-adjacent location.

f) Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.

g) Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.

h) Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.

i) Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.

j) Log the samples in field notebook, chain of custody and other required documentation.

k) Handle samples for shipment to the laboratory.

When using split-spoon methods for collecting soil samples for VOC analysis, the drilling subcontractor shall not retrieve more than one subsequent sampler from the subsurface while the project geologist/scientist collects samples from a previous interval.

3.1.3 Monitoring Well Installation and Development Procedures – AECC SOP #107

Monitoring wells will be installed at the site in accordance with AECC SOP #107. In general, the following steps will be followed for the installation of monitoring wells.

1. Each monitoring well shall be constructed using 2-inch Schedule 40 PVC. A 10-foot length (unless groundwater depth requires a shorter screen interval) of slotted PVC screen (10 slot) will be attached to the appropriate length of riser and placed in the well. The screen shall be placed so as to intersect the observed water table.

2. A uniformly graded washed silica sand pack shall be placed using a free drop method to establish a sand pack around the screen and extending 1-foot above the top of the screen.

3. A hydrated bentonite seal shall be placed immediately on top of the sand pack and shall extend for 2-feet.

4. A grout comprised of cement and bentonite shall be placed above the seal using tremie or gravity methods.

5. The well shall be completed with a locking surface completion (flush or stick-up) set in a concrete surface seal.

6. After 48 hours has passed to allow for hardening of the grout and full hydration of the seal, the well shall be developed using a surge and pump technique to remove sediment from the well bore and sand pack. Development shall continue until turbidity has reached 50 NTU's.

7. Sampling of the developed wells shall not occur until a minimum of 7-days has passed.

3.1.4 Groundwater Sampling Procedures – AECC SOP #106

Low-flow groundwater sampling at the site will be conducted in accordance with AECC SOP #106. In general, the following steps will be followed for the collection of groundwater samples.

1. The sampling technician will remove the well cap and, using a PID, test for VOC vapors immediately above well riser pipe. The PID reading will be recorded in the field logbook. This procedure will then be performed at each well to be sampled.

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2. Using a peristaltic pump, each monitoring well will be purged utilizing low-flow techniques. A metering device will be used to monitor field parameters as listed below. Only after the meter readings indicate that the following acceptance criteria (USEPA EQASOP- GW 001, Rev. 3, updated January 19, 2010) have been achieved will the sample be collected:
    - *groundwater turbidity (10% for values >5 NTU)*
    - *temperature (3%)*
    - *pH (+ 0.1 unit)*
    - *specific conductance (3%)*
    - *dissolved oxygen (10% for values >5mg/L)*
    - *Oxygen/Reduction Potential (+ 10 millivolts)*
3. Purged groundwater will be placed into a 55-gallon drum which will be labeled, tightly covered, and temporarily stored on-site.
4. A sufficient volume of groundwater will be collected from each well to fill dedicated vials/jars.
5. The label on each sample jar will identify the sample location, date and time, and parameters to be analyzed.

Sampling for PFAS will be performed in accordance with the field sampling guidelines provided by Alpha Analytical (attached to the end of AECC SOP#106).

3.1.5 Sample Handling and Chain-of-Custody – AECC SOPs #102 and #108

Upon completion of the soil and groundwater sampling for a particular day or period of time, the following procedures will be followed:

1. The sealed, labeled samples of soil and groundwater will be carefully packed into a cooler refrigerated with ice or ice packs for delivery to the laboratory for analysis.
2. Packing material may be placed around the sample jars inside the cooler to minimize the potential for sample container breakage that could occur during sample handling and delivery to the laboratory.
3. A chain-of-custody form will be properly completed, signed, and dated by all persons responsible for the collection and delivery of the soil and groundwater samples.
4. The chain-of-custody form will be placed into a sealable plastic bag, sealed, and placed inside the cooler to accompany the soil and groundwater samples from the time of collection until delivery to the laboratory within 24-hours from the time of collection.

3.1.6 Sample Identification

Samples of soil and groundwater will be identified and labeled to include the site name, the sample location, grid location (if applicable), and the sampling time and date. The following alphanumeric system will be used to identify each sample and will correspond with the sample location to be identified on a field-generated sampling diagram:

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Sample Type +	Location No. +	Grid Location	Depth(s) =	Example Sample I.D
Soil – Test Pit	TP-01, 02…	N/A	(# - #")	TP-02 (48-60")
Soil – Boring	SB-01, 02…	N/A	(# - #")	SB-02 (2-6")
Soil – PCB	SS-37…	N1E1	(# - #")	SS-37-N1E1 (2-12")
Groundwater	MW-2	N/A	N/A	MW-2
Blind Duplicate	SB, MW, SS…	N/A	N/A	SS-D1, SB-D2, MW-D1…

3.2 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC) PROCEDURES

This section describes the manner in which the Quality Assurance Project Plan (QAPP) will be implemented during remedial investigation activities. QAPP procedures will assure the accuracy and precision of the data collection during the project. Guidance for the selection of QAPP objectives was obtained from NYSDEC's *DER-10 Technical Guidance for Site Investigation and Remediation* (May 2010).

Quality Assurance (QA) refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring, and surveillance of the performance.

Quality Control (QC) refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field. QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections.

3.2.1 Project Team

On behalf of Woodbine Business Park, AECC will be responsible for the coordination and performance of the RI activities, interpretation of the analytical data, and evaluation of the need for and performance of Interim Remedial Measures (IRMs).

Project direction and related assistance will be provided by Woodbine Business Park, NYSDEC, and NYSDOH.

Subcontractors and subconsultants will be used as necessary to perform required tasks.

3.2.2 Key Personnel

Key personnel anticipated for this project are as follows:

Team Member	Organization	Telephone	Role/Title
Brian St. Laurent	Woodbine Business Park	315.471.7400	Owner Contact
Harry Warner	NYSDEC	315.426.7400	Regional HW Engineer
Michael Belveg	NYSDEC	315.426.7446	Project Manager
Arunesh Ghosh	NYSDOH	518.402.7860	Project Manager
Richard McKenna	AECC	315.432.9400	Project Manager
H. Nevin Bradford	AECC	315.432.9400	Field Manager
Bryan Airel	AECC	315.432.9400	H&S Officer
James Saxton	AECC	315.432.9400	QAPP Officer

A description of AECC personnel assignments is provided below:

Richard McKenna - Project Manager

Mr. McKenna will act as the primary point of contact for AECC, and will be responsible for the overall management and coordination of the project.

H. Nevin Bradford, P.E. - Field Manager

Mr. Bradford will be responsible for the management and oversight of investigatory actions at the Site.

Bryan Airel - Health & Safety Officer

Mr. Airel will be responsible for ensuring that the HASP is implemented during remedial actions.

James Saxton - QAPP Officer

Mr. Saxton will ensure that QAPP objectives for the project are maintained.

3.2.3 Subcontractors and Subconsultants

During the remedial investigation, subcontractors and subconsultants will be utilized to perform various project tasks, likely including:

- Environmental Drilling Contractor - to install soil borings and groundwater monitoring wells and other sampling points to monitor environmental media (as needed)
- Environmental Laboratory - to analyze soil and groundwater samples.
- Data Validator - to prepare Data Usability Summary Reports.
- Licensed Land Surveyor - to determine location and/or elevation data associated with excavations, monitoring wells, sample locations, etc.

3.2.4 Data Quality Objectives

Data Quality Objectives (DQOs) are statements that describe the desired quality of data necessary to meet the objectives of the sampling program. The DQOs for the project were prepared in anticipation of the various media that would require sampling for laboratory analysis. DQO Forms have been completed for each type of sampling media and are located in Appendix B.

The DQO forms include information on the type of media sampled, the intended use of the data being collected, the type of analyses that will be requested, the level of analytical methodology and documentation required, sampling procedures, and the type of QAPP field samples that will be collected in support of the project. The sections of the DQO forms are described below.

Sampled Media: This section describes the material that is being sampled (groundwater, soil, surface water, waste material, etc.).

Data Use: This section is used to indicate the intended purpose of the sampling and analytical data. (i.e., for site characterization, evaluation or remedial alternatives, risk assessment, monitoring of existing sampling points, or waste characterization, etc.).

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Data Type: This section identifies the compounds/analytes that samples collected during the program will be analyzed for. Also indicates whether field parameters such as pH, specific conductivity, temperature and turbidity will be monitored during sample collection.

Level of Analysis: This section identifies the level of analytical support required of the samples collected for a specific purpose as described below:

- Level I - Field Screening: This level is characterized by the use of portable type instruments that provide real-time data.

- Level II - Field Analysis: This level is characterized by the use of portable analytical instruments in an on-site lab or transported to the site. This section identifies the field analysis to be used.

- Level III - Standard Analytical Protocols: This level may include standard analytical protocols in accordance with NYSDOH Environmental Laboratory Approval Program (ELAP) certification requirements, without the NYSDEC Analytical Services Protocol (ASP) Category B QAPP and deliverables / reportables documentation.

- Level IV - NYSDEC ASP Reportables / Deliverables: This level is characterized by rigorous QAPP NYSDEC ASP protocols and Category B reportable / deliverable documentation that is suitable for data validation.

Sampling Procedures: This section provides information on sampling procedures to be used in sample collection, or provides directions to where to find this information in the project plans.

Data Quality Factors: This section describes factors that influence the quality or quantity of data to be collected. Primary contaminants and associated levels of concern are identified concerning ARARs or potential risks. The required detection limits are also given or referenced.

QAPP Samples: This section indicates additional samples to be collected to support QA/QC procedures. Additional samples to be collected include:

- Split Samples –Split samples (or duplicates) are two samples taken from the same source; digested, distilled or otherwise processed; and then analyzed. Duplicate sample analysis is used to determine reproducibility or consistency in the analysis. For this RI, spilt samples will noted in AECC's log book, but will not be identified on the sample label (known as a blind duplicate), preventing the laboratory from knowing which samples are duplicates. Duplicate / split samples shall be collected at a rate of 1 per 20 samples (5%)

- Matrix Spike / Matrix Spike Duplicates – Matrix spike duplicate samples are collected as a duplicate sample, to which the analytical laboratory will add known amounts of analyte. These QA/QC samples are intended to assess the extraction procedure used by the laboratory. These samples shall be collected at a rate of 1 per 20 samples (5%) or sample delivery group whichever is smaller and for each sample matrix.

- Trip Blanks – Trip blanks are samples that are prepared prior to the sampling event in the same type of sample container and are kept with the collected samples throughout the sampling event. Trip blank vials are not opened in the field and are analyzed for volatile organics only, and trip blanks are only collected when the sampling program includes samples that are being analyzed for VOCs. Trip Blanks shall accompany any shipment of samples for VOCs.

- Equipment Blanks – Equipment blanks are samples that are obtained by running analyte-free water through or over the sample collection equipment in a way that is identical to the sample collection procedures. Field blanks may be used during QA/QC procedures to evaluate if sampling equipment has contributed contaminants to the samples. These samples shall be collected daily whenever re-usable sampling equipment is used.

3.2.5 Sampling Procedures

Objectives and procedures for soil, groundwater, and soil vapor sampling have been designed to allow for the acquisition of accurate and precise data, and are detailed in the Field Sampling Plan (Section 3.1).

3.2.6 Laboratory Coordination

All chemical analyses for soils and waters will be completed by a laboratory capable of performing project-specific analyses as indicated in this QA/QC Plan and approved by the NYSDOH/NYSDEC as having the appropriate standard operating procedures QA/QS programs, current resumes, and organizational structure to complete analytical work as specified in this Work Plan. The laboratory will have current certification for standard methodologies and QA/QC, and will be required to remain certified as such throughout the project. The project-specific Quality Assurance/Quality Control (QA/QS) Officer will also be responsible for all project related laboratory coordination.

Laboratory coordination will be conducted under the direction of the project-specific QAPP officer. The laboratory utilized for laboratory analysis required under this project will be certified under the NYSDOH Environmental Laboratory Approval Program (ELAP) and will be required to maintain this certification for the duration of the program. The laboratory will be capable of producing ASP Category B deliverables, as needed for subsequent data validation / data usability evaluation purposes.

3.2.7 Analytical Methodologies

All analyses will be performed by SW-846 methodologies with QAPP guidelines of 2005 ASP Category B. The following criteria will describe the appropriate methodologies for extraction, digestion, and analysis of the previously listed matrices. The specific analytes to be identified by each method, along with the Contract Required Quantitation Limits, are listed in Appendix C of the NYSDEC ASP (http://www.dec.ny.gov/data/der/asp2005cd/asp2005cd.zip).

Parameter Group	Analytical Method
TCL VOCs	USEPA Method 8260B + TICS
TCL SVOCs	USEPA Method 8270C +TICS
TAL Metals	USEPA Method 6010, 7470/7471 (Hg), 9014 (CN)
PCB Aroclors	USEPA Method 8082 (with Soxhlet extraction)
Herbicides	USEPA Method 8151
Organochlorine Pesticides	USEPA Method 8081
1,4-Dioxane*	USEPA Methods 8270SIM (soil) and 522 (groundwater)
PFAS**	NYSDOH Method 537 (Modified) – Groundwater Only

*The detection limit for 1,4-Dioxane in aqueous samples is to be no greater than 0.35 ug/L
**Polyfluoroalkyl substances, 2ng/L reporting limit for PFOA and PFOS

Comprehensive Soil/Groundwater Analysis – Soil samples collected from the borings advanced during groundwater monitoring well installation, and all groundwater samples collected for monitoring purposes under this RIWP will be analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-VOCs (SVOCs), PCBs, Herbicides, Pesticides, TAL metals, and 1,4-Dioxane. In addition, groundwater samples will also be analyzed for PFAS and field-analyzed for a limited group of field parameter analyses to include pH, specific conductance, dissolved oxygen (DO), redox potential (ORP), temperature, and turbidity.

PCB Soil Sampling – Soil samples collected during the re-sampling of select locations and the grid-pattern sampling will be analyzed for PCBs. If the comprehensive sampling and analysis reveals contaminants of concern (COCs) other than PCBs, AECC will consult with the NYSDEC to determine applicable analytical methodologies for the additional COCs.

Soil Vapor Sampling – Soil vapor sampling will not be performed as part of the RI. However, if the comprehensive sampling and analysis identifies VOCs or SVOCs as a concern, AECC will consult with the NYSDEC to either determine the scope of a soil vapor sampling event, or confirm that Remedial Actions or Site Management Plan will include a soil vapor mitigation system for any buildings constructed on the Site.

Waste Characterization Samples – Note that samples collected for waste characterization/disposal purposes will be analyzed in accordance with the appropriate SW-846 methodologies, for the parameters required by the disposal facility. Category B deliverables will not be requested for these samples.

3.2.8 Analytical Quality Control

As stated previously, analytical quality for samples collected for site characterization or monitoring purposes will be in accordance with NYSDEC-ASP Category B. Analysis in accordance with NYSDOH-ELAP certification requirements may be used for samples collected for waste characterization or disposal purposes. The following holding times will be required from the contracted analytical laboratory, regardless of sample matrix:

Parameter	Task	Aqueous Holding Time	Solids Holding Time
VOCs	Analysis*	14 days	14 days
SVOCs	Extraction	7 days	14 days
	Analysis**	40 days	40 days
PCBs	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Pesticides	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Herbicides	Extraction	7 days	14 days
	Analysis**	40 days	40 days
Metals	Analysis	180 days	180 days
Mercury	Analysis	28 days	28 days
Cyanide	Analysis	14 days	14 days
1,4-Dioxane	Extraction	7 days	7 days
	Analysis**	40 days	40 days
PFAS	Analysis	14 days	Not Applicable

* The extraction time for Encore samplers is 48 hours.
** Days after extraction.

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3.2.9 Reportable Deliverables Documentation

The analytical data will be presented in 2005 ASP Category B reportable/deliverables format.

3.2.10 Data Usability and Acceptability

Because the investigation will produce data to be utilized to determin site-specific remedial alternatives, it is important that an evaluation of the validity of the data generaged be completed. In an effort to provide adeuate, compliant, and defensible data consistent with NYSDEC Guidance, the analytical data generated as part of the investigation shall be reviewed by a data usability subcontractor. It will be the resonsibility of the reviewer to determine the usability and acceptability of the data. A general evaluation of field records and analytical data will be performed to assess wheather the data are accurate and defensible. The data usability review effort shall be consistent with NYSDEC-DUSR Guidance for this type of project. A Data Usability Summary Report (DUSR) will be signed by the person completing the reivew.

4.0 DECONTAMINATION PROCEDURES – AECC SOP #103

The following procedures will be performed to decontaminate exploration equipment, sampling equipment, and personnel after each drilling/sampling event and equipment demobilization.

4.1 PERSONNEL DECONTAMINATION

Personnel will be required to follow procedures outlined in the Health and Safety Plan (see Appendix C).

4.2 EQUIPMENT DECONTAMINATION

Equipment will be decontaminated between uses, and at the end of each project phase (contractor demobilization).

4.2.1 Prior to Use On-Site

The drill rig, backhoe, and/or excavator will be steam-cleaned prior to their entrance to the site. Greases and oils will not be used on any down-hole equipment during drilling or exploration activities.

Hand-operated equipment, direct-push sampling tubes, split-spoons, etc. that have been used on other sites will be decontaminated according to the protocols detailed in Section 4.2.2 prior to their use on-site.

4.2.2 Reusable Equipment

The following steps will be employed to decontaminate other reusable equipment:

1. Don PPE items appropriate to the characteristics of the contaminated material that was encountered (safety glasses, latex or nitrile gloves, and disposable Tyvek garment for example).

2. Remove gross contamination, dirt, etc from the equipment by brushing and rinsing with tap water. This step should be completed in a 5-gallon bucket or appropriately sized container.

3. Wash the equipment with a phosphate-free detergent and tap water solution. This step should be completed in a separate wash bucket using brush, or pressure sprayer.

4. Rinse the equipment with potable water until all detergent has been removed. This step can be performed over an empty bucket using a squeeze bottle or pressure sprayer.

5. Triple-rinse the equipment with distilled or de-ionized water. Rinsate should be collected in the bucket used in step 3.

6. Saturate by spraying or immersion in laboratory-grade hexane.

7. Allow the equipment to air dry on clean plastic sheeting. If faster drying is required, use paper towels to blot the equipment dry before reuse.

8. Wrap the dried decontaminated equipment with aluminum foil, shiny side out, for storage until the equipment is to be used again. Alternately, small equipment can be placed into clean plastic bags and sealed for longer term storage.

9. Properly containerize and/or manage wash water and decontamination rinsate.

4.2.3 Disposable Equipment

In lieu of decontamination, disposable equipment will be placed in a dedicated 55-gallon drum or container for contaminated solids.

4.2.4 Sample Containers

Upon filing and capping sample bottles, the outside of the bottle will be wiped off with a clean paper towel. These towels will be handled / managed as disposable equipment.

4.2.5 Decontamination Prior to Demobilization

Prior to leaving the Site, equipment will undergo a rigorous decontamination process.

Pre-Sampling

Since the contaminated media is soil, and not a liquid spill, it is possible that items that were in contact with the soil are not themselves contaminated. Therefore, we request that all equipment/tools subject to decontamination may be pre-sampled using the methodology under the Confirmatory Wipe Sampling section below. If the results of the pre-sampling reveal that the clearance value (see Clearance Value section below) has been met, the item will not require decontamination.

General Decontamination Procedure

The following procedures shall be performed unless otherwise noted under the Item-Specific Protocols section below.

a) Hand-scrape / remove bulk amounts of dirt utilizing applicable tools (shovels, rods, etc.).

b) Cover the entire surface with concentrated or industrial-strength detergent/surfactant and let sit for a minimum of 15 minutes.

c) Scrub surfaces with a scrub brush or pad to further loosen adhered dirt, such that the brush/pad is passed over each square foot (or less) a minimum of one time (to the extent feasible).

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d) To the extent feasible, absorb the residual cleaner solution and suds with a clean, disposable, absorbent pad, mop, or similar. This cleaning should remove any residual dirt, dust, grime, or other absorbent materials left on the surface during the first wash.

e) Rinse using high-pressure steam, such that the steam is passed over each square foot (or less) a minimum of two times.

f) Cover the entire surface with hexane or a product designed for removal of PCBs (Less Than 10 PCB Cleaner, Pipe X, or similar), and let sit for a minimum of 15 minutes.

g) Scrub surfaces with a scrub brush or pad, such that the brush/pad is passed over each square foot (or less) a minimum of one time (to the extent feasible).

h) Rinse using high-pressure steam, such that the steam is passed over each square foot (or less) a minimum of two times.

i) To the extent feasible, absorb the residual solution with a clean, disposable, absorbent pad, mop, or similar.

j) At each stage, as necessary, capture and properly containerize and/or manage wash water and decontamination rinsate.

Confirmatory Wipe Sampling

Standard wipe tests (40 CFR 761.123) will be collected at locations to be determined using the methodologies described in 40 CFR 761.306 or 40 CFR 761.308 at AECC's discretion.

Any three-dimensional surfaces will be projected (schematically "folded-out") to a two-dimensional surface to obtain a large nearly flat surface (40 CFR 761.302(a)(1)).

We are assuming that due to the extended widespread exposure of the items with no point-source of contamination, it can be reasonably assumed that the exposure mirrors a single-source of PCBs at uniform concentration.

Grab samples may be composited in accordance with 40 CFR 761.312.

Wipe Sample Analysis

Wipe samples will be analyzed via SW-846 Method 8082 with Soxhlet prep/extraction.

Clearance Value

Results will be compared to a clearance value of less than or equal 10 ug/100 cm^2. Results will apply to entire sampled surface / item (40 CFR 761.316).

If laboratory results indicate that re-cleaning is necessary, Steps f) through h) of the General Decontamination Procedure will be followed, and the item will be re-sampled in accordance with 40 CFR 761.304(c). This process will continue until satisfactory results are obtained.

Item-Specific Details and Protocols

The following items will be decontaminated in accordance with the General Contamination Procedure detailed above, but require additional tasks to assure proper decontamination.

- Drill Rigs – If applicable, the rollers and visible surfaces of the treads will be decontaminated (if they have been exposed to contaminated soils). Then the rig will be rolled forward/back to expose the other side of the tread, and the decontamination of the newly exposed surfaces will be conducted. Similarly, tires will be rolled to expose all surfaces. The cab floor will be decontaminated in accordance with the self-implementing double wash/rinse procedures described at 40 CFR 761.79(c)(2) and Subpart S (if the operator has travelled on contaminated soils). The following clearance wipe samples will be collected and analyzed, as necessary:

    - Sleeves – Sleeves and similar apparatus are considered reusable equipment and will be decontaminated in accordance with the protocols detailed in Section 4.2.2.

    - Tracks – Two grab samples collected from the "exterior" face and 2 grab samples collected from the "interior" face of each track will be combined into one composite sample (i.e. - 4 grab samples combined into 1 composite sample for each tread). Each track shall be considered a separate item as it pertains to 40 CFR 761.316 (each side will consist of "interior" and "exterior" faces).

    - Rollers – Two grab samples collected from the "exterior" face of the rollers and 2 grab samples collected from the "interior" face of the rollers on each side of the excavator will be combined into one composite sample (i.e. - 4 grab samples combined into 1 composite sample for each side of the excavator). Each side (left and right) shall be considered a separate item as it pertains to 40 CFR 761.316 (each side will consist of "interior" and "exterior" faces).

    - Tires – A total of 3 grab samples from each tire will be combined into 1 composite sample. Laboratory result of the composite sample will pertain to the entire tire (40 CFR 761.316).

    - Cab Floor – No sampling since the decontamination will be conducted in accordance with 40 CFR 761.79(c)(2) and Subpart S.

- Excavator / Backhoe – Excavators or backhoes might be used to collect soil pile samples at depth. If so, decontamination and clearance sampling of the excavator / backhoe will occur in a similar fashion to the drill rigs.

- Loaders – Although loaders are not anticipated to be utilized during the investigation, if they are used, the decontamination and clearance sampling of the loaders will occur in a similar fashion to the drill rigs.

- Dump Truck/Trailer Boxes and Similar Containers – Although dump trucks, trailer boxes, and other similar large containers are not anticipated to be utilized during the investigation, if they are used, they will be double-lined with polyethylene sheeting before each load. Therefore, the surfaces of the boxes/containers will not be exposed to contaminated soils. As such, decontamination will not be necessary. Loads will be carefully placed to avoid puncture / tearing. However, in the event of a major tear that breaches both layers of sheeting, the exposed area will either be decontaminated in accordance with the General Decontamination Procedures described above.

- Non-Porous Materials – Non-porous materials will likely be disposed after each phase of the investigation. However, if the non-porous material will instead be decontaminated and re-used, each surface of the material that was in contact with contaminated media will be decontaminated and sampled (confirmatory).

5.0 GENERAL SITE-SPECIFIC HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) sets forth requirements for maintaining the health and safety of persons at the Site. The HASP addresses general health and safety issues related to the presence of specific chemical and physical hazards that may be encountered during performance of the work activities at the Site. The HASP includes an Emergency Response Plan, which presents the procedures to be followed in the event of an emergency situation.

The site-specific Health and Safety Plan is presented as Appendix C.

6.0 COMMUNITY AIR MONITORING PLAN

The intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. The action levels specified within the Plan require increased monitoring, corrective actions to abate emissions, and / or work shutdown.

Continuous monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) will be required for all ground intrusive activities, including but not limited to, soil excavation and handling, trenching, and the installation of monitoring wells. CAMP monitoring is not required for this project when using hand tools for shallow soil sampling, provided that sampling does not occur during extremely dry or windy conditions to minimize any off-site migration of contaminated soil particles.

The site-specific CAMP, prepared in accordance with Appendix 1A of DER-10, is presented as Appendix D.

7.0 CITIZEN PARTICIPATION PLAN

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

A Citizen Participation Plan (CPP) provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

A site-specific CPP has been approved by the NYSDEC. A copy of the CPP is provided as Appendix E.

TABLES

TABLE 1 – SUMMARY OF PAST AND PROPOSED SAMPLE LOCATIONS

Summary of Past and Proposed Sample Locations

Location	Grid/Section	Analyzed Compounds / Depth of Sample Collection							
		VOCs	SVOCs	Metals	PCBs	Pesticides	Herbicides	1,4-Dioxane	PFAS
Comprehensive - Groundwater									
MW-01^	N/A	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval
MW-02	N/A	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	---	---
MW-03	N/A	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	---	---
MW-04^	N/A	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval	Screened Interval
Comprehensive - Soil									
SB-01/MW-01^	N/A	2"-6"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	---	---
SB-02/MW-02	N/A	2"-6"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	---	---
SB-03/MW-03	N/A	2"-6"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	---	---
SB-04/MW-04^	N/A	2"-6"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	0"-2"/2"-12"/GWI	---	---
SB-5	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
SB-6	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
SB-7	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
SB-08	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
SB-09	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
SB-10	N/A	2"-6"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	0"-2"/2"-12"	---	---
Comprehensive - Soil Pile									
	01C1	---	CoS	CoS	CoS	CoS	CoS	---	---
	01G1	CoS	---	---	---	---	---	---	---
	01G2	CoS	---	---	---	---	---	---	---
	01G3	CoS	---	---	---	---	---	---	---
	02C1	---	CoS	CoS	CoS	CoS	CoS	---	---
	02G1	CoS	---	---	---	---	---	---	---
	02G2	CoS	---	---	---	---	---	---	---
	02G3	CoS	---	---	---	---	---	---	---
	03C1	---	CoS	CoS	CoS	CoS	CoS	---	---
	03G1	CoS	---	---	---	---	---	---	---
	03G2	CoS	---	---	---	---	---	---	---
	03G3	CoS	---	---	---	---	---	---	---
	04C1	---	CoS	CoS	CoS	CoS	CoS	---	---
	04G1	CoS	---	---	---	---	---	---	---
SP2	**04G2**	CoS	---	---	---	---	---	---	---
	04G3	CoS	---	---	---	---	---	---	---
	05C1	---	CoS	CoS	CoS	CoS	CoS	---	---
	05G1	CoS	---	---	---	---	---	---	---
	05G2	CoS	---	---	---	---	---	---	---
	05G3	CoS	---	---	---	---	---	---	---
	01	---	---	---	9.072 ppm	---	---	---	---
	02	---	---	---	0.110 ppm	---	---	---	---
	03	---	---	---	0.0802 ppm	---	---	---	---
	04	---	---	---	0.271 ppm	---	---	---	---
	05	---	---	---	9.926 ppm	---	---	---	---
	06	---	---	---	7.273 ppm	---	---	---	---
	07	---	---	---	14.405 ppm	---	---	---	---
	08	---	---	---	25.673 ppm	---	---	---	---
	09	---	---	---	0.119 ppm	---	---	---	---
Areas of Concern - Soil									
	X	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2	---	---	---	0"-2"/2"-12"	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2	---	---	---	0"-2"/2"-12"	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"	---	---	---	---
AOC2	**N1W2**	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	CS-1	---	---	---	34.4 ppm	---	---	---	---
	CS-2	---	---	---	6.32 ppm	---	---	---	---
	CS-3	---	---	---	7.8 ppm	---	---	---	---
	CS-4	---	---	---	9.41 ppm	---	---	---	---

Summary of Past and Proposed Sample Locations

Location	Grid/Section	Analyzed Compounds / Depth of Sample Collection							
		VOCs	SVOCs	Metals	PCBs	Pesticides	Herbicides	1,4-Dioxane	PFAS
AOC1	X	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3	---	---	---	0"-2"/2"-12"	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3	---	---	---	0"-2"/2"-12"	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N1W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N2W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	N3W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3E1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3E2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3E3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S1W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S2W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3W1	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3W2	---	---	---	0"-2"/2"-12"	---	---	---	---
	S3W3	---	---	---	0"-2"/2"-12"	---	---	---	---
	SS-51	---	---	---	137.94 ppm	---	---	---	---
	SS-53	---	---	---	197.84 ppm	---	---	---	---
	SS-75/75d	---	---	---	1.37/6.90 ppm	---	---	---	---
	SS-76	---	---	---	5.52 ppm	---	---	---	---
	SS-81	---	---	---	14.32 ppm	---	---	---	---
	SS-82	---	---	---	367.7 ppm	---	---	---	---
	SS-83	---	---	---	4,404 ppm	---	---	---	---
	SS-85	---	---	---	1.2 ppm	---	---	---	---
	SS-86	---	---	---	77.82 ppm	---	---	---	---
	SS-87	---	---	---	3.5 ppm	---	---	---	---
	SS-88	---	---	---	2.81 ppm	---	---	---	---
	SS-99	---	---	---	96.7 ppm	---	---	---	---
Individual Locations - Soil									
SS-37	X	---	---	---	104.38 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-38	X	---	---	---	87.43 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-41	X	---	---	---	38.53 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---

Summary of Past and Proposed Sample Locations

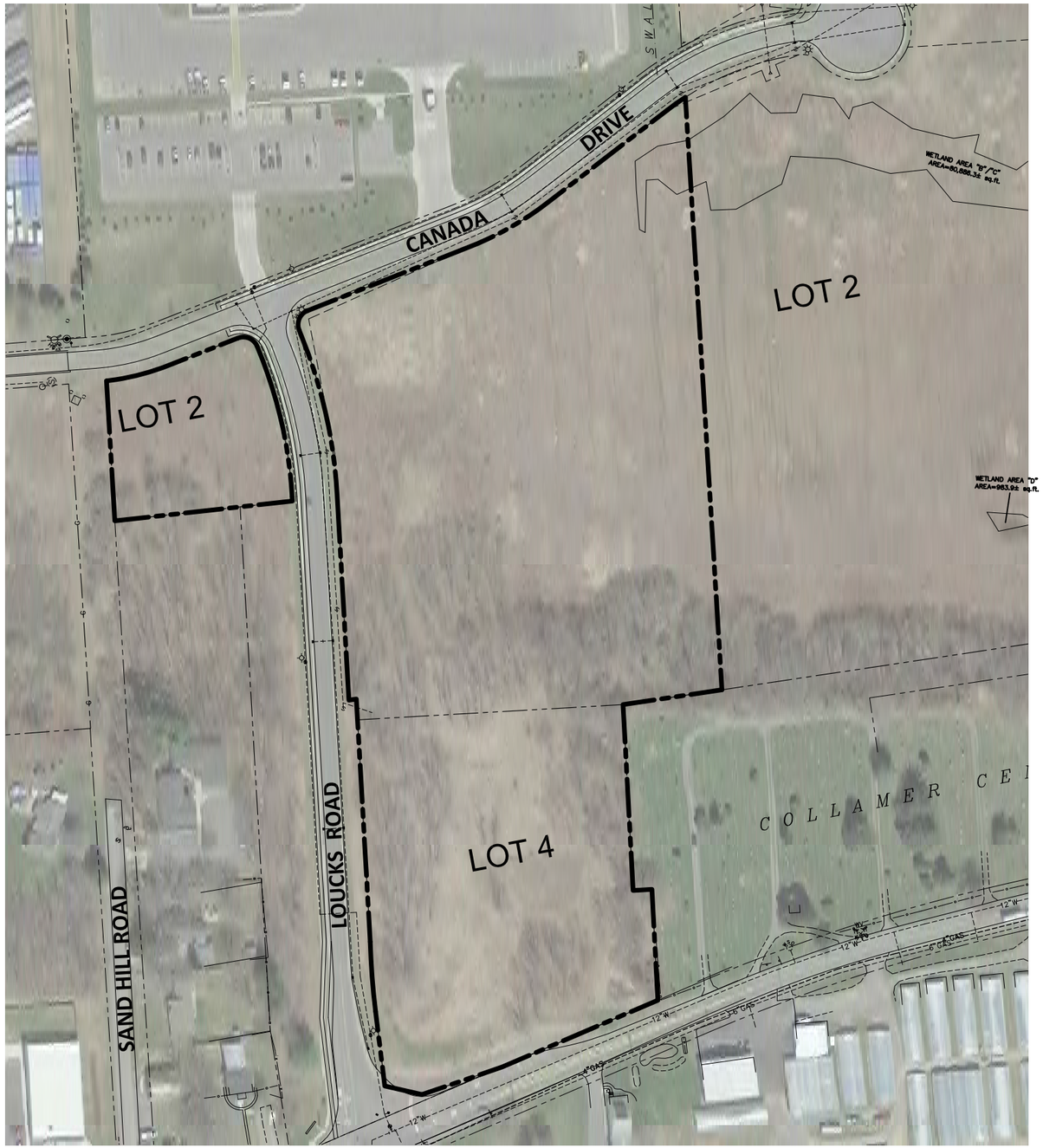
Location	Grid/Section	Analyzed Compounds / Depth of Sample Collection							
		VOCs	SVOCs	Metals	PCBs	Pesticides	Herbicides	1,4-Dioxane	PFAS
SS-42	X	---	---	---	15.48 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-45	X	---	---	---	37.12 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-49	X	---	---	---	90.51 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-52	X	---	---	---	66.52 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-59	X	---	---	---	1.68 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-67	X	---	---	---	121.07 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
SS-89	X	---	---	---	5.18 ppm/2"-12"	---	---	---	---
	N1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	N1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1E1	---	---	---	0"-2"/2"-12"*	---	---	---	---
	S1W1	---	---	---	0"-2"/2"-12"*	---	---	---	---
Clean Soil Locations									
SS-39	N/A	---	---	---	0.77 ppm	---	---	---	---
SS-40/40d	N/A	---	---	---	0.04/0.00 ppm	---	---	---	---
SS-43	N/A	---	---	---	0.00 ppm	---	---	---	---
SS-44	N/A	---	---	---	0.27 ppm	---	---	---	---
SS-46	N/A	---	---	---	0.59 ppm	---	---	---	---
SS-47	N/A	---	---	---	0.02 ppm	---	---	---	---
SS-50	N/A	---	---	---	0.19 ppm	---	---	---	---
SS-54	N/A	---	---	---	0.13 ppm	---	---	---	---
SS-55	N/A	---	---	---	0.04 ppm	---	---	---	---
SS-57	N/A	---	---	---	0.03 ppm	---	---	---	---
SS-63	N/A	---	---	---	0.09 ppm	---	---	---	---
SS-65	N/A	---	---	---	0.07 ppm	---	---	---	---
SS-72	N/A	---	---	---	0.05 ppm	---	---	---	---
SS-73	N/A	---	---	---	0.57 ppm	---	---	---	---
SS-74	N/A	---	---	---	0.02 ppm	---	---	---	---
SS-80	N/A	---	---	---	0.18 ppm	---	---	---	---
SS-84	N/A	---	---	---	0.27 ppm	---	---	---	---
SS-90	N/A	---	---	---	0.35 ppm	---	---	---	---
SS-91	N/A	---	---	---	1.00 ppm	---	---	---	---
SS-92	N/A	---	---	---	0.22 ppm	---	---	---	---
SS-93	N/A	---	---	---	0.03 ppm	---	---	---	---
SS-94	N/A	---	---	---	0.099 ppm	---	---	---	---
SS-95/95d	N/A	---	---	---	0.03/0.00 ppm	---	---	---	---
SS-96	N/A	---	---	---	0.03 ppm	---	---	---	---
SS-98	N/A	---	---	---	0.05 ppm	---	---	---	---
SS-100	N/A	---	---	---	0.07 ppm	---	---	---	---
SS-101	N/A	---	---	---	0.13 ppm	---	---	---	---
SS-106	N/A	---	---	---	0.08 ppm	---	---	---	---

Summary of Past and Proposed Sample Locations

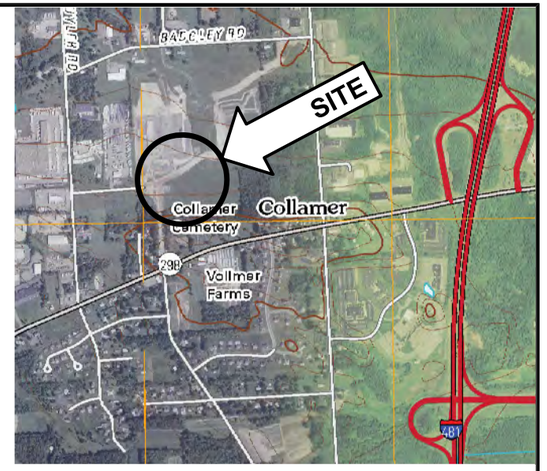
Location	Grid/Section	Analyzed Compounds / Depth of Sample Collection							
		VOCs	SVOCs	Metals	PCBs	Pesticides	Herbicides	1,4-Dioxane	PFAS
ROAD-1	N/A	---	---	---	0.41 ppm	---	---	---	---
ROAD-2	N/A	---	---	---	0.30 ppm	---	---	---	---
ROAD-3	N/A	---	---	---	0.15 ppm	---	---	---	---
ROAD-4	N/A	---	---	---	0.04 ppm	---	---	---	---

Notes:
Bold = Location of sample to be collected
--- = No sample to be collected
^ = Assumed hydraulically upgradient and downgradient wells
GWI = Groundwater Interface
CoS = Center of Section (i.e. - middle of applicable layer)
Values shown in ppm are past analytical results of soil samples collected 0"-2" below the vegetative cover
* = the 2"-12" samples will be analyzed if necessary (i.e. - if analytical results of samples above or adjacent do not meet criteria)

FIGURES



SITE PLAN



SITE LOCATION

LEGEND:

BROWNFIELD AREA EXTENT

PROPERTY LINE

NOTES:

1. AERIAL PHOTOGRAPH FROM GOOGLE EARTH WEBSITE.
2. ALL LOCATIONS ARE APPROXIMATE.

0 200' 400'

GRAPHIC SCALE

AECC ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
DRAWN:	DEC 2018
DRAWN BY:	HS
CHECKED BY:	RM
FILE NAME:	

SITE AND LOCATION PLAN

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
1

Sample Location	Date	Total PCBs (ppm)
SS-37	10/07/14	104.38
SS-38	10/07/14	87.43
SS-39	10/07/14	0.77
SS-40	10/07/14	0.04
SS-40d	10/07/14	0.00
SS-41	10/07/14	38.53
SS-42	10/07/14	15.48
SS-43	10/07/14	0.27
SS-44	10/07/14	0.19
SS-45	10/07/14	37.12
SS-46	10/07/14	0.59
SS-47	10/07/14	0.02
SS-49	10/07/14	90.51
SS-50	10/07/14	0.19
SS-51	10/07/14	137.94
SS-52	10/07/14	66.52
SS-53	10/07/14	197.84
SS-54	10/07/14	0.13
SS-55	10/07/14	0.04
SS-57	10/07/14	0.03
SS-59	10/07/14	1.68
SS-63	10/07/14	0.09
SS-65	10/07/14	0.07
SS-67	10/29/14	121.07
SS-72	10/29/14	0.05
SS-73	10/29/14	0.57
SS-74	10/29/14	0.02
SS-75	10/29/14	1.37
SS-75d	10/29/14	6.90
SS-76	10/29/14	5.52
SS-80	12/02/14	0.18
SS-81	12/02/14	14.32
SS-82	12/02/14	367.7
SS-83	12/02/14	4,404
SS-84	12/02/14	0.27
SS-85	12/02/14	1.20
SS-86	12/02/14	77.82
SS-87	12/02/14	3.50
SS-88	12/02/14	2.81
SS-89	12/02/14	5.18
SS-90	12/02/14	0.35
SS-91	12/02/14	1.00
SS-92	12/02/14	0.22
SS-93	12/02/14	0.03
SS-94	12/02/14	0.0985

Sample Location	Date	Total PCBs (ppm)
SS-95	12/02/14	0.03
SS-95d	12/02/14	0.00
SS-96	12/02/14	0.03
SS-98	12/15/14	0.05
SS-99	12/15/14	96.7
SS-100	12/15/14	0.07
SS-101	12/15/14	0.13
SS-106	12/15/14	0.08

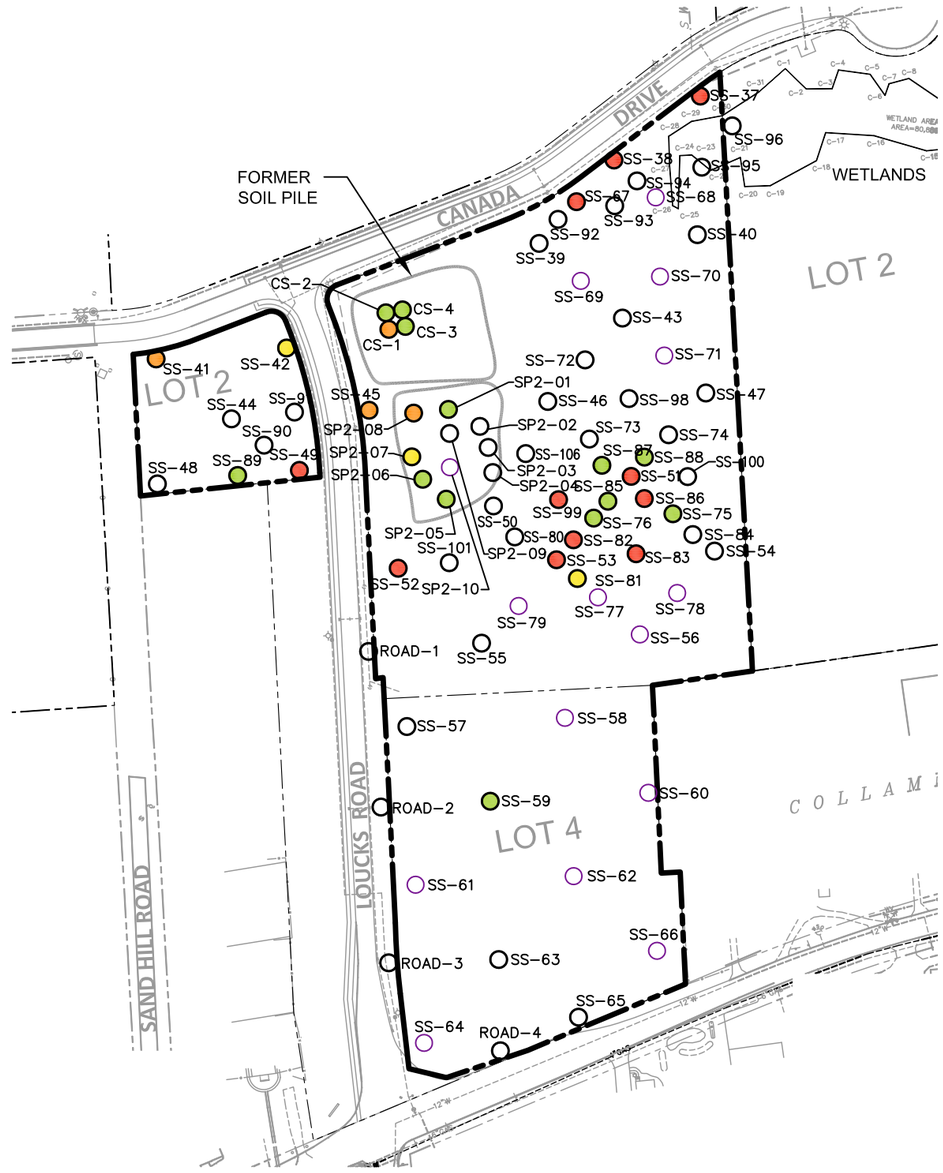
Sample Location	Date	Total PCBs (ppm)
SP2-01	05/31/13	9.072
SP2-02	05/31/13	0.110
SP2-03	05/31/13	0.0802
SP2-04	05/31/13	0.271
SP2-05	05/31/13	9.926
SP2-06	05/31/13	7.273
SP2-07	05/31/13	14.405
SP2-08	05/31/13	25.673
SP2-09	05/31/13	0.119

ROAD-1	10/07/14	0.411
ROAD-2	10/07/14	0.0297
ROAD-3	10/07/14	0.1532
ROAD-4	10/07/14	0.038

Sample Location	Date	Total PCBs (ppm)
CS-1	04/08/13	34.4
CS-2	04/08/13	6.32
CS-3	04/08/13	7.8
CS-4	04/08/13	9.41

Sample Location	Date	Total PCBs (ppm)
CS-1(0.5')	04/08/13	34.4
CS-1(1.5')	12/15/14	1.65
CS-1(2.5')	12/15/14	0.30
SS-53(0.5')	10/07/14	197.84
SS-53(1.5')	12/15/14	13.31
SS-53(2.5')	12/15/14	6.06
SS-83(0.5')	12/02/14	4,404
SS-83(1.5')	12/15/14	66.6
SS-83(2.5')	12/15/14	297.0
SS-87(0.5')	12/02/14	3.50
SS-87(1.5')	12/15/14	4.88
SS-87(2.5')	12/15/14	0.17

NOTE: SAMPLES THAT DID NOT EXHIBIT DETECTABLE CONCENTRATIONS OF PCBs ARE NOT SHOWN.



LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- SURFACE SOIL SAMPLE LOCATION

NOTES:

1. BASE MAP MODIFIED FROM ELECTRONIC DRAWING FILES PROVIDED BY CLIENT.

- = PCB CONCENTRATION EXCEEDS 50 ppm (HAZARDOUS; CAP - LOW OCCUPANCY; NOT ALLOWED HIGH OCCUPANCY)
- = PCB CONCENTRATION BETWEEN 25 AND 50 ppm (FENCE OR CAP - LOW OCCUPANCY; NOT ALLOWED HIGH OCCUPANCY)
- = PCB CONCENTRATION BETWEEN 10 AND 25 ppm (NO RESTRICTIONS - LOW OCCUPANCY; NOT ALLOWED HIGH OCCUPANCY)
- = PCB CONCENTRATION BETWEEN 1 AND 10 ppm (NO RESTRICTIONS - LOW OCCUPANCY; CAP - HIGH OCCUPANCY)
- = PCB CONCENTRATION LESS THAN OR EQUAL TO 1 ppm (NO RESTRICTIONS)

0 200' 400'

GRAPHIC SCALE

AECC ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

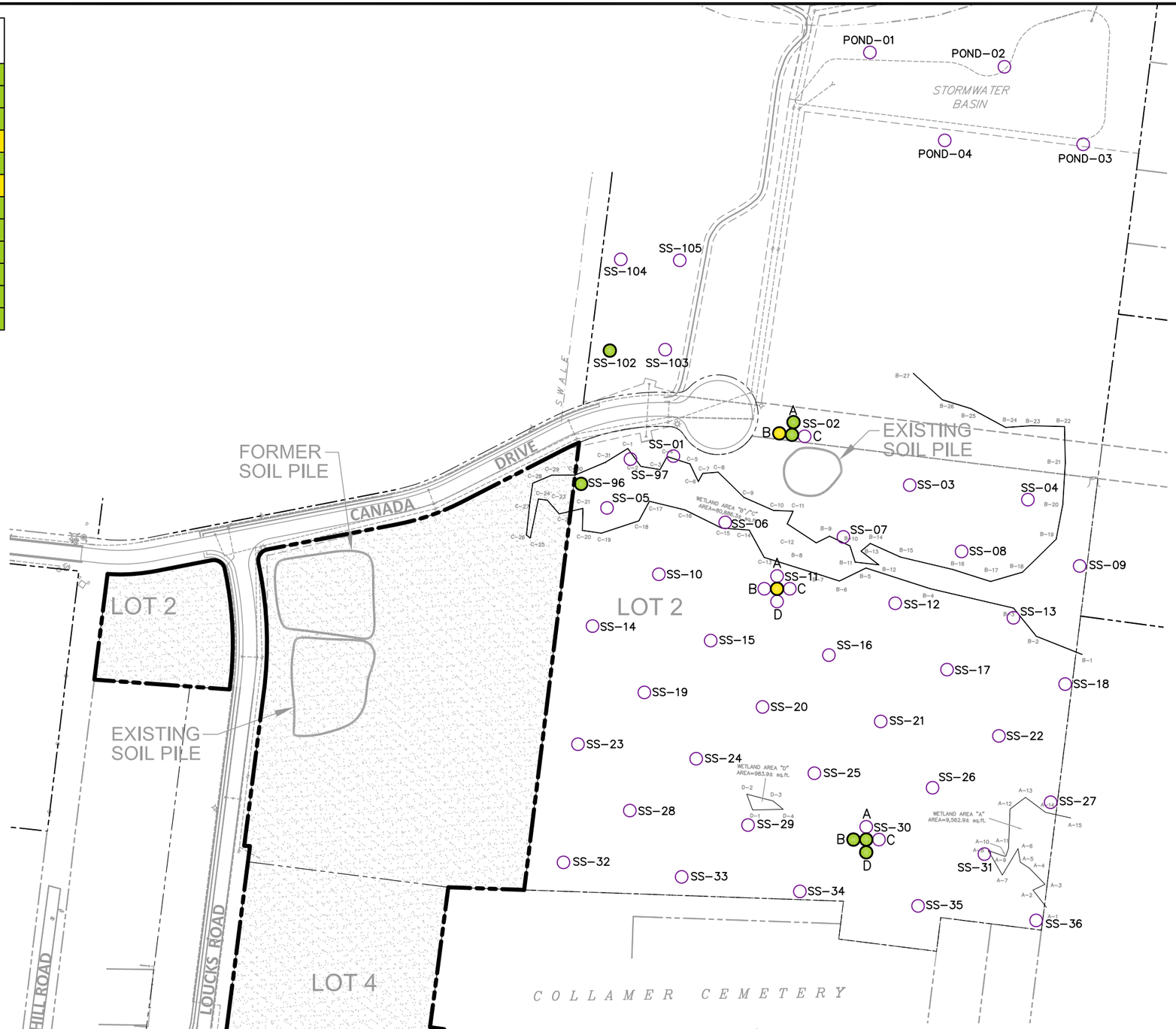
PROJECT NO. 17-009
DRAWN: DEC. 2018
DRAWN BY: HS
CHECKED BY: RM
FILE NAME:

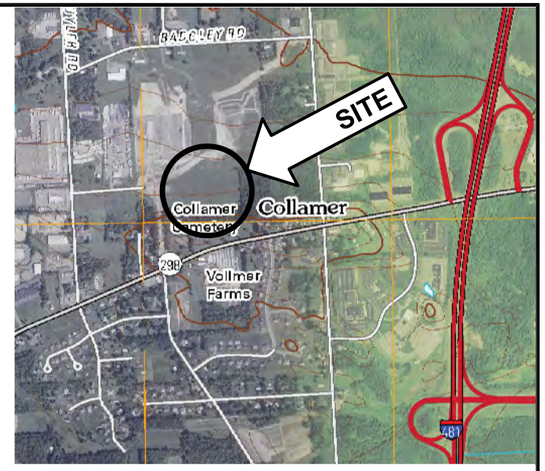
PRIOR INVESTIGATIVE RESULTS - ON SITE

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
2A

Sample Location	Total PCBs (ppm)
SS-02	0.03
SS-02A	0.08
SS-02Ad	0.046
SS-02B	2.39
SS-11	0.05
SS-11d	0.26
SS-30	0.07
SS-30d	0.06
SS-30B	0.02
SS-30D	0.02
SS-96	0.03
SS-102	0.08





SITE LOCATION

LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- RIGHT-OF-WAY
- SURFACE SOIL SAMPLE LOCATION
- BROWNFIELD AREA

NOTES:

1. BASE MAP MODIFIED FROM ELECTRONIC DRAWING FILES PROVIDED BY CLIENT.

- = PCB CONCENTRATION EXCEEDS 50 ppm (HAZARDOUS)
- = PCB CONCENTRATION BETWEEN 25 AND 50 ppm (ABOVE INDUSTRIAL USE SCO BUT LESS THAN THE HAZARDOUS WASTE CHARACTERIZATION LIMIT)
- = PCB CONCENTRATION BETWEEN 0.1 AND 25 ppm (ABOVE UNRESTRICTED USE SCO BUT BELOW THE INDUSTRIAL USE SCO)
- = PCB CONCENTRATION LESS THAN 0.1 ppm (BELOW UNRESTRICTED USE SCO)
- = NO PCBs DETECTED

0 200' 400'

GRAPHIC SCALE

AECC ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
DRAWN:	DEC 2018
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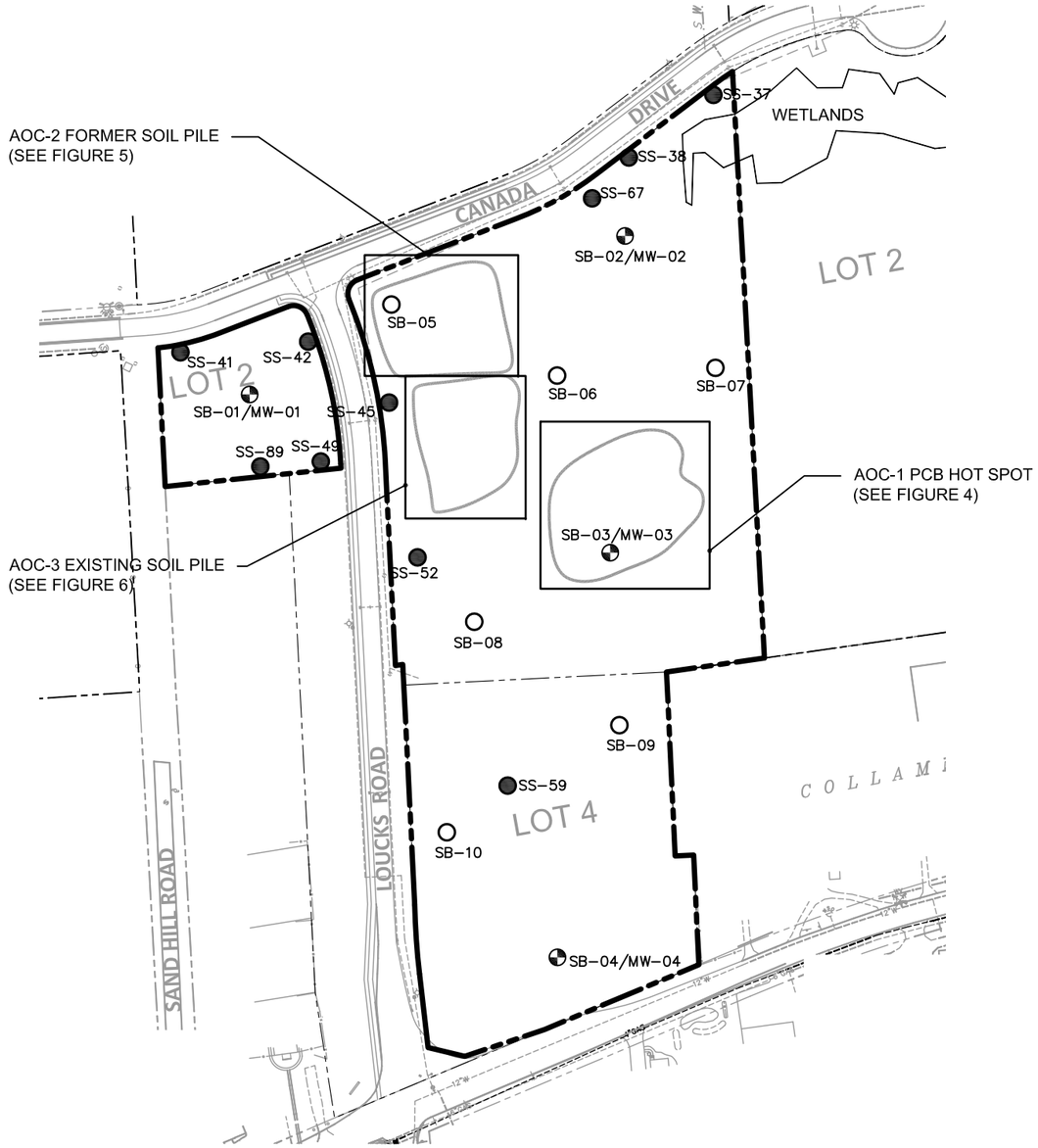
FILE NAME:	

PRIOR INVESTIGATIVE RESULTS - OFF SITE

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE **2B**



LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- PROPOSED INDIVIDUAL SAMPLING LOCATION (PCB INVESTIGATION)
- PROPOSED GROUNDWATER WELL LOCATION (COMPREHENSIVE SOIL AND GROUNDWATER ANALYSIS)
- PROPOSED SOIL BORING LOCATION (COMPREHENSIVE SOIL ANALYSIS)

NOTE:

1. BASE MAP MODIFIED FROM ELECTRONIC DRAWING FILES PROVIDED BY CLIENT.

0 200' 400'

GRAPHIC SCALE

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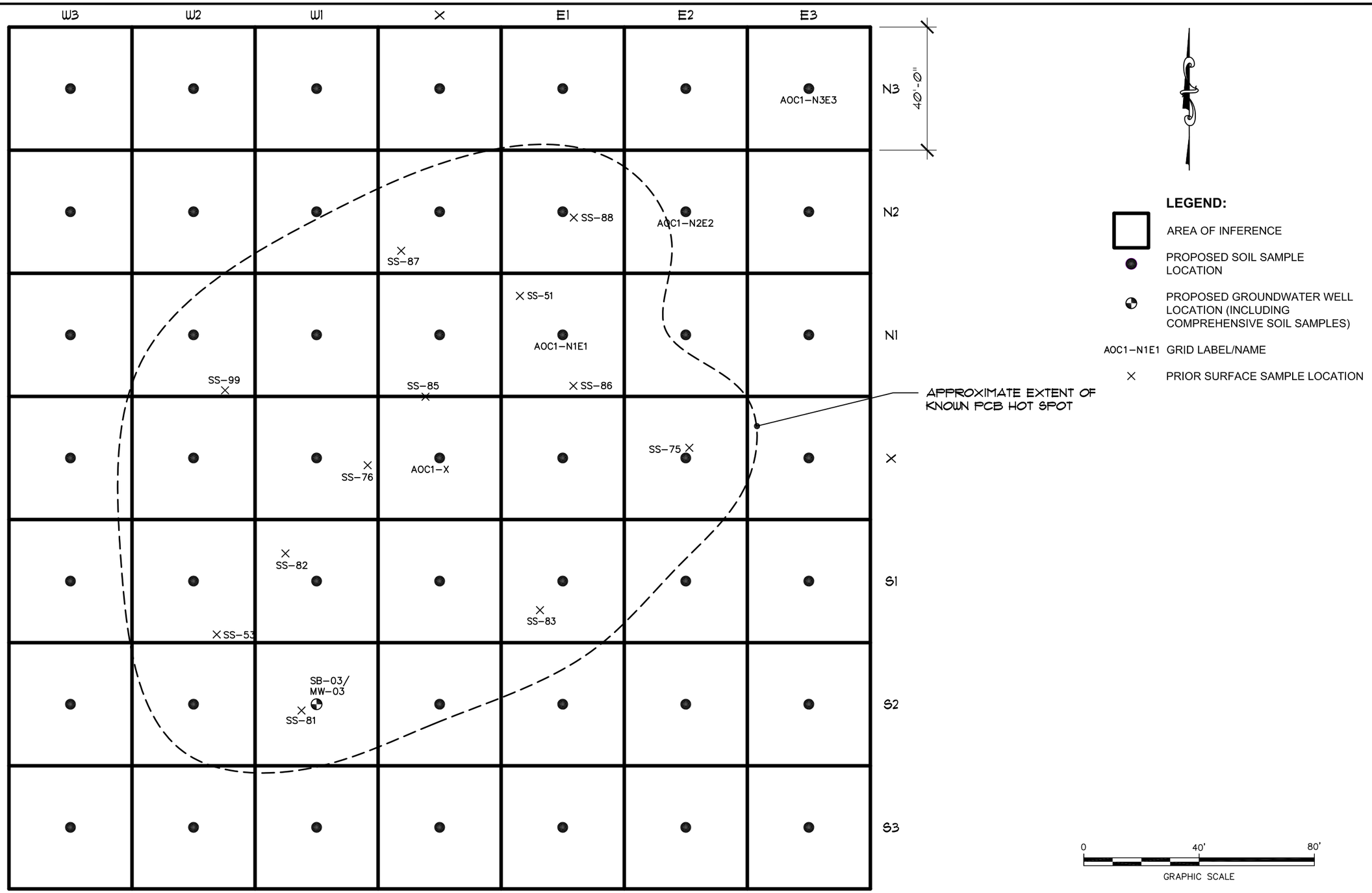
AREAS OF CONCERN AND PROPOSED BORING LOCATIONS

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
3



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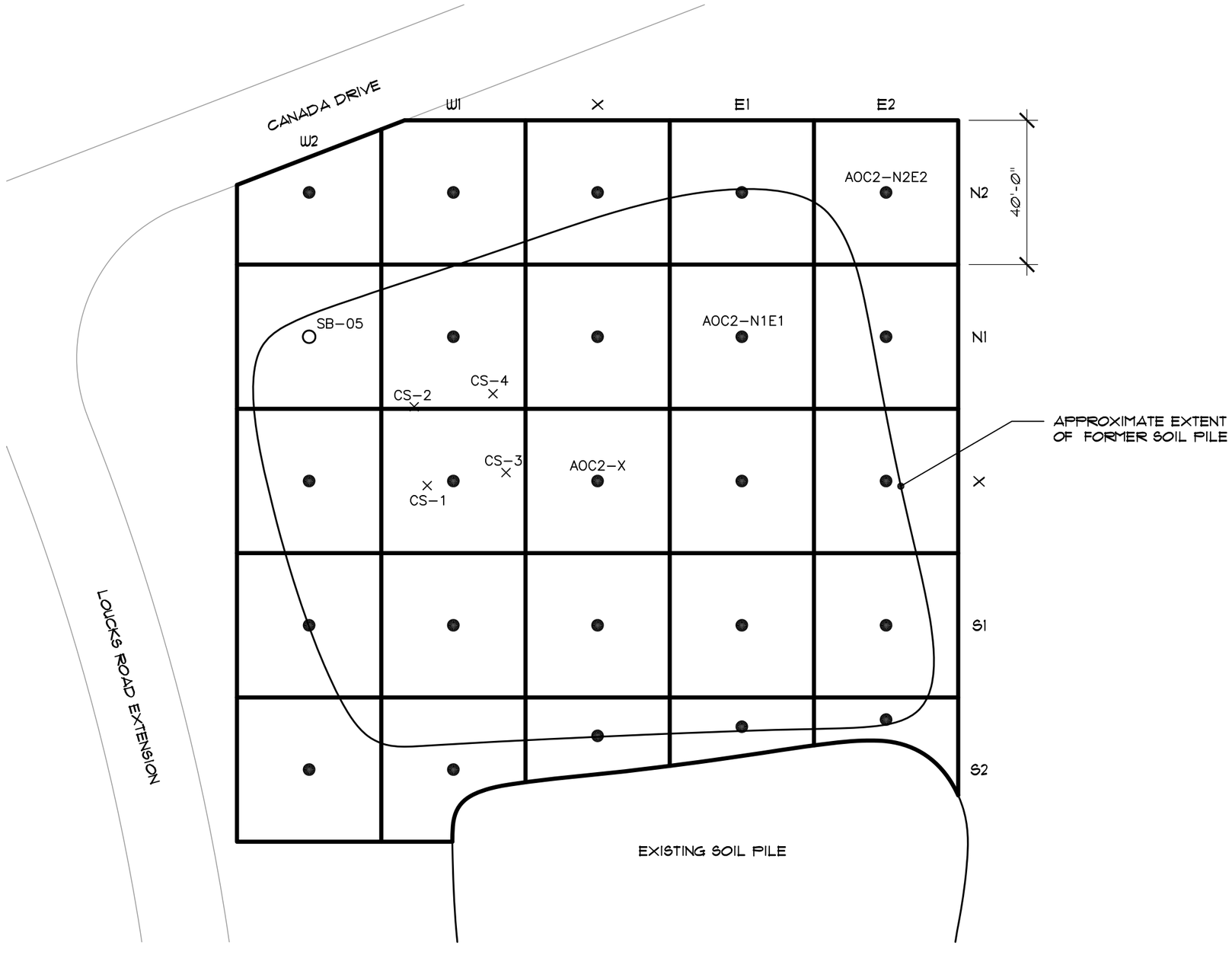
AOC-1 PCB HOT SPOT SAMPLING PLAN

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
4



LEGEND:

- AREA OF INFERENCE
- PROPOSED SOIL SAMPLE LOCATION
- AOC2–N1E1 GRID LABEL/NAME
- × PRIOR SURFACE SAMPLE LOCATIONS
- ○ PROPOSED SOIL BORING LOCATION (COMPREHENSIVE SOIL ANALYSIS)

NOTES:

1. BASE MAP MODIFIED FROM ELECTRONIC DRAWING FILES PROVIDED BY CLIENT.
2. EXTENT OF FORMER SOIL PILE INFERRED FROM AERIAL PHOTOGRAPHY.

0 40' 80'

GRAPHIC SCALE

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ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
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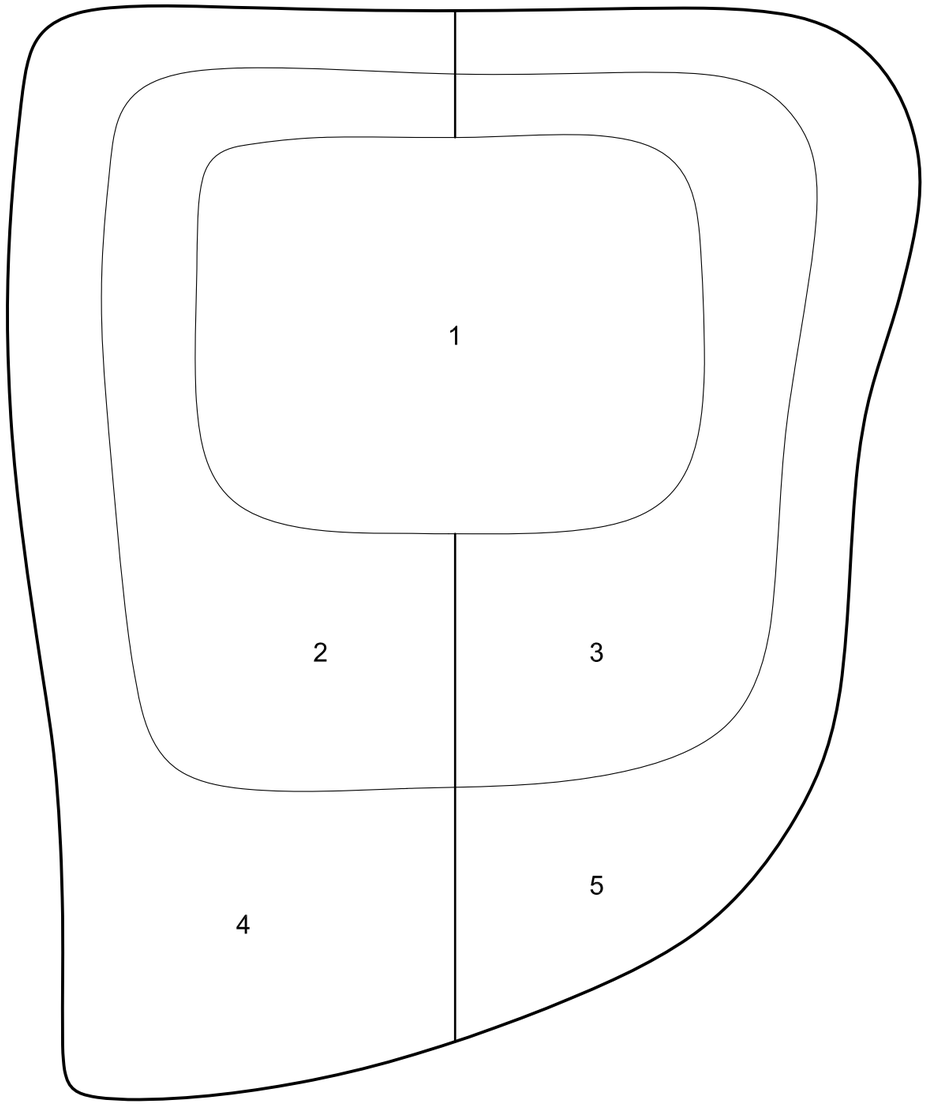
FILE NAME:	

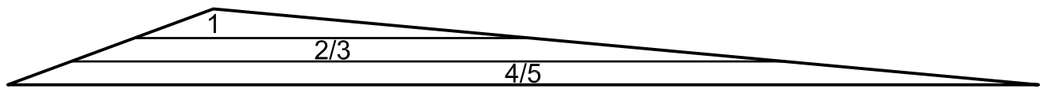
AOC-2 FORMER SOIL PILE AREA SAMPLING PLAN

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
5



SOIL PILE SECTIONS
(PLAN VIEW)



SOIL PILE SECTIONS
(PROFILE VIEW)

LEGEND:

1 SOIL PILE SECTION

0 25' 50'

GRAPHIC SCALE

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Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
DRAWN:	DEC. 2018
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FILE NAME:	

AOC-3 EXISTING SOIL PILE CHARACTERIZATION PLAN

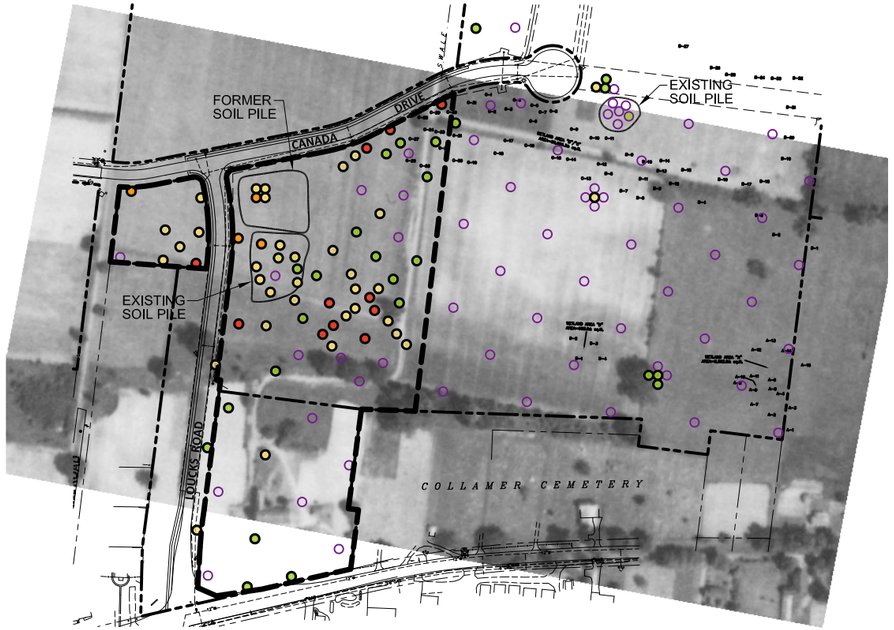
LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
6

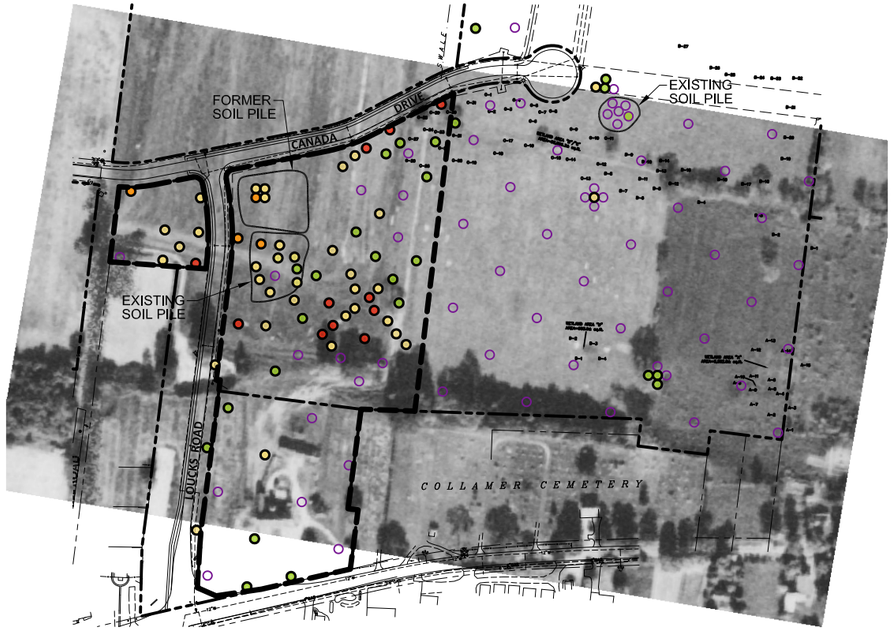
EXHIBITS

EXHIBIT 1 – HISTORICAL AERIAL PHOTOGRAPH OVERLAYS – 1938-1972

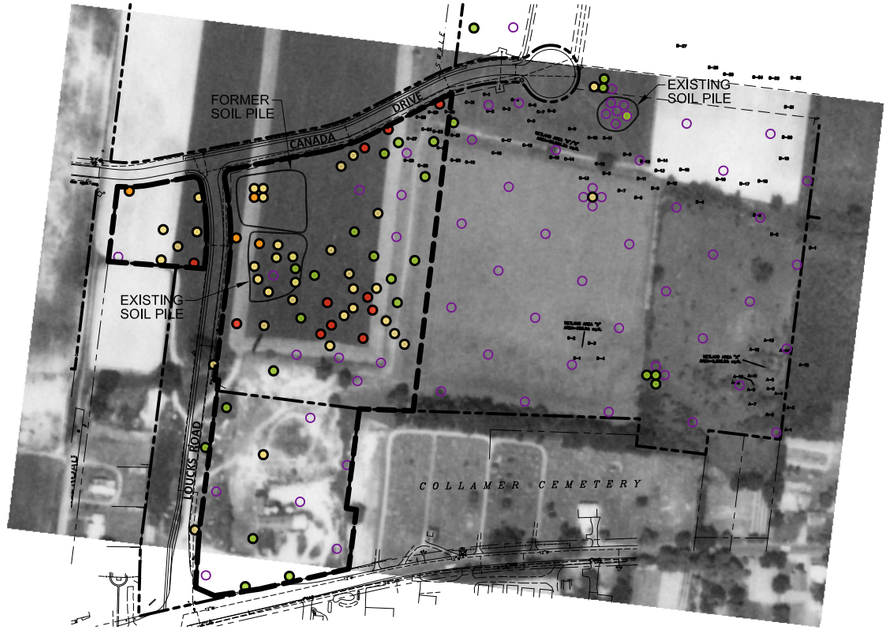
EXHIBIT 2 – HISTORICAL AERIAL PHOTOGRAPH OVERLAYS – 1995-2011



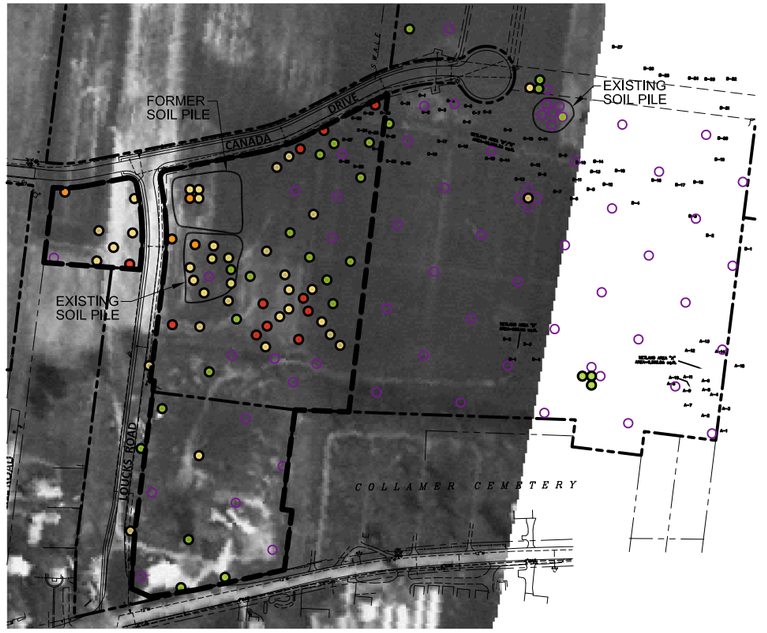
1938



1951



1966



1972

LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- RIGHT-OF-WAY
- SURFACE SOIL SAMPLE LOCATION

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- = NO PCBs DETECTED

0 600' 1200'

GRAPHIC SCALE

AECC ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	14-091
DRAWN:	MAY 2018
DRAWN BY:	HS
CHECKED BY:	RM
FILE NAME:	

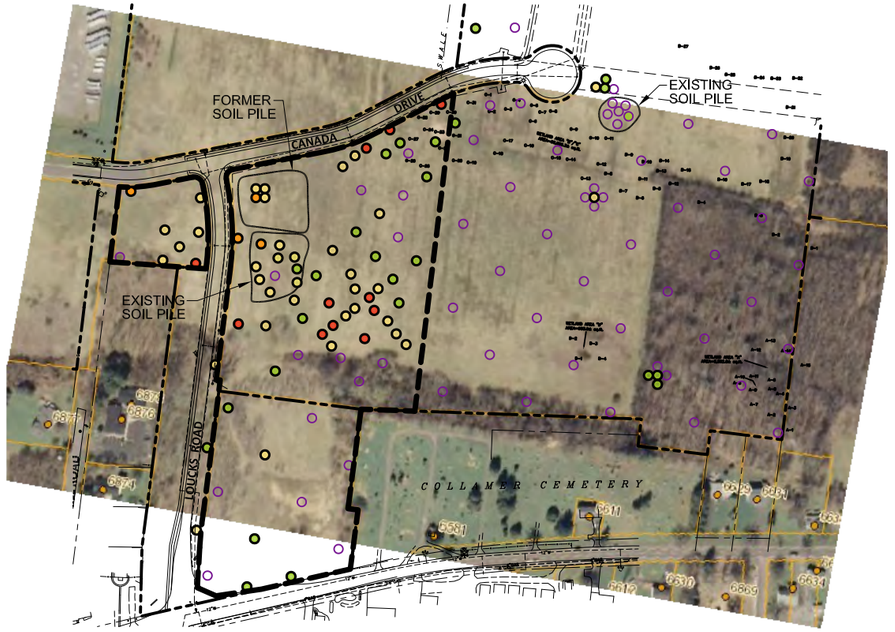
HISTORICAL AERIAL PHOTOGRAPH OVERLAYS - 1938-1972

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

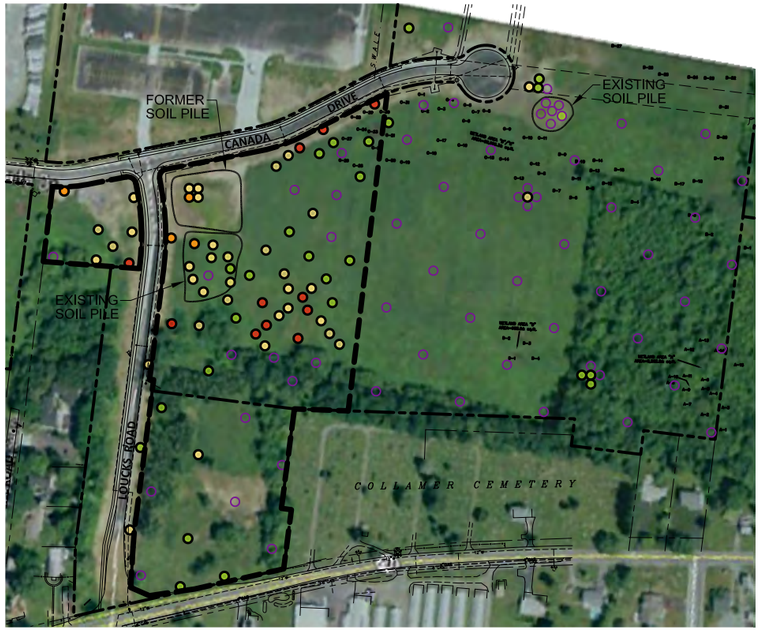
EXHIBIT

EX-1

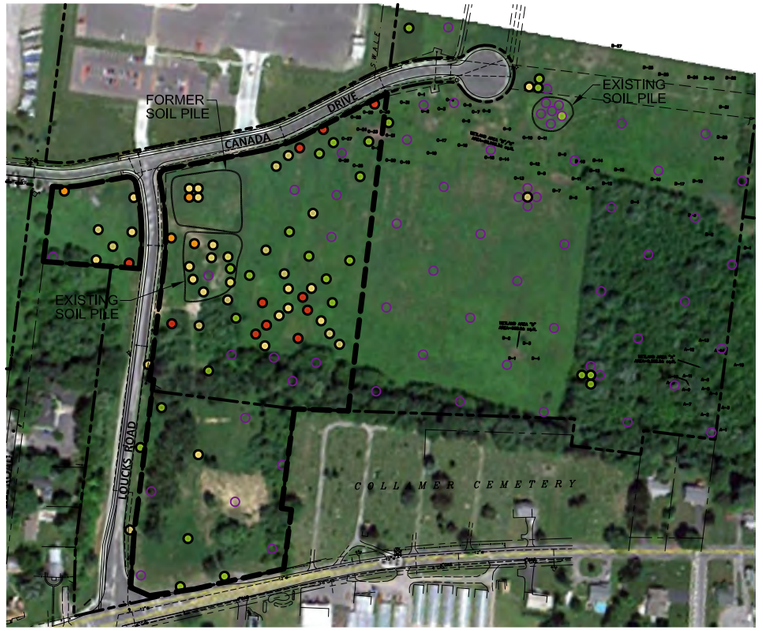
2003



2006



2009



2011

LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- RIGHT-OF-WAY
- SURFACE SOIL SAMPLE LOCATION

NOTES:

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- = PCB CONCENTRATION BETWEEN 0.1 AND 25 ppm (ABOVE UNRESTRICTED USE SCO BUT BELOW THE INDUSTRIAL USE SCO)
- = PCB CONCENTRATION LESS THAN 0.1 ppm (BELOW UNRESTRICTED USE SCO)
- = NO PCBs DETECTED

0 600' 1200'

GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	14-091
DRAWN:	MAY 2018
DRAWN BY:	HS
CHECKED BY:	RM
FILE NAME:	

HISTORICAL AERIAL PHOTOGRAPH OVERLAYS - 1995-2011

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

EXHIBIT

EX-2

APPENDIX A

Standard Operating Procedures

Scope and Application

The purpose of this SOP is to establish uniform procedures for the collection of surface and shallow soil samples using hand-operated sampling tools/equipment. Adherence to this SOP will promote consistency in sampling methods and if followed properly will provide a basis for sample representativeness.

It is noted that other state or federal agency standard operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Equipment/Apparatus/Supplies

Materials needed for this SOP may include:

Spoons/Scoops/Trowels – Sampling spoon/scoops/trowels may be reusable or disposable. Reusable spoons/scoops shall be constructed of stainless steel to facilitate easy decontamination. Disposable scoops may be constructed of other materials (example: high density polypropylene (HDPE), which are preferable to stainless steel when acquiring samples for trace element analysis.) however the use of softer and more brittle materials may be less effective in higher density soils.

Shovel – Shovels may be used for the preparation of the sample collection area (i.e., to remove surface materials to allow sampling with a spoon or scoop) or for samples requiring large sample volume (i.e, bench-scale treatability samples).

Soil Auger/Bucket (Hand) Auger - A soil auger/bucket (hand) auger usually comprises a T-handle attached to a spiral-bladed metal auger (soil auger) or a hollow tube with cutting teeth at the bottom (bucket or hand auger). Turning the handle in a clockwise direction, either brings soil toward the surface (hand auger) or into the hollow tube (bucket). Only moderate down-pressure should be used as forcing the auger through hard zones or in cobble-rich soils can damage equipment and injure the individual using the equipment.

Soil Augers are typically good for sampling depths up to 3 feet. Representative samples can be collected directly from the auger flight as it is withdrawn from the ground, or from the tube-sampler attachment which can be advanced into the soil after augering to the top of the desired depth interval. It should be noted that soil augers cause considerable disturbance of the soil that can cause the loss of volatile organic compounds (VOCs) from the soil, therefore, some consideration should be given to using a tube-sampler attachment, or another less invasive method for sampling soils for (VOCs).

Bucket/hand augers are generally used to collect soil samples from depths ranging from the ground surface to approximately five (5) feet below the ground surface. In some instances, soil samples may be collected from greater depths, but often with considerable more difficulty. Bucket/hand augers allow for discrete depth interval sampling as the soil is retained within the hollow tube of the auger when it is extracted from the ground. It should be noted that if depth-discrete sampling is the objective, more than one auger may be necessary, with one larger bucket auger used to provide access to the required sampling depth and another (clean) smaller auger used for sample collection.

Upon retrieval from the ground, the soil on the flights of the auger or within the bucket can be poured directly into collection pan or sample container (if loosely consolidated) or be removed with a clean decontaminated spoon or scoop and transferred into the appropriate container.

Collection Pan – A soil collection pan is often used as an intermediate between removal of soil from the ground and filling the sample containers/soil jars. Stainless steel is required material of construction..

Other commonly used materials –

- Stainless steel teaspoon or spatula
- Ziploc-type bags
- Aluminum Foil
- Sampling kit (i.e., bottles, labels, custody records, cooler, etc.)
- Six foot folding tape for depth measurement
- Personal protective equipment (as required in HASP)
- Field project notebook/pen

Procedures

General

Site-specific soil characteristics and project-specific requirements such as sampling depth will dictate the preferred type of sampling equipment to be used. In addition, the analytical program requirements will define the volume of sample needed, which will also influence the selection of the appropriate sampling equipment (i.e., sampling for semi-volatile organic compounds requires a larger soil volume and thus a larger sized bucket auger, than that necessary for total lead sampling). The project work plan/sampling plan should define specific requirements and equipment required for the given site. Sampling personnel should be equipped with a variety of sampling equipment to address deviations from anticipated sampling situations.

Equipment Decontamination

Sampling equipment must be decontaminated prior to its initial use and following the collection of each soil sample. Site specific decontamination should be outlined in the sampling plan/work plan. If site-specific decontamination procedures are not stipulated in the work/sampling plan,

the procedures described in AECC SOP # 103 – Equipment Decontamination, shall be used.

Samples for Volatile Organic Compound Analysis

Because volatile organic compounds (VOCs) can volatilize and be lost during the sampling process, precautions are necessary to minimize this effect during soil sampling. A sample collected for VOC analysis should be collected first (before collecting samples to be analyzed for other parameters) and should collected as quickly and as directly as possible, from a discrete, relatively undisturbed portion of soil. In general, it is best to transfer soils directly from the sampling device into the sampling container, without the use of an intermediate collection pan.

Sampling Procedures

Preparing the Ground Surface at the Sampling Location

At most locations the surface must be prepared prior to surface soil sampling. This may include removal of surface debris or vegetation to expose the actual soil surface, or the loosening of dense compacted soils such as those in heavy traffic areas or frozen soils.

Shovel Sampling

Detailed operating procedures for shovels, trowels, spoons and scoops is unnecessary, other than to state that this equipment shall be decontaminated before use.

Upon completion of sampling activities, backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible to eliminate surface hazard or preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Trowel, Spoon and Scoop Sampling

Spoons, scoops, and trowels are of similarly designed construction and will therefore be operated in accordance with the following procedure, unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – Remove surficial material with shovel if necessary to achieve the required depth.
3. Turn the sampling tool into the ground and rotate so that a representative column of soil is removed.

4. If sampling for VOCs is required, collect this sample portion first.
5. If a specific depth interval has been targeted, collect soils from that depth into a collection pan.
6. If more soil is needed to meet sample volume requirements, additional soil cores may be collected from an immediately adjacent location.
7. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
8. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
9. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled. Do not submerge the sample containers in water to clean them.
10. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
11. Log the samples in field notebook, chain of custody and other required documentation.

12. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
13. Decontaminate sampling tools prior to reuse.
14. Investigation-derived waste (IDW) should be properly contained before leaving the area.
15. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible, to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Soil Auger Sampling

When using a soil auger for the collection of surface or shallow soil samples, the following procedure will be employed unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select Location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – remove vegetation or surface debris as necessary.
3. Turn the soil auger gently in a clockwise direction until the top of the desired depth is achieved.
4. Remove the auger, thus clearing the disturbed soil from the augered hole.
5. If using the auger flights to collect the sample, return the auger to the hole and continue turning the auger so that it penetrates the interval of interest. Retrieve the auger and transfer soil into a collection pan.

6. If using a tube–sampler attachment, insert the tube sampler into the augered hole to the top of the desired interval and push/turn the tube sampler through the interval of interest.
7. Multiple trips and/or multiple adjacent auger holes may be necessary to sample the interval of interest at a given location.
8. Samples to be analyzed for VOCs should be collected first, directly from the auger flights or tube-sampler attachment.
9. With the exception of the VOC fraction (if required), the remaining soils should be placed into the soil collection pan.
10. Homogenize the soil in the collection pan (excluding soil for VOC analysis) by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled.
13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
14. Log the samples in field notebook, chain of custody and other required documentation.
15. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
16. Decontaminate sampling tools prior to reuse.
17. Investigation-derived waste (IDW) should be contained before leaving the area.
18. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible, to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Bucket/Hand Auger Sampling

When using a bucket/hand auger for the collection of surface or shallow soil samples, the following procedure will be employed unless an alternate method is described in the site-specific work plan or sampling plan. Deviations from the standard operating procedures described herein and the rationale/justification for those deviations are to be recorded in the field logbook.

1. Select location and be sure that all surface preparation and soil sampling tools are decontaminated.
2. Prepare surface for sampling – remove vegetation or surface debris as necessary.
3. Push downward and turn the bucket/hand auger in a clockwise direction until bucket becomes filled with soil. Usually a 6 to 12-inch core of soil is obtained each time the auger is inserted.
4. Empty and repeat until the top of the interval of interest is encountered. Soil from above the interval that requires sampling and analysis can be emptied onto plastic sheeting for description/classification.

5. Using a clean/decontaminated bucket auger, insert the auger into the bottom of the hole so that it is positioned above the interval of interest. A smaller diameter bucket may be necessary to prevent the auger from being contaminated by passing through the overburden soils.
6. Turn the bucket/hand auger so that bucket fills with soil from the interval of interest.
7. Once filled, the auger should be removed from the ground and emptied into the soil collection pan. If a VOC sample is required, the sample should be taken directly from the auger bucket using a clean/decontaminated teaspoon or spatula and/or directly filling the sample container from the auger.
8. Repeat the process until the desired sample interval has been thoroughly penetrated with extracted soils placed into the collection pan.
9. Except for VOC sample fractions, the remainder of the soil sample should be collected into the collection pan.
10. Homogenize the soil in the collection pan by mixing the soil in the collection pan with the sampling tool until a uniform mixture is achieved.
11. Transfer soil from the collection pan into the appropriate sample jars/containers using the sampling tool or a clean stainless steel teaspoon or spatula. Use of fingers should be avoided.
12. Once filled, the rim and threads of the sample container should be cleaned of gross soil by wiping with a paper towel, then capped and labeled.
13. Label the samples and place the containers into a cooler with wet ice that has been contained within sealed plastic bag(s) as soon as possible (immediately) after collection.
14. Log the samples in field notebook, chain of custody and other required documentation
15. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.
16. Decontaminate sampling tools prior to reuse.
17. Investigation-derived waste (IDW) should be contained before leaving the area.
18. Backfill the sampling location and restore the surface to as close to pre-sampling conditions as possible to eliminate surface hazard and/or the creation of a preferred path for contaminant migration. The sampling plan/work plan may specify the requirements for backfilling and surface restoration.

Quality Assurance/Quality Control

Quality control requirements for sample collection are dependent on project-specific sampling objectives which may be outlined in the site-specific Quality Assurance Project Plan (QAPP) if applicable, or may be included in the site-specific work plan/sampling plan. This information will include requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, matrix spike/matrix spike duplicates, field blanks/equipment blanks, and field duplicates. The Project Manager is responsible for assuring that the Quality Assurance/Quality Control objectives are specified and communicated to individuals responsible for collecting the samples.

Documentation

Documentation of sample collection, handling and shipping is required, and takes a variety of forms including:

- Field log book
- Sample collection records
- Chain-of-Custody forms
- Shipping Labels

The field book will be maintained as an overall log of all samples collected during a project. Sample collection records are generated for each sample collected during a project and must include:

- Project Number and Location
- Sampling point location location/ID
- Date and time that sample was collected
- Description/designation of the sample location
- Name of collector
- Equipment used to collect the sample
- Number of sample containers, sizes, preservatives
- Specific Sample ID
- Depth
- Soil type
- Analysis Requested
- Laboratory Designation
- Shipping ID Number/Tracking ID Number

Depending on project-specific requirements, this information may be required to be collected on a separate sample collection record form. If such a form is not required, the information will be collected in the project field log book.

Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes. These may be AECC-specific or be provided by the laboratory providing analytical services for the project. Shipping labels are required if sample coolers are to be transported to the laboratory by a third-party (courier service). Original and/or copies of these documents will be retained in the appropriate project files.

Training & Qualifications

Surface soil sampling is a relatively simple procedure requiring minimal training and generally a small amount of equipment. Individuals conducting surface soil sampling for the first time will be supervised/trained by experienced personnel. Sampling personnel collecting samples that

might contain petroleum compounds, heavy metals, or other potentially hazardous materials will be trained and certified in accordance with the requirements of 29 CFR 191O.120(e)(3}(i), OSHA's HAZWOPER standard.

Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for handling, packaging and shipping environmental samples. Adherence to this SOP will ensure that samples are received by the laboratory in good condition. This procedure will also prevent cross-contamination of samples during shipment and minimize sample container breakage.

This SOP is to be used **ONLY** for environmental samples. Hazardous material shipments shall adhere to USDOT requirements which are not presented in this document.

Equipment/Apparatus/Supplies

Required materials include the following:

Duct tape
Strapping tape (1-inch minimum width)
Clear packing tape
Re-sealable plastic bags (Ziploc® or equivalent) sized for the sample containers used
Bubble wrap
“Fragile” labels
“This Side Up” labels
Adhesive address labels

Procedures

Sample bottle shipping preparation

Each bottle shall be properly labeled using the provided labels as detailed in SOP # 108. Once the label is affixed to the bottle the label shall be covered with clear packing tape which is wrapped completely around the bottle.

Each bottle shall be sealed by placing clear packing tape completely around the neck of the bottle and the bottle cap. If a QAPP for a particular project states that a custody seal on the bottle cap is required it shall be placed across the bottle cap prior to placing the clear packing tape on the bottle.

Sample bottle packaging

Each bottle or VOA vial pair (aqueous samples) shall be placed in an appropriately sized sealable plastic bag. Care shall be taken to ensure that air is removed from each bag. The purpose of bagging the samples is to protect against sample material release and cross-contamination should the sample container leak or break during shipment.

Bubble wrap shall then be used to completely wrap the bagged sample bottle or VOA vial pair. The bubble wrap shall be secured in place using packing tape.

Cooler Inspection, Preparation and Packing

Each cooler to be used for shipment of samples shall be inspected for integrity. The hinges shall be inspected and the walls, bottom and top of the cooler shall be inspected for cracks. Coolers with broken hinges and/or cracks shall not be used for sample shipment.

Each cooler shall be clean and free of any solid or liquid residue. If the cooler is equipped with a drain then duct tape shall be placed on the inside and outside portions of the drain to ensure that liquids or solids cannot pass through it.

Prior to placement of ice and or samples in the cooler, the cooler shall be lined with bubble wrap. A layer of bagged ice (see below) shall then be placed on the bottom of the cooler.

Prepared sample containers shall then be placed upright in the cooler such that they are tightly arranged. If there are insufficient sample bottles to achieve a tight packing arrangement then the samples shall be equally spaced throughout the cooler and the interstices shall be filled with additional bubble wrap.

A second layer of bagged ice shall then be placed on top of the samples and bubble wrap shall be laid over the top of them.

If the cooler is to be shipped via an overnight carrier (i.e.FedEx®, UPS or similar) the signed chain of custody shall be placed in a sealable plastic bag and taped to the underside of the cooler lid.

Ice Bagging

Ice, consisting of commercially available cubed ice, shall be placed in sealable plastic bags sized for the cooler to be used. A second bag shall be place over the first to provide a secondary containment layer. Care shall be taken not to overfill the bags such that the bag is difficult to seal. A typical cooler will require four 1 or 2-gallon bags with two bags beneath the samples and two on top of the samples.

Cooler Sealing and Labeling

The cooler shall be closed and the lid shall be securely sealed using duct tape. Duct tape shall be placed along the entire perimeter of the lid where it meets the cooler body including hinges. Care shall be taken to ensure a tight seal by the tape on the cooler surface.

"Fragile" and "This Side Up" labels shall be placed on each side of the cooler. A "Fragile" label shall be placed on the top of the cooler. "This Side Up" labels shall have an arrow pointing upward. Clear packing tape shall be placed over labels. Examples of the labels are shown below:

An adhesive label shall be attached to the top of the cooler which has the destination information clearly shown on it. Clear packing tape shall be placed over the entire surface of the label.

Clear packing tape shall be wrapped completely around the cooler at a minimum of two points. Strapping tape (1-inch width minimum) shall then be placed on top of the packing tape and shall completely encircle the cooler.

If shipping will be by FedEx® or similar, the airbill shall be affixed to the top of the cooler.

Quality Assurance/Quality Control

Prior to shipment, the cooler shall be inspected to ensure that it is properly sealed and labeled.

Documentation

If samples are being shipped via courier or via direct delivery then a copy of the signed chain of custody shall be retained. If shipping via other carrier, the copy of the airbill shall be retained for the project records.

Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for conducting decontamination of field sampling equipment. Decontamination is performed as a quality assurance measure and a safety precaution. The use of equipment that has not been properly decontaminated for collecting samples for chemical analysis can lead to erroneous data due to cross contamination. In addition, decontamination protects field personnel and others from potential exposure to hazardous materials and prevents contamination from being transported away from a site.

This SOP focuses on decontamination of non-disposable equipment used for sampling environmental media for chemical analysis. Decontamination of other materials (well-construction materials and drill stem for example)are sometimes required and are discussed in other SOPs or dealt with in project-specific work plans.

It is noted that other state or federal agency standard operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Equipment/Apparatus/Supplies

Required materials may include:

- Tap/potable water
- Phosphate-free detergent (Liqui-nox, Alconox, or similar)
- Distilled and/or deionized water
- Solvents as defined by the Work Plan, QAPP, etc. (may include nitric acid, dilute hydrochloric acid, methanol, hexane, isopropanol, etc.)
- PPE
- Paper towels
- Wash buckets/basins/containers
- Waste containers pails/buckets with lids, drums or plastic bags.
- Cleaning brushes
- Pressure sprayers and/or squeeze bottles
- Plastic sheeting
- Aluminum foil/plastic bags
- Project notebook/pen

Procedures

AECC's standard decontamination procedure is presented in the steps listed below. The standard may be modified on a project-specific basis, as described in project specific QAPP, sampling programs or other documents, and may include additional steps, solvents, materials, etc., depending on the quality assurance objectives for the project.

1. Don PPE items appropriate to the characteristics of the contaminated material that was encountered (safety glasses, latex or nitrile gloves, and disposable Tyvek garment for example).
2. Remove gross contamination, dirt, etc from the equipment by brushing and rinsing with tap water. This step should be completed in a 5-gallon bucket or appropriately sized container.
3. Wash the equipment with a phosphate-free detergent and tap water solution. This step should be completed in a separate wash bucket using brush, or pressure sprayer.
4. Rinse the equipment with potable water until all detergent has been removed. This step can be performed over an empty bucket using a squeeze bottle or pressure sprayer.
5. Triple-rinse the equipment with distilled or de-ionized water. Rinseate should be collected in the bucket used in step 3.
6. Allow the equipment to air dry on clean plastic sheeting. If faster drying is required, use paper towels to blot the equipment dry before reuse.
7. Wrap the dried decontaminated equipment with aluminum foil, shiny side out, for storage until the equipment is to be used again. Alternately, small equipment can be placed into clean plastic bags and sealed for longer term storage.
8. Containerize and/or manage wash water and decontamination rinseate in accordance with project-specific requirements.

When decontaminating submersible pumps used for groundwater sampling (or monitoring well development), the above-listed steps 2 and 3 may be conducted in a tube or cylinder that is sealed at the bottom end (commonly a 3-foot length of PVC pipe affixed with a water-tight end cap). The pump is inserted into the cylinder which is filled with the wash water, detergent solution, or rinse water and is turned on at a low setting for approximately five (5) minutes, so as to cycle the wash solutions through the pump's impellers and internal components. After the pump is removed from the potable water rinse cycle, the triple-rinse is performed with copious amounts of distilled/deionized water, being sure to flush through the impellers.

As stated previously, project-specific decontamination procedures may be required and will be specified in the project's QAPP, sampling plan or project-specific work plan. Some project-specific modifications may include the following:

- For glass and plastic sampling equipment used for sampling environmental media for metals analyses, decontamination may include a rinse with a 10% solution of nitric acid.
- For metallic sampling equipment used for sampling environmental media for metals analyses, decontamination may include a rinse with a 10% hydrochloric acid solution.

- For sampling equipment used for sampling environmental media for organic parameters (volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, etc.), decontamination may include an intermediate rinse with methanol, hexane, or isopropanol.

The above-listed solvents are hazardous materials due to their toxicity and/or corrosivity, and are specifically excluded from AECC's standard decontamination procedure because of these properties. When the use of these (or other similar) solvents is required by a project-specific QAPP or Sampling Plan, the plans must also describe additional protocols and procedures regarding their safe use and handling and to assure that associated investigation-derived waste (wash water and spent rinseate) is handled, characterized, and disposed of in accordance with federal, state and local requirements.

Large Equipment Decontamination

On some projects, large equipment (excavators, backhoes, truck-mounted drilling equipment, etc) is used for sampling or site characterization activities, and may become contaminated during site activities (or may require decontamination prior to use on site). For these situations, the drilling subcontractor will construct a temporary decontamination pad that typically consists of a bermed, plastic-sheet lined area where equipment and tooling can be brought for decontamination with a high-temperature high pressure washer (steam jenny) and/or manual scrubbing. If heavy equipment decontamination is required for a specific project, the specifications for the decontamination pad, and procedures for decontamination will be stipulated in the project QAPP and/or Sampling Plan.

Quality Assurance/Quality Control

General guidelines for quality control check of field equipment decontamination usually require the collection of one equipment blank from the decontaminated equipment per day, however the collection of equipment blanks and similar QA/QC samples is to be based on specific project requirements. For projects with a QAPP, the document will specify the type and frequency of collection of each type of quality assurance sample. For projects without a QAPP, the need for and/or frequency of equipment blanks and other QA/QC samples will be specified in the scope of work, or the project work plan.

Equipment blanks are generally collected by pouring laboratory-supplied deionized water into, over, or through the freshly decontaminated sampling equipment and then transferring this water into a sample container. Field blanks should then be labeled as a sample and submitted to the laboratory to be analyzed for the same parameters as the associated sample. Field blank sample numbers, as well as collection method, time and location should be recorded in the field notebook.

Documentation

Specific information regarding decontamination procedures should be documented in the project-specific field notebook. Documentation in the notebook should thoroughly describe the construction of each decontamination facility and the decontamination steps implemented in order to show compliance with the project work plan. Decontamination events should be logged when they occur with the following information documented:

- Date, time and location of each decontamination event
- What equipment was decontaminated
- Method used for decontamination
- Solvents used
- Notable circumstances
- Date, time and location of equipment blanks collected and the methods/procedures used for collection.
- Storage of decontamination wastes (spent wash and rinse water).

Repetitive decontamination of small items of equipment does not need to be logged each time the item is cleaned, however a note should be made that such equipment was decontaminated as required and in accordance with this SOP, or project specific QAPP, Work Plan, etc.

Scope and Application

The purpose of this SOP is to lay out the specific standardized procedure to be used for collecting soil samples using split-spoon sampling methods. Subsurface soil sampling, conducted in accordance with this SOP will promote consistency in sampling and provide a basis for sample representativeness.

This SOP covers split-spoon sampling methods only, and does not cover other types of subsurface soil sampling equipment.

Split-spoon sampling generally requires use of a drilling rig, typically a hollow-stem auger rig, to drill a borehole in which the sampling equipment is used. The split-spoon sampler is inserted through the augers and driven into the subsurface soil with a weighted hammer. The sampler is then retrieved and opened to reveal the recovered soil sample.

Split spoon sampling methods are generally applicable to unconsolidated subsurface soil/fill materials. Soils may be obtained using this method for visual classification, field screening for contamination, as well as physical and/or chemical analysis.

Split-spoon sampling (and the associated drilling process) is an intrusive subsurface exploration method. By law, the clearance of underground utilities must be performed prior to the initiation of any intrusive activities. The drilling subcontractor performing drilling activities is responsible for notifying the Underground Facilities Protective Organization (UFPO) with jurisdiction over the project site.

Responsibilities

Project Geologist/Scientist

The project geologist/scientist is responsible for conducting subsurface soil sampling in a manner consistent with this SOP. The project geologist/scientist will observe all sampling activities to ensure that the SOP is followed, and will record all pertinent data and information on appropriate forms, logs and/or in the project field notebook.

It is also the project geologist/scientist's responsibility to indicate the specific targeted sampling depth or sampling interval to the drilling subcontractor. Sample depth intervals are usually defined on a project-specific basis with these requirements specified in the project sampling plan. Sampling intervals typically range from one (1) sample per five (5) feet of drilling to continuous sampling where the entire drilled interval is sampled.

The project geologist/sampling engineer is also responsible for the collection of representative environmental characterization samples once the sampling device has been retrieved from the subsurface, disarticulated and liner removed.

Additional sample collection responsibilities include labeling, handling, and storage of samples while in their custody.

Drilling Subcontractor

The drilling subcontractor is responsible for providing the necessary equipment for obtaining subsurface soil samples. This generally includes the truck-mounted drilling rig, and one or more split-spoon samplers (multiple diameters) in good operating condition, and other necessary equipment for borehole preparation and sampling. It is the drilling subcontractor's responsibility to provide and maintain their own boring logs if desired and to provide sample containers for geotechnical/stratigraphic characterization samples. Additionally, the drilling contractor is responsible for providing for decontamination of the drilling and sampling equipment, consistent with the project specifications.

Equipment/Apparatus/Supplies

In addition to the equipment and materials provided by the drilling subcontractor, required materials may include the following:

- Project-specific documents (Scope of work, HASP, QAPP, Sampling Plan)
- Boring Logs
- Stainless steel spoons, spatulas, soil mixing pans etc.
- Sampling supplies (bottles, labels, custody records and tape, cooler, ice)
- Folding rule or tape measure
- Photoionization detector (PID) meter, (if volatile organic compounds (VOCs) are expected)
- Decontamination supplies (per the QAPP)
- Health and safety equipment/PPE (per the HASP)
- Portable chair & folding table
- Field project notebook/pen
- Plastic sheeting

Procedures

Split-spoon samplers are generally constructed of steel and a variety of sizes. 2-inch diameter, two-foot long samplers are most common, however 3-inch diameter samplers are often used when the use of a 2-inch sampler produces poor soil recovery. The split-spoon consists of a tubular body with two halves that split apart lengthwise, a drive head on the upper end with a ball-check valve for venting, and a steel cutting shoe at the bottom. As the sampler is driven

into the ground, soil enters the split-spoon through the cutting shoe. A replaceable plastic basket is often inserted into the shoe to assist with retaining soil within the device. Upon retrieval of the sampler from the subsurface, the drive head and cutting shoe are removed and the split-spoon halves are separated and the soil is exposed.

Split-spoons used collecting samples for chemical analysis must be decontaminated prior to their initial use and after each time they are used. Decontamination shall be completed in accordance with AECC SOP 103 – Equipment Decontamination or, if applicable, project specific specifications.

Subsurface soil sampling is typically performed as part of a drilling program where a soil boring is advanced to a designated depth prior to collection of a representative sample. The following briefly outlines the procedures for conducting split-spoon sampling in conjunction with hollow-stem auguring.

1. The drilling contractor advances the hollow-stem augers to the required depth for sampling. A temporary center plug shall be used in the lead auger to prevent the auger from becoming filled with drill cutting during advancement.
2. At the top of the interval to be sampled, the driller stops the auger, disconnects the auger from the drill rig's drive head, and retrieves the temporary center plug.
3. The drilling subcontractor will lower the split-spoon attached to a length of center rods to the bottom of the borehole.
4. The top of the center rods are attached to a 140 pound slide-hammer (or similar).
5. The slide hammer is repeatedly raised via rope and cathead and dropped to drive the split-spoon sampling device into the ground.
6. The hammer is disconnected from the center rod and the center rod and split spoon is retrieved from the augers.
7. The split-spoon is then disarticulated to allow for soil classification/description, field-screening, sampling for laboratory analysis, etc.
8. The drilling contractor re-installs the temporary center plug and advances the auger to the top of the next interval to be sampled.
9. Steps 2 through 8 are repeated until the termination depth of the borehole is reached.
10. Upon completion of auguring and sampling, the borehole can be backfilled or completed as a piezometer of monitoring well.

<u>Standard Penetration Test</u>

Split-spoon samplers are typically hammered into the ground (see steps 4 and 5 above) using a method referred to as the Standard Penetration Test (SPT) in accordance with ASTM standard D 1586-11 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel

Sampling of Soils. The STP method involves driving a 2-inch diameter split spoon by dropping the 140-pound hammer through a vertical free fall of 30 inches (hydraulic hammers that simulate these conditions are common). The number of hammer blows required for each 6 inches of penetration is recorded on the boring log. Blow count information can be used as an indicator of soil density for geotechnical and stratigraphic logging purposes. If STP in accordance with the ASTM standard is required for a project, it should be communicated to the drilling subcontractor before the sampling program begins. During the program, the project geologist/scientist should verify that the equipment being during sampling meets the required specifications.

Adding Water During Drilling

Drilling in some geologic conditions may require the use of added water. The use of added water is permitted, however the volume of water used should be minimized as it may affect sample quality. The volume and source of added water should be documented in the field notebook. Sampling the added water may be necessary for QA/QC purposes (refer to the project specific QAPP).

Sampling Soils for Environmental Laboratory Analysis

Sampling soils for environmental laboratory analysis shall be conducted as described in AECC SOP-101 - Surface and Shallow Soil Sampling. If the sampling program includes laboratory analysis for volatile organic compounds (VOCs), the VOC sampling shall be performed before any other activity.

Once the split-spoon sampler has been opened, the soils contained within can be sampled for laboratory analysis and classified. Materials from the split-spoon can be removed using clean decontaminated/disposable spoons or spatulas. Except for soils to be sampled for volatile organic compound analysis, the soils should be placed into a sample collection pan and homogenized, or placed directly into the appropriate sample container(s).

Once filled, the sample container should be properly capped, cleaned and labeled, and placed into a cooler with ice in preparation for shipping to the laboratory, in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging and Shipping.

Volatile Organic Samples

In order to minimize the loss of volatiles during the sampling process, samples should be collected into lab-supplied glassware as soon as possible after retrieving the sampler from the subsurface. Other tasks (classification, sampling for other parameters, field-screening with a PID meter, equipment decontamination, etc.) should either be performed by others, or be completed after collecting samples for VOC analysis.

Upon filling the sample container, clean and label the container and place it into a cooler immediately. Residual sample may then be used to fill other sample or logging requirements

When using split-spoon methods for collecting soil samples for VOC analysis, the drilling subcontractor shall not retrieve more than one subsequent sampler from the subsurface while the project geologist/scientist collects samples from a previous interval.

Soil Classification

Soils will be visually classified in using the Modified Burmeister Soil Classification System or alternate methods required by project specifications.

Equipment Decontamination

Sampling equipment must be decontaminated prior to its initial use and following the collection of each soil sample. Site specific decontamination should be outlined in the sampling plan/work plan. If site-specific decontamination procedures are not stipulated in the work/sampling plan, the procedures described in AECC SOP # 103 – Equipment Decontamination, will be used.

Quality Assurance/Quality Control

Quality control requirements are dependent on project-specific sampling objectives. The QAPP will provide requirements for equipment decontamination (frequency and materials), sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

In the absence of a QAPP, QA/QC will be attained through adherence to SOPs and requirements stipulated in project-specific specifications.

Documentation

Various forms are required to ensure that adequate documentation is made of sample collection activities. These forms will vary from project to project and may include:

- Field Log Books
- Soil Boring Logs
- Sample Collection Records
- Chain of Custody Forms
- Shipping Labels

Boring logs (Figure 1) will provide visual and descriptive information for each sample collected and are often the most critical form of documentation generated during a soil sampling program. The field log book is kept as a general log of activities. Occasionally, sample collection records are used to supplement boring logs, especially for environmental samples which have been collected for laboratory analysis. Chain-of-custody forms are transmitted with the samples to the laboratory for sample custody tracking purposes. Shipping labels are required if sample coolers are to be transported to the laboratory by a third party (courier service). Original copies of these records should be maintained in the appropriate project files.

Figure 1 – Soil Boring Log

AECC

Soil Boring Log

Client:	Project:	**BORING ID:**
Project Number:		
Site Location:		
Coordinates:	Elevation:	Sheet: of
Drilling Method:		Monitoring Well Installed:
Sample Type(s):	Boring Diameter: in.	Screened Interval:
Weather:	Logged By:	Date/Time Started:	Depth of Boring:
Drilling Contractor:	Ground Elevation:	Date/Time Finished:	Water Level:

Depth (feet)	Geologic sample ID	Sample Depth (ft)	Blow Count (per 6-inches)	Recovery (ft.)	(Headspace (ppmv)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Scope and Application

The purpose of this SOP is to lay out the specific standardized procedure to be used for collecting soil samples using direct-push methods. Subsurface soil sampling, conducted in accordance with this SOP will promote consistency in sampling and provide a basis for sample representativeness.

Direct push sampling involves the hydraulic pushing and/or percussive hammering of a sampling tube into the subsurface. The inside of the sampling tube is generally lined with a sleeve or liner made of acetate or (it may also be made of stainless steel, brass, plastic, Teflon, etc.), that catches the soil during the samplers advancement. The sampler includes a cutting shoe, and may also include an internal locking piston (or similar device) that seals the sampling tube until it is unlocked at the top of a specific depth to facilitate the collection of soils from a discrete interval. The sampling tube is threaded onto direct-push rods. The rods and tooling are driven into, and subsequently pulled from the subsurface with the hydraulic/percussive direct-push equipment. The direct-push "rig" may be mounted on wheels so that it can be manually moved about. More typically, however, the direct-push rig is mounted in the back of a pick up truck, on a skid-steer or the unit is track mounted so that it can be driven from location to location in areas of a site that are not accessible to truck-mounted units.

Direct-push sampling methods are generally applicable to unconsolidated soil/fill materials to a maximum recommended depth of approximately 30 feet below ground surface (bgs). Soils may be obtained using this method for visual classification, field screening for contamination, as well as for physical and/or chemical analysis. Sampling shall be continuous throughout the length of the boring.

Direct-push sampling is an intrusive subsurface exploration method. By law, the clearance of underground utilities must be performed prior to the initiation of any intrusive activities. The drilling subcontractor performing the direct-push activities is responsible for notifying Dig Safely New York or another Underground Facilities Protective Organization (UFPO).

The ability to drive the sample tooling to a desired depth (as well as the ability to retrieve the sampling device from the subsurface) depends on the density and composition of the soil and the power of the hydraulic equipment. Additionally, sample recovery is somewhat dependent on grain size. Coarse gravel, cobbles, and boulders may plug a small diameter sample tube, preventing material from entering, or may cause refusal of the tooling altogether.

Likely soil types that might be encountered and preliminary site information (accessibility, surface conditions, etc) should be used to determine whether direct-push methods are appropriate for a site, and to determine the specific tooling best suited for subsurface characterization. Subcontractors/direct-push service providers should then be selected on the

basis of whether or not they have equipment and tooling necessary for those specific site/soil conditions.

Responsibilities

Project Geologist/Scientist

The project geologist/scientist is responsible for conducting subsurface soil sampling in a manner consistent with this SOP. The project geologist/scientist will observe all sampling activities to ensure that the SOP is followed, and will record all pertinent data and information on appropriate forms, logs and/or in the project field notebook.

It is also the project geologist/sampling engineer's responsibility to indicate the specific targeted sampling depth or sampling interval to the drilling subcontractor.

The project geologist/sampling engineer is also responsible for the collection of representative environmental characterization samples once the sampling device has been retrieved from the subsurface, disarticulated and liner removed.

Additional sample collection responsibilities include labeling, handling, and storage of samples until further chain-of-custody procedures are implemented.

Drilling Subcontractor

The drilling subcontractor is responsible for providing the necessary equipment for obtaining subsurface soil samples. This generally includes the truck or ATV-mounted percussion/probing machine and one or more sampling tubes (multiple diameters) in good operating condition, appropriate liners, and other necessary equipment for borehole preparation and sampling. It is the drilling subcontractor's responsibility to provide and maintain their own boring logs if desired. Equipment decontamination materials should also be provided by the subcontractor and should meet project specifications.

Equipment/Apparatus/Supplies

In addition to the equipment and materials provided by the drilling subcontractor, required materials may include the following:

- Project-specific documents (Scope of work, HASP, QAPP, Sampling Plan)
- Boring Logs
- Stainless steel spoons, spatulas, soil mixing pans etc.
- Sampling supplies (bottles, labels, custody records and tape, cooler)
- Folding rule or tape measure

- Portable chair and/or folding table
- Decontamination supplies (per the QAPP)
- Health and safety equipment/PPE (per the HASP)
- Field project notebook/pen
- Steel tape measure
- Stainless steel spoons, spatulas
- Plastic sheeting

Procedures

Typical Direct-Push Sampling Procedure

1. Don PPE as per the project HASP.
2. Decontaminate sample tooling and components that may come in contact with soil during sampling activities. Note: the level of decontamination will depend on whether soils are being sampled for laboratory analysis, field screening, or simply for visual classification.
3. Assemble the sampling tube including the liner, discrete sample tooling (if appropriate), sand-basket (if appropriate), and cutting shoe.
4. Prepare the surface for direct-push sampling. Direct push tooling can generally penetrate several inches of asphalt and/or crushed stone surface materials. If several inches of concrete are present at the location, coring or another method will be necessary to penetrate the surface pavement.
5. The direct-push rig operator will thread on a push/drive cap on the top of the device and push the sample tube into the ground.
6. The direct-push rig operator removes the push/drive cap, replaces it with a pull-cap and pulls sampler from the ground with the machine hydraulics.
7. The sample tube is then opened, to allow the soil-filled liner to be removed so that it can be cut open by the project geologist/scientist/ engineer to allow for soil classification/description, field-screening, sampling for laboratory analysis, etc.
8. The sampling tube and components that contact soil during the sampling process are decontaminated, re-assembled, with a new, disposable liner and the process is repeated. The advancement of the sampling tube to depth is achieved through the addition of drive-rods, each of which is typically the same length as the sampling tube (commonly 3, 4, or 5 feet in length).
9. Upon completion of the corehole, the hole is backfilled with soil cuttings or hydrated granular bentonite, or is completed as a piezometer or monitoring well.

Exposing Soils for Classification/Characterization and/or Sampling for Laboratory Analysis

Upon extraction of the liner from the direct-push sampling tube, the liner must be opened so as to expose the soils for visual classification/description, field screening and/or sampling for

laboratory analysis. This is accomplished through the use of a liner cutting system, typically comprising a liner holder, and a liner cutter. The liner holder is a trough-like device that holds the liner securely in place so that it can be cut open.

The liner cutter is a tool affixed with two parallel hook-shaped blades that is drawn along the liner to cut a lengthwise opening in the liner for easy access and viewing of the sampled material. Liner cutters come in one-handle and two-handle varieties.

1. Place the soil-filled liner into the soil holder. Be sure that the liner holder is placed on a solid surface such as a sturdy work table, tailgate, etc.
2. Install the liner in the liner holder. Adjust the stop on the liner holder to secure the liner tightly in the holder.
3. Wearing leather work gloves, grasp the cutter by the handle(s) (avoid accidental contact with the blades) and place the cutter on the liner. The liner holder will usually have a bent bar that secures the liner in place, which provides resistance against the draw of the liner cutter. Begin the cut at the end of the liner opposite this bar. Be sure that blades are positioned just beyond the end of the liner to initiate the cut.
4. With slight downward pressure on the cutter, draw the cutter slowly and smoothly along the liner. If excessive force is required to open the liner, the cutter blades may be dull and should be replaced immediately.
5. When the cutter has been drawn the entire length of the liner, the cut section of the liner may be removed to access the sampled material.

The equipment described above is standard practice for most drilling subcontractors and is required by this SOP. This requirement should be communicated and confirmed with the drilling subcontractor before going into the field. Alternate methods of cutting sample liners open (i.e., holding a liner with one hand and using a hook-blade utility knife with the other to open the liner) can result in severe cuts and nasty infections, and **are not to be used**.

<u>Sampling Soils for Environmental Laboratory Analysis</u>

Sampling of soils for environmental laboratory analysis shall be conducted as described in AECC SOP # 101 - Surface and Shallow Soil Sampling. The intervals to be sampled shall be specified in the Project Work Plan. If the sampling program includes laboratory analysis for volatile organic compounds (VOCs), the VOC sampling shall be performed before any other activity.

Once the liner has been opened, the soils contained within can be sampled for laboratory analysis and classified. Materials from the liner can be removed using clean decontaminated/disposable spoons or spatulas. Except for soils to be sampled for volatile organic compound analysis, the soils should be placed into a sample collection pan and homogenized, or placed directly into the appropriate sample container(s).

Once filled, the sample container should be properly capped, cleaned and labeled, and placed into a cooler with ice in preparation for shipping to the laboratory, in accordance with standard operating procedures pertaining to sample handling, packaging and shipping.

Volatile Organic Samples

In order to minimize the loss of volatiles during the sampling process, samples should be collected into lab-supplied glassware as soon as possible after retrieving the sampler from the subsurface. Other tasks (classification, sampling for other parameters, field-screening, equipment decontamination, etc.) should either be performed by others, or be completed after collecting samples for VOC analysis.

Upon filling the sample container, clean and label the container and place it into a cooler immediately. Residual sample may then be used to fill other sample or logging requirements

When using direct-push methods for collecting soil samples for VOC analysis, the drilling subcontractor shall not retrieve more than one subsequent sampler from the subsurface while the project geologist/scientist collects samples from a previous interval.

Soil Classification

Soils will be visually classified in using the Modified Burmeister Soil Classification System or alternate methods required by project specifications.

Equipment Decontamination

Sampling equipment must be decontaminated prior to its initial use and following the collection of each soil sample. Site specific decontamination should be outlined in the sampling plan/work plan. If site-specific decontamination procedures are not stipulated in the work/sampling plan, the procedures described in AECC SOP # 103 – Equipment Decontamination, will be used.

Quality Assurance/Quality Control

Quality control requirements are dependent on project-specific sampling objectives. The QAPP will provide requirements for equipment decontamination (frequency and materials), sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

In the absence of a QAPP, QA/QC will be attained through adherence to SOPs and requirements stipulated in project-specific specifications.

Documentation

Various forms are required to ensure that adequate documentation is made of sample collection activities. These forms will vary from project to project and may include:

- Field Log Books
- Soil Boring Logs
- Sample Collection Records
- Sample Container Labels
- Chain of Custody Forms
- Shipping Labels

Boring logs (see Example in AECC SOP # 104 – Split Spoon Soil Sampling) will provide visual and descriptive information for each sample collected and are often the most critical form of documentation generated during a soil sampling program. The field log book is kept as a general log of activities and should not be used in place of the boring log. Occasionally, sample collection records are used to supplement boring logs, especially for environmental samples which have been collected for laboratory analysis. Sample container labels are affixed to individual sample containers and then completed. Chain-of-custody forms are transmitted with the samples to the laboratory for sample custody tracking purposes. Shipping labels are required if sample coolers are to be transported to the laboratory by a third party (courier service). Original copies of these records should be maintained in the appropriate project files.

Scope and Application

The purpose of this SOP is to establish uniform procedures for the collection of groundwater samples. Adherence to this SOP will promote consistency in sampling methods and if followed properly will provide a basis for sample representativeness.

This SOP focuses on the collection of groundwater samples from properly developed monitoring wells, and may be applicable from other wells, springs etc that can be accessed for sampling. Groundwater samples might also need to be collected from residential potable water wells, industrial supply wells, open soil borings/core holes, and other sources which are not readily accessible, or that might require additional instruction and protocols for sampling. The collection of groundwater samples from these sources will vary according to the project and protocols, and procedures for collecting groundwater samples from these features will be discussed in the project-specific QAPP, or sampling plan.

State or federal agency mandated operating procedures may exist that require deviation from this SOP. These required deviations must be identified before the sampling program begins (ideally during the work plan/sampling plan development), and must be explained in the project-specific work plan/sampling plan.

Responsibilities

Project Manager

The project manager is responsible for assuring that project specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the work in accordance with this SOP and associated project-specific work plan.

Sampling Technician

The sampling technician is responsible for conducting groundwater sampling in a manner consistent with this SOP and/or in accordance with the QAPP, sampling plan or other project documents. The sampling technician will observe all sampling activities to ensure that the SOP is followed, and will record all pertinent data and information on appropriate forms, logs and/or in the project field notebook.

The sampling technician is responsible for ensuring that he/she has the appropriate laboratory supplied sampling supplies, the sampling equipment and supplies, and the supplies and materials for equipment decontamination.

Generally, the sampling technician is also responsible for handling the collected samples, maintaining custody documentation and preparing the samples for shipping/delivery to the analytical laboratory. On larger projects, a separate team may be assigned this task.

Equipment/Apparatus/Supplies

Required materials will vary depending on the method of groundwater sampling being conducted. In general, the equipment necessary may include:

- Project-specific plans (QAPP, sampling plan, scope of work, HASP).
- Appropriate PPE and safety equipment.
- Plastic sheeting
- Bailers (disposable or re-usable) and bailer-line/string.
- Development pumps (submersible, peristaltic, bladder, Waterra, centrifugal, air-lift, etc.)
- Sampling pumps (typically submersible, peristaltic or bladder)
- Monitors/meters (water quality meter) with calibration standards.
- Water Level Indicator (WLI) or Oil/Water Interface Probe
- Decontamination equipment and supplies (see AECC SOP-103)
- Sample bottles, labels, preservatives, chains of custody, coolers, etc. (sampling kits)
- Sample handling and shipping supplies (see AECC SOP–102),
- Field notebook, and records/forms for documentation/pen(s).
- Buckets and/or drums for carrying/containing purge water.
- Sampling cup/clear container for checking field parameters during purging
- Cooler and ice for samples
- Filters if required for metals analysis.
- Paper Towels

It is important that the sampling technician understand how to use all equipment and supplies that are provided for, and expected to be used, for collection of groundwater samples. If you have never used a particular piece of equipment, be sure to talk to the project manager for direction/instructions prior to deploying to the jobsite.

All equipment/supplies/apparatus that will be inserted into a well to facilitate well purging or groundwater sample collection, or that will come into contact with potentially contaminated groundwater during the sampling process must be decontaminated before and after each use.

Field monitoring equipment/meters should be calibrated and operated in accordance with manufacturer's instructions.

Procedures

General

During a groundwater sampling event, the first activity upon arrival at the site is typically the measurement/collection of depth-to-water data at each well location. Each of the wells to be gauged should be opened so that they are each able to equilibrate with the atmosphere, and should be gauged with a water level indicator, for depth to water and total well depth. If free phase product is anticipated at a given location, this should be field verified with a clean new disposable bailer and/or an oil/water interface probe.

Data on depth to water, depth to the base of the welland the diameter of each well should be recorded on the groundwater sample collection record and/or in the field notebook, as should any other pertinent information such as length and vertical position of well screen (if present), depth and thicknesses of immiscible layers, odors, lack of water, etc. The water level indicator/oil water separator must be decontaminated between use at each well. Flushing the probe and tape of the WLI with distilled water is generally sufficient for wells with no free product, however decontamination with detergents or solvents may be necessary if wells contain non-aqueous phase liquids (NAPLs).

NOTE: Historical water-level and groundwater quality data if available, should be used be used by the sampling technician. These data will aid in identifying changes in water levels over time, changes in well conditions (e.g., gradual silting up of a well screen), and which wells may be the most contaminated.

The length of the water column and the well diameter are used to calculate the volume of water in the well (calculated well volume) and is recorded on the groundwater sample collection record and/or the field notebook. Well volume is calculated as presented below.

$V = 0.041D^2(d2-d1)$, where
V = Calculated well volume in gallons
D = inside diameter of well casing in inches
d2 = total well depth in feet
d1 = depth to water surface in feet

Groundwater Sampling

Groundwater sampling is conducted in two general stages, well purging and sample collection. During purging, groundwater is removed from the well so as to remove the water that might have been affected by exposure to the atmosphere. This is commonly done by pumping or bailing a minimum of three (3) calculated well volumes from a well, prior sample collection. Field parameters such as temperature, specific conductivity, turbidity, and pH may be collected during the purging process. When such field parameters are collected, purging continues until

the parameters have stabilized to within 10-percent of their preceding measurement, or until a maximum of five (5) calculated well volumes have been removed from the well.

Sample collection involves the filling of sample containers and the measurement of field-measured parameters. A summary of the most common groundwater sampling methods, and procedures to be followed for each method, are presented below.

Sampling with a Bailer

Bailing is a common and convenient method for purging and sampling groundwater, especially for situations where the depth of groundwater and the total depth of groundwater and well depth are both relatively shallow.

A bailer is a tube shaped device with a check valve at its lower end. Bailers come in a variety of sizes and volumes and are commonly disposable, although reusable bailers are available. Clean braided nylon or cotton cord is tied to the top of the bailer and the bailer is lowered into groundwater. When filled, the bailer is lifted from the well and the check-valve prevents water from draining out.

Procedures

Purging

1. Don PPE as per the project HASP section regarding groundwater sampling.
2. Obtain a clean bailer and a spool of clean polypropylene or nylon bailer cord.
3. Uncover the top end of the bailer and tie the cord to the bailer loop. Test the knot to ensure that it is secure, and remove the wrapping from the bailer.
4. Gently lower the bailer to bottom of the well.
5. Cut the cord at a proper length and tie a hand loop at the end of the cord, and attach it to your arm, or other fixed feature to prevent losing it down the well.
6. Gently raise the bailer, using the cord. The bailer cord should never touch the ground surface during purging or sampling.
7. Grab the bailer with one hand as it emerges from the well. Pour the bailed groundwater from the bailer into a graduated purge container.
8. Repeat this procedure until one calculated well volume of water is removed from the well.
9. After purging one calculated well volume, place a small volume of purged water into a sample cup and measure any required field parameters and record results on the Groundwater Sample Collection Record or in the field logbook or groundwater sampling form. If using a flow through apparatus for monitoring field parameters, record the readings from the display at this time and record in the filed logbook or groundwater sampling form.
10. Continue purging, by repeated bailing until the required purge volume has been removed from the well or until field parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. Insert the bailer into the well and gently lower the bailer to the bottom of the well.
3. Gently raise and retrieve the filled bailer from the well.
4. Grab the bailer with one hand as it emerges from the well. Insert a sample discharge tube into the bottom of the bailer to open the check valve and collect the discharging water into sample containers. In general, samples to be analyzed for VOCs are to be collected first, followed by samples to be analyzed for other organic compounds and inorganic constituents.
5. The samples to be analyzed for volatile organic compounds (VOCs) should be collected as gently as possible; so as to minimize the disturbance and aeration of the water as it enters the sample vials. Care should be taken to fill the vials such that no air bubbles are visible within the vial.
6. Repeat the sampling process until all sample containers are filled, adding required preservatives as necessary before capping.
7. After all sample containers are filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the Groundwater Sample Collection Record, or in the field notebook.
8. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
9. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

<u>Sampling with a Peristaltic Pump</u>

Peristaltic pumps are commonly used for groundwater samples when the volume of water required to be purged is low, and when the depth to the groundwater surface is less than approximately 20 feet. Peristaltic pumps provide a low flow rate, typically in the range of 0.02-0.2 gallons/minute (75-750 ml/min), and are therefore best suited to low-flow sampling techniques, or for collecting samples from wells with low purge volumes.

A peristaltic pump is a type of positive displacement pump. During operation, a series of rollers rotate inside the pump casing, over a section of flexible silicone tubing. The silicone tubing is compressed and continued rotation forces water to be pumped through the system. A suction tube typically made of polyethylene or Teflon-lined polyethylene is attached to the intake end of the silicone tubing, and a discharge tube of similar material is attached to the outflow end of the silicone tubing. The suction tube is lowered into the water surface far enough so that it will remain submerged if drawdown occurs. Upon turning the pump on, the water is drawn up the suction tube, through the pump tube, and pushed out the discharge tube. Because each of the sections of hose comes in contact with groundwater, clean, new tubing must be used for each sampling location, and it is common practice to dedicate tubing to a specific well for use during future groundwater sampling events.

Procedure

Purging

1. Don PPE as per the project HASP section regarding groundwater sampling.
2. Attach new (or dedicated) sections of suction, silicone and discharge tubing, and install the silicone tubing into the peristaltic pump.
3. Insert the suction tubing into the well so that the open end is below the water surface (commonly set midway along the well screen, or so the intake is situated halfway between the lower screen slot and the uppermost submerged screen slot).
4. Start the pump and direct the discharging purge water into a graduated purge bucket, and adjust the pump speed to produce a smoothly flowing discharge.
5. Calculate the purge rate by recording the time required to purge a given volume and adjust to a flow rate of between 250 and 500 ml/min (if possible).
6. Measurements of temperature, pH and specific conductance (and/or other assigned parameters) should be made after each well purge volume and documented on the Groundwater Sample Collection Record or in the field logbook.
7. Samples may be collected after the required purge volume has been removed or the field-parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. During sample collection from a given well, samples to be analyzed for VOCs are collected first, and samples to be analyzed for other organic compounds and inorganic constituents are collected last.
3. When sampling for VOCs, reduce the flow rate so that the flow approximates 50 ml/min and use the discharge to fill the sample vials. This should be done as gently as possible, minimizing the disturbance and aeration of the water as it enters the vials. Care should be taken to fill the vial completely such that no air bubbles are visible in the vial.
4. For subsequent, non VOC samples, return the flow rate to approximately 250 ml/min and fill sample containers, being sure to add the required preservatives as necessary before capping.
5. After all sample containers are filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the Groundwater Sample Collection Record or in the field notebook.
6. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
7. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

<u>Sampling with a Submersible Pump</u>

Submersible pumps are commonly used for groundwater sampling activities when groundwater is deep, or when a large volume of water must be purged prior to sampling. Because this type of pump is inserted into the groundwater being sampled, thorough decontamination between sampling locations is necessary to prevent cross-contamination. As an additional measure to prevent potential cross-contamination, historic groundwater quality data should be used (if available) to establish the order in which sampling occurs. Groundwater sampling with submersible pumps should proceed from the least contaminated wells to the most contaminated wells.

Discharge tubing, typically made of polyethylene or Teflon lined polyethylene is attached to the outflow of the pump. The pump, discharge tubing, and power cord/ air hose is lowered into the groundwater far enough so that the pump intake will remain submerged if drawdown occurs. A support cable/line is used to support the weight of the pump while it is suspended in the well, and the power cable/air hose is attached to a controller at the ground surface. Upon turning the pump on, the water is pushed up the discharge tube. Because the tubing comes in contact with groundwater, clean, new tubing must be used for each sampling location, and it is common practice to dedicate tubing to a specific well for use during subsequent groundwater sampling events.

Purging

1. Attach new or dedicated discharge tubing to the submersible pump.
2. Insert the pump, discharge hose, power cable/air hose, and support cable into the well so that the pump's intake is below the water surface (commonly set midway along the well screen, or so the intake is situated halfway between the lower screen slot and the uppermost submerged screen slot).
3. Start the pump and direct discharge into graduated purge bucket, and adjust the pump speed to produce a smoothly flowing discharge.
4. Calculate the purge rate by recording the time required to purge a given volume.
5. Measurements of temperature, pH and specific conductance (and/or other assigned parameters) should be made after each well purge volume and documented on the Groundwater Sample Collection Record or in the field logbook.
6. Samples may be collected after the required purge volume has been removed or until field parameters have stabilized.

Sample Collection

1. After completing purging, allow the well to recover to 90% of its static level before collecting the sample.
2. In general, samples to be analyzed for VOCs are to be collected first, followed by samples to be analyzed for other organic compounds and inorganic constituents.
3. If sampling for VOCs, reduce the flow rate so that the flow approximates 50 ml/min and use the discharge tube to fill the sample vials. This should be done as gently as possible, minimizing the disturbance and aeration of the water as it enters the vials. Care should be taken to completely fill the vial such that no air bubbles are visible in the vial.

4. For other parameters, adjust the flow rate to approximately 250 ml/min, and fill other sample containers, being sure to add the required preservatives as necessary before capping.
5. After all sample containers have been filled, fill the sampling cup with water and collect any required field-measured data (may include: temperature, pH, specific conductance, dissolved oxygen, total dissolved solids, oxidation-reduction potential, turbidity, salinity, etc) on the groundwater sample collection record or in the field notebook.
6. Label and log the samples and place the containers into a cooler with ice as soon as possible (immediately) after collection.
7. Handle samples for shipment to the laboratory in accordance with AECC SOP # 102 – Environmental Sample Handling, Packaging, and Shipping.

Quality Assurance/Quality Control

Quality assurance sampling is a common component of groundwater sampling programs. QA/QC sampling involves the collection and analysis of additional samples for the purposes of verifying that sampling equipment is suitably clean (equipment blanks), to check the laboratory's accuracy and/or precision (field duplicate), whether the sample matrix may be affecting the analytical results (Matrix Spike/Matrix Spike Duplicate), and whether samples might have been affected by conditions during shipment of the sample containers or samples (trip blank). The specific types of samples to be collected, the procedures to be used for collection, and the frequency QA/QC sample collection will be defined in the QAPP, work plan or project-specific work plan.

Documentation

Groundwater sampling activities should be documented in the field notebook, as well as on forms including the chain of custody record and sample collection records. Purge data collected during well purging prior to sample collection may be collected in the field notes, or on Groundwater Sample Collection Records (See Figure 1 Groundwater Sample Collection Record and Figure 2 for Low Flow Groundwater Sample Collection Record). Labels for sample jars must replicate the information provided on the chain-of-custody and at a minimum must include site ID/project number, sample ID, sampling date, sampling time, preservative, and sampler's initials. Other documentation such as meter calibration records, certifications for pre-cleaned sample containers, and shipping paperwork should be maintained as part of the project file.

FIGURE 1 Groundwater Sample Collection Record

AECC

Well/Piezo ID:

Groundwater Sample Collection Record

Client: _____ Date: _____
Project No: _____ Time: Start _____ am/pm
Site Location: _____ Finish _____ am/pm
Weather Conds: _____ Collector(s) _____

WATER LEVEL DATA: (measured from Top of Casing) Well ☐ Piezometer ☐

a. Total Well Length _____ c. Casing Material _____ e. Length of Water Column _____0

b. Water Table Depth _____ d. Casing Diameter _____ f. Calculated Well Vol.see back) _____

WELL PURGING DATA

a. Purge Method _____

b. Acceptance Criteria defined (from workplan)
- Minimum Required Purge Volume (@ _____ well volumes) _____
- Maximum Allowable Turbidity _____ NTUs
- Stabilization of parameters _____ %

c. Field Testing Equipment Used: Make Model Serial Number

_____

_____

d. Field Testing Equipment Calibration Documentation Found in Field Notebook # _____ Page #_____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	Other

e. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

_____

_____

SAMPLE COLLECTION: Method: _____

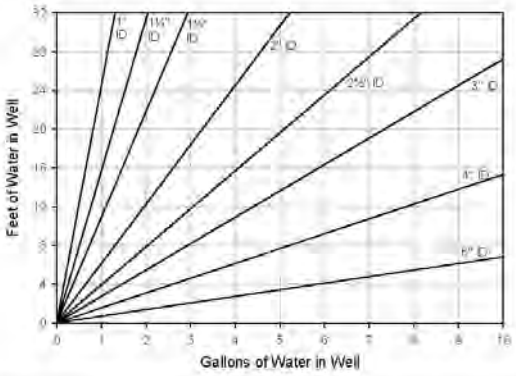
Sample ID	Container Type	No. of Containers	Preservation	Analysis	Time

Comments _____

Signature _____ Date _____

FIGURE 1 (Cont'd) Groundwater Sample Collection Record

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time	Depth to GW	Temp	pH	Spec. Cond.	Turbidity	Flow Rate	Volume Removed	Draw-down	Other
(24 hr)	(feet)	(°C/F)	(SU)	(µS/cm)	(NTU)	(liters/min)	(liters)	(feet)	(Color, odor, sheen, etc.)

FIGURE 2 Low Flow Groundwater Sample Collection Record

AECC

Well ID:

Low Flow Groundwater Sample Collection Record

Client: _____ Date: _____ Time: Start _____ am/pm
Project No: _____ Finish _____ am/pm
Site Location: _____
Weather Conds: _____ Collector(s): _____

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column 0 (a-b) Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

a. Purge Method: _____

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used: Make Model Serial Number

_____
_____

Time (24hr)	Volume Removed (Liters)	Temp. (°C/F)	pH (SU)	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

(continued on back)

If no or N/A - Explain below.

_____

3. SAMPLE COLLECTION: Method: _____

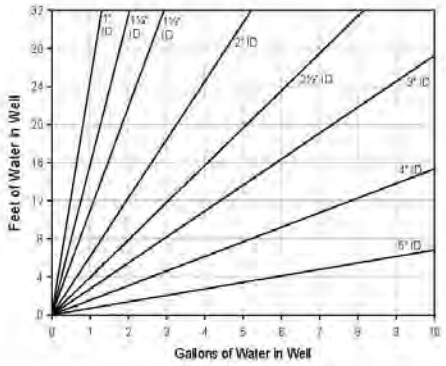
Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time

Comments _____

Signature _____ Date _____

FIGURE 2 (Cont'd) Low Flow Groundwater Sample Collection Record

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C/F)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (ft)	Color/Odor

EPA 537 (PFAS) Field Sampling Guidelines

PLEASE READ INSTRUCTIONS ENTIRELY PRIOR TO SAMPLING EVENT

Sampling for PFAS via EPA 537 can be challenging due to the prevalence of these compounds in consumer products. The following guidelines are strongly recommended when conducting sampling.

Reference-NHDES https://www.des.nh.gov/organization/divisions/waste/hwrb/documents/pfc-stakeholder-notification-20161122.pdf

FIELD CLOTHING and PPE

- No clothing or boots containing Gore-Tex®
- All safety boots made from polyurethane and PVC
- No materials containing Tyvek®
- Do not use fabric softener on clothing to be worn in field
- Do not used cosmetics, moisturizers, hand cream, or other related products the morning of sampling
- Do not use unauthorized sunscreen or insect repellant (see reference above for acceptable products)

FOOD CONSIDERATIONS

No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

OTHER RECOMMENDATIONS

Sample for PFAS first! Other containers for other methods may have PFAS present on their sampling containers

SAMPLE CONTAINERS

- All sample containers made of HDPE or polypropylene
- Caps are unlined and made of HDPE or polypropylene (no Teflon® -lined caps)

WET WEATHER (AS APPLICABLE)

Wet weather gear made of polyurethane and PVC only

EQUIPMENT DECONTAMINATION

- "PFAS-free" water on-site for decontamination of sample equipment. No other water sources to be used
- Only Alconox and Liquinox can be used as decontamination materials

FIELD EQUIPMENT

- Must not contain Teflon® (aka PTFE) or LDPE materials
- All sampling materials must be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books can be used
- No plastic clipboards, binders, or spiral hard cover notebooks can be used
- No adhesives (i.e. Post-It® Notes) can be used
- Sharpies and permanent markers not allowed; regular ball point pens are acceptable
- Aluminum foil must not be used
- Keep PFC samples in separate cooler, away from sampling containers that may contain PFAS
- Coolers filled with regular ice only - Do not use chemical (blue) ice packs

EPA 537 (PFAS) Field Sampling Guidelines

PLEASE READ INSTRUCTIONS ENTIRELY PRIOR TO SAMPLING EVENT

Sampler must wash hands before wearing nitrile gloves in order to limit contamination during sampling. Each sample set requires a set of containers to comply with the method as indicated below. **Sample set is composed of samples collected from the same sample site and at the same time.*

Container Count	Container Type	Preservative
3 Sampling Containers - Empty	250 mL container	Pre preserved with 1.25 g Trizma
1 Reagent Water for Field Blank use	250 mL container	Pre preserved with 1.25 g Trizma
P1 Field Blank (FRB) - Empty	250 mL container	Unpreserved

Sampling container must be filled to the neck. For instructional purposes a black line has been drawn to illustrate the required fill level for each of the 3 Sample containers

Field blanks are recommended and the containers have been provided, please follow the instructions below.

Field Blank Instructions:

1. Locate the Reagent Water container from the bottle order. The Reagent Water container will be pre-filled with PFAS-free water and is preserved with Trizma.
2. Locate the empty container labeled "Field Blank".
3. Open both containers and proceed to transfer contents of the "Reagent Water" container into the "Field Blank" container.
4. If field blanks are to be analyzed, they need to be noted on COC, and will be billed accordingly as a sample.

Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.

Sampling Instructions:

1. Each sampling event requires 3 containers to be filled to the neck of the provided containers for each sampling location.
2. Before sampling, remove faucet aerator, run water for 5 min, slow water to flow of pencil to avoid splashing and fill sample containers to neck of container (as previously illustrated) and invert 5 times.
3. Do not overfill or rinse the container.
4. Close containers securely. Place containers in sealed ZipLoc® bags, and in a separate cooler (no other container types).
5. Ensure Chain-of-Custody and all labels on containers contain required information. Place sample, Field Blank and empty Reagent Blank containers in ice filled cooler (do not use blue ice) and return to the laboratory. Samples should be kept at 4°C ±2. Samples must not exceed 10°C during first 48 hours after collection. Hold time is 14 days.

Please contact your Alpha Analytical project manager with additional questions or concerns.

Scope and Application

The purpose of this SOP is to provide guidance on the installation of overburden and bedrock monitoring wells and the subsequent development of monitoring wells after they are installed. Monitoring wells are installed to monitor the depth to groundwater, aquifer properties, and to obtain samples of groundwater for chemical analysis.

If monitoring wells are not properly installed, they may act as a route of contaminant migration between separate aquifers or may allow contamination at the ground surface to migrate to the subsurface. This condition represents a huge liability to the Company, and in many states, to the individual Professional Geologist responsible for installing the well. It is vitally important that monitoring wells be constructed and maintained so as to ensure that such migration of contamination does not occur.

Some states and EPA Regions have implemented strict requirements for monitoring well construction. These requirements must be reviewed in advance of the field program and specified in the project work plan.

Monitoring wells are generally constructed in a soil boring or core hole that has been advanced using conventional drilling equipment, using commercially-available well construction and filter/sealing materials. After installation, and prior to groundwater sample collection, the wells must be properly developed to enhance/maximize the interconnectivity between the well and the formation, and to remove fine grained material from the filterpack. Procedures for monitoring well development are outlined at the end of this SOP, and procedures for groundwater sample collection are provided in AECC SOP# 106 – Groundwater Sampling.

Responsibilities

Project Manager

The project manager is responsible to make sure that projects involving the installation of monitoring wells are properly planned and executed, and to assure that project-specific well construction specifications are effectively communicated to the Project Geologist/Scientist and to the Drilling Subcontractor that will be responsible for monitoring well construction.

<u>Project Geologist/Scientist</u>

The project geologist/scientist is responsible for directly overseeing the construction and installation of monitoring wells by the drilling subcontractor. He/she is also responsible for making sure that well installation procedures are consistent with this SOP and that the specifications defined in the project work plan are adhered to. The project geologist/scientist is

responsible for recording all pertinent data on the appropriate forms and/or in the field notebook.

Subcontractors

The drilling subcontractor is responsible for providing the necessary equipment for well construction and installation consistent with the project requirements. In addition to the drilling equipment, this will typically include:

- Threaded flush-joint riser pipe of an approved material that typically consist of polyvinyl chloride (PVC) or stainless steel. Other specialty riser pipe materials may be required (e.g., Teflon). Note that glue or PVC cements for joining lengths of riser pipe are not permitted.
- Threaded flush-joint slotted screen of appropriate slot size and approved material (PVC, stainless steel). The use of glues or PVC cements is not permitted.
- Properly sized and washed filter pack material (quartz sand).
- Bentonite (granular, and chips or pellets)
- Steel surface casing (if required)
- Tremie pump and pipe

Commonly a surveying subcontractor is retained to survey aspects of a subsurface site characterization project. Depending on the project work plan, the surveyor may be responsible for providing a monitoring well's horizontal coordinates, ground surface elevation, gauging point (i.e., top of casing) elevation and/or the top of the protective casing elevation.

Equipment/Apparatus/Supplies

In addition to the equipment and materials provided by the drilling subcontractor, required materials may include the following:

- Project-specific documents (Scope of work, HASP, QAPP, Sampling Plan)
- Monitoring Well As-Build Diagrams (Figure 1)
- Weighted tape measure for verifying well and hole depths and well material dimensions. Stainless steel spoons, spatulas, soil mixing pans etc.
- Health and safety equipment/PPE (per the HASP)
- Field project notebook/pen

Procedures

Monitoring well installation begins with the completion of a soil boring or corehole to the required depth, and often begins while hollow-stem augers (or other temporary casing material) are still in the ground to prevent the open hole from collapsing. The soil boring/core hole should be at least 2-inches larger in diameter than the screen/riser so that filter pack, seals, and grouting materials can be installed effectively and without causing bridging. The well construction

materials are carefully emplaced into the soil boring/corehole while the hollow stem augers/temporary casing is progressively withdrawn from the ground.

Before starting the well construction process, the field geologist/scientist should verify that the well construction materials are new/clean or whether decontamination of the materials is required. The geologist/scientist should also measure and record the dimensions of the various components that will collectively become the well. Upon completion, a person should be able to use these measurements to precisely locate the depth of any well feature (i.e., flush-joint, bottom of end cap, top screen slot, etc.) as measured from the top of the well casing.

Procedures

The following general procedure will be used during the installation of monitoring wells:

1. Advance the hollow stem augers/temporary casing to the required termination depth and remove center rods.
2. Check the total depth of the soil boring/corehole with a decontaminated, weighted tape.
3. Emplace lowermost portion of the filter-pack sand into the boring through the hollow-stem augers/temporary casing, withdrawing the augers/temporary casing as necessary, so that 6-inches of filter pack sand lies in the bottom of the boring.
4. Verify depth with weighted tape.
5. Thread the bottom cap onto screened section(s), and tighten so that joints are flush.
6. Insert screen into the boring, and add lengths of riser pipe, adding centralizers as necessary (especially in deeper installations), until the well string rests on the bottom of and is centered in the soil boring/corehole.
7. Cut the top riser off at the appropriate height for stick-up or flush mount type well installation and insert locking expansion plug. Be sure to measure the length of riser removed and subtract from the total riser length measured previously.
8. Continue adding filter pack sand into the annular space between the well casing and the augers/temporary casing, progressively withdrawing the augers/temporary casing as necessary, until the filter pack sand is 2 to 3 feet above the uppermost screen slot.
9. Verify depth to top of filter pack with weighted tape.
10. Tremie, or for shallow wells (<35 feet in depth) gravity feed a 2-foot thick (minimum) layer of bentonite chips, pellets or slurry above the filter pack, being sure that the bentonite does not bridge or accumulate within the hollow stem auger/temporary casing.
11. Verify depth to the top of the filter pack seal with weighted tape.
12. Prepare bentonite-cement grout approximating the ratio:

    2 # bentonite powder: 94 # Portland cement: 7 gal. potable water

13. Tremie the grout into the annulus using a tremie pipe and pump (gravity feed bentonite pellets if emplacing them at a shallow depth range). Grout the well to within 2 to 3 feet of the surface but not higher than the average frost line.

14. Install protective cover (stick-up or flush-mount) and prepare concrete pad and finish so that it slopes away from the wellhead in all directions. Pads will have a minimum thickness of 4 inches. Drill vent hole in casing or expansion plug/well cap (stick up installations only) and lock the protective cover (or the expansion plug for flush mount installations).
15. If the well design specifies guard posts/bollards, dig the holes and set the guard posts in concrete separate from the concrete well pad. Bollards must extend to a depth of 2 feet.
16. Record the appropriate construction/completion information in the field logbook and on the monitoring well as-built detail (Figure 1).
17. If a form was used for the concrete pad, return to the well site after the concrete has cured for at least 24 hours and remove the form. Backfill around the pad with native soil and restore surface as appropriate.
18. The well identification should be marked on the protective casing and PVC cap. Paint the well cover and posts, if required.

Monitoring Well Development:

Monitoring wells are developed to enhance the interconnection between the well and the aquifer. Drilling methods inherently cause disturbance of the saturated portion of a monitoring well, and if mud rotary techniques are used when drilling in bedrock, the drilling mud may cake up on and seal off, or partially obstruct the water-bearing zone in a well. Development is the process of removing the caked material from the bore/corehole wall, and/or removing fine-grained materials from the filter pack. Development using vigorous methods should occur a minimum of 48 hours after the well is completed to allow the filter pack seal grout to sufficiently cure. Development may occur before the 48 hour minimum if the development occurs before the emplacement of the filter-pack and grout, or if development is to be completed by hand bailing or other relatively low stress method that will not draw the seal/grout materials into the filter-pack or well.

Equipment needed:

- Pump, pump tubing, or bailer and bailer cord, surge block (or other method-specific equipment as appropriate)
- Water-level indicator.
- Temperature, conductivity and pH meters.
- Personnel protective equipment as specified in the site-specific HASP.
- Decontamination supplies.

- Disposal drums, if required.

The most common well development methods utilized by AECC are: surging with a surge block, over-pumping, and bailing. Surging involves raising and lowering a surge block or surge plunger inside the well. The resulting surging motion forces water into the formation and loosens sediment, pulled from the formation into the well. Occasionally, sediments must be removed from the well with a bailer or pump.

Over-pumping involves pumping at a rate high enough to draw the water level in the well down as low as possible, and then allowing the well to recharge to near the original level. This process is repeated until sediment-free water is produced.

Bailing includes the use of a simple manually operated check-valve bailer to remove water from the well. The bailing method, like other methods, should be repeated until sediment free water is produced. Bailing may be the method of choice in a shallow well or in slowly-recharging wells.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed and/or combined as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. Other less-common methods may also be applicable, depending on project/site specific situations. In all instances, the procedures employed are to be documented in the field notebook and development data log.

The following steps will be followed when developing monitoring wells:

1. Obtain information on each well to be developed and list on the Development Data Logs (i.e., drilling method, well diameter, well depth, screened interval, anticipated contaminants).
2. Obtain a water level meter, air monitoring instruments, materials for decontamination, and water quality instrumentation (if stipulated in the QAPP/Work Plan or other project specific documents).
3. Assemble drums or containers for temporary storage of water produced during well development.
4. Assemble necessary equipment on a plastic sheet surrounding the wellhead.
5. Record pertinent information in the field logbook and or development data log (personnel, time, location ID, etc.) and don appropriate PPE as specified in the site specific HASP or Job Safety Analysis (JSA).
6. Open the monitoring well, take air monitor reading with a PID at the top of casing and in the breathing zone as appropriate.
7. Measure depth to water and the total depth of the monitor well. Calculate the water column volume of the well (refer to the groundwater sampling logs in AECC SOP# 106 - Groundwater Sampling) to approximate well volume based on well diameter.

8. Begin development and measure the initial pH, temperature, turbidity, and specific conductivity of the water and record in the site logbook. Note the initial color, clarity, and any other observable conditions.
9. Continue to develop the well and periodically measure the water quality parameters indicated in step 8 (above). Depending on project objectives and available time, development should proceed until these water quality parameters stabilize, or until the water has a turbidity of less than 50 nephelometric turbidity units (NTUs).
10. Record the final water quality parameters in the field notebook and purge data sheets.
11. Remove the pump assembly or bailers from the well, decontaminate, and cleanup the site.
12. Lock the well cover before leaving. Dispose of produced water as required by the project work plan

Terms/Definitions:

Annulus: The space between the borehole wall and the outside of the well screen or riser pipe.

Bentonite Seal: A granular, chip, or pellet bentonite material that is often used to provide an annular seal above the well screen filter pack. This seal is typically installed dry followed by in-place hydration with or without the addition of water. Hydrated bentonite is sometimes used as a grout seal.

Bottom Cap/Plug: Threaded or slip-on cap placed at the bottom of the well prior to installation. Often serves as a sump for accumulation of silt which settles within the well. The measured length from the lowermost well screen slot to the bottom of the bottom cap is known as the sump or tail pipe portion of the well.

Centralizers: Stainless steel expansion clamps which, when fitted to well screens or riser pipe, expand to contact the borehole walls positioning the well centrally (and plumb) within the open borehole so as to allow for even placement and distribution of filter pack, seals and grout.

Expansion Plug/Well Cap: Cap used to cover the opening at the top of the well riser pipe. Expansion plugs are equipped with a rubber gasket and threaded wing nut which, when turned, provides a watertight seal. Expansion caps may also be locked, and generally are recommended for use with flush-constructed wells where road box protective casings are also used. Other well caps may include slip-on or threaded caps made of the same material as the well casing.

Filter Pack: A well-graded, clean sand or gravel placed around the well screen to act as a filter in preventing the entry of very fine soil particles into the well.

Grout Seal: A cement/bentonite mixture used to seal a borehole that has been drilled to a depth greater than the final well installation depth or to seal the remaining borehole annulus once the filter pack seal has been installed above the filter pack. Occasionally, pure bentonite is used as a grout seal.

Measuring Point: A selected point at the top of the well casing (riser pipe) used for obtaining periodic water-level measurements. The measuring point should consist of either a notch or indelibly marked point on the upper surface of the casing. Typically, the highest point on the casing (if not level) is used as the measuring point. The measuring point is also the point that is surveyed when well elevation data is obtained.

Protective Casing: A locking metal casing, placed around that portion of the well riser pipe that extends above the ground surface. The protective casing is generally cemented in place when the concrete pad is constructed around the well.

Riser Pipe: The non-perforated portion of well casing material used above the well screen, that extends to the ground surface. Riser pipe is typically available pre-cleaned and pre-threaded for immediate use.

Road Box/Flush Mount Protective Cover: A protective casing that is flush-mounted with the ground surface, and are used in areas where the monitoring well cannot extend above the ground surface for traffic or security reasons.

Tremie Pipe: A small diameter pipe which fits in the open borehole annulus and is used to inject filter sands or hydrated seal materials or grouts under pressure.

Well Screen: That portion of the well casing material that is perforated in some manner so as to provide a hydraulic connection to the aquifer. Typically a well screen is purchased pre-slotted, pre-cleaned, and pre-threaded for immediate use.

Vent Hole: Small diameter hole drilled in the upper portion of the well riser pipe (or in the expansion plug/well cap which provides atmospheric venting of the well. The vent holes allow for constant equilibration of the water level with changing atmospheric conditions. In flood-prone areas, or with flush-mount wells, vent holes should not be used.

Quality Assurance/Quality Control

Quality control requirements are project-specific and can vary greatly from project to project. QA/QC protocols regarding the decontamination of well construction materials or the collection and analysis of equipment blanks and/or well material blanks, if required, will be specified in the QAPP. In the absence of a QAPP, QA/QC will be attained through adherence to SOPs and requirements stipulated in other project-specific specifications (i.e., work plan, sampling plan, etc.).

Documentation

All well construction data will be recorded on the Monitoring Well As-Built Detail form (Figure 1). Well locations are to be identified on field maps, and additional information collected during installations will be recorded in the field notebook.

Well development will be documented on the Monitoring Well Development Record (Figure 2).

Deviations from this SOP, and the rationale for those deviations should be documented in the field project notebook.

Figure 1 – Monitoring Well Construction Detail

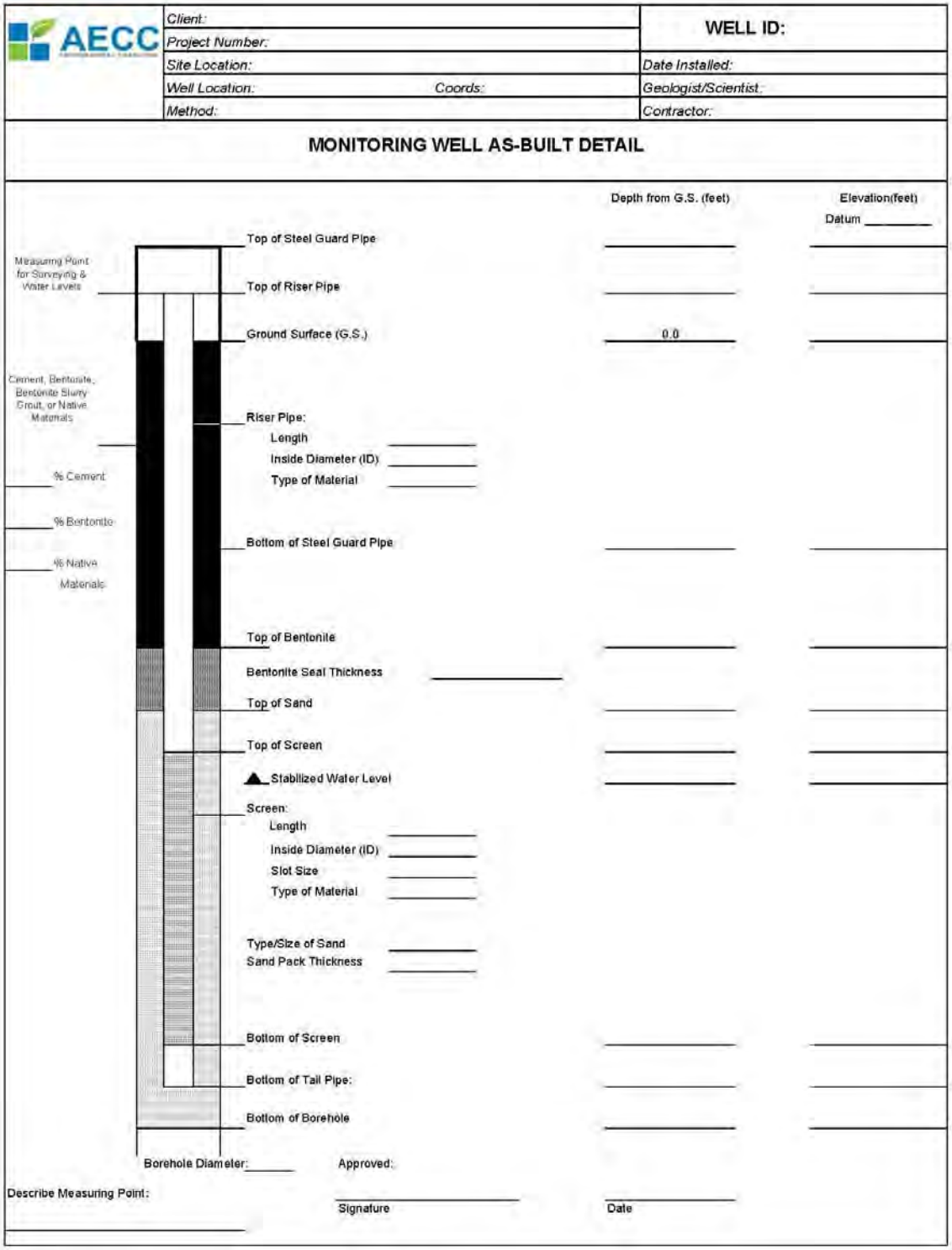


Figure 2
Monitoring Well Development Record

AECC

Well/Piez. ID:

Monitoring Well Development Record

Client: _____ Site Location: _____

Project #: _____ Date: _____ Developer: _____

WELL DATA

Well ☐ Piezometer ☐ Diameter _____ Material _____

Measuring Point Description _____ Geology at Screen Interval (if known) _____

Depth to Top of Screen (ft.) _____

Depth to Bottom of Screen (ft.) _____ Time of Water Level Measurement _____

Total Well Depth (ft.) _____ Calculate Purge Volume (gal.) _____

Depth to Static Water Level (ft.) _____ Disposal Method _____

Wellhead PID/FID _____

Original Well Development ☐ Redevelopment ☐ Date of Original Development _____

DEVELOPMENT METHOD _____ **PURGE METHOD** _____

Field Testing Equipment Used: Make Model Serial Number

Field Testing Calibration Documentation Found in Field Notebook # _____ Page # _____

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	Turbidity (NTUs)	DO	Color	Odor	Other

ACCEPTANCE CRITERIA (from workplan)

Min. Purge Volume (____ well volumes) _____gallons

Maximum Turbidity Allowed _____ NTUs

Stabilization of parameters _____%

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A explain below: _____

Signature _____ Date: _____

8/13/2012 Well-Piez. developing

Figure 2 Monitoring Well Development Record (Cont'd)

Continued from front

Well ID: ____________

Time	Volume Removed (gal)	T° (C/F)	pH	Spec. Cond (umhos)	rbidity (NTU	DO	Color	Odor	Other

Scope and Application

The purpose of this procedure is to establish a uniform set of procedures for labeling environmental sample containers and properly completing a Chain of Custody (COC) form. Adherence to this SOP will ensure that sample containers are properly labeled, the sample collection and descriptive information is documented and that the required analytical parameters are specified on the COC form.

Sample labels provide the information necessary during handling to complete the COC forms and they reduce the possibility of confusing sample containers. The COC form is intended as a legal record of possession of a sample.

This SOP is to be used **ONLY** for the labeling and COC documentation of environmental samples. The labeling of hazardous material sample containers and the completion of COC forms shall adhere to USDOT regulations.

Equipment/Apparatus/Supplies

Required materials include the following:

Adhesive Sample Labels (laboratory-provided)
COC form(s)
Clear packing tape

Procedures

Sample bottle labeling

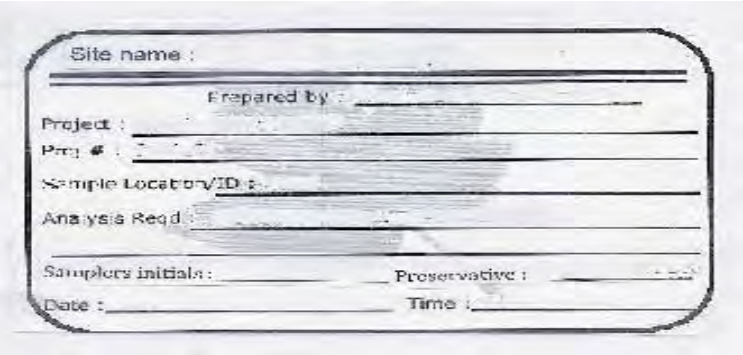
Sample containers shall be pre-labeled with blank adhesive label before samples are collected. The container shall be labeled using the adhesive labels provided by the analytical laboratory

Once a sample has been placed into a container and the container is properly sealed, the sampler shall record the following information on the label:

- Site name
- Label prepared by (lab name)
- Project name
- Project number
- Sample Location / ID
- Analysis required
- Samplers' initials
- Preservative (if present)
- Date and time that the sample was acquired

The label shall then be covered with clear packing tape which is wrapped completely around the bottle.

An example of a sample container label is shown below.



Chain of Custody Completion

The COC form is typically provided by the analytical laboratory and must be partially completed by the sampler prior to releasing custody of the sample. The essential information that must be provided on the COC form by the sampler is as follows:

- Project Name/Site Name
- Details of who the lab report should be routed to
- Details of who should be invoiced for the analytical services
- Project number
- Turnaround time requested
- Date and time that each sample was collected
- Type of sample collection method (composite or grab)
- Matrix sampled (liquid, soil, sludge)
- Number of containers filled per sample number
- Requested analyses
- Remarks

Most importantly, each COC form has a section where the sampler signs, dates and records the time that he/she releases the samples to a shipping agent or the sample receiver at the laboratory. Once the samples are released a copy of the COC form shall be retained by the sampler and routed to the project file. If the cooler is to be shipped via an overnight carrier (i.e. FedEx®, UPS or similar) the signed chain of custody shall be placed in a sealable plastic bag

and taped to the underside of the cooler lid. The COC form should be initiated at the lab at sample container receipt and it remains with the sample at all times.

Quality Assurance/Quality Control

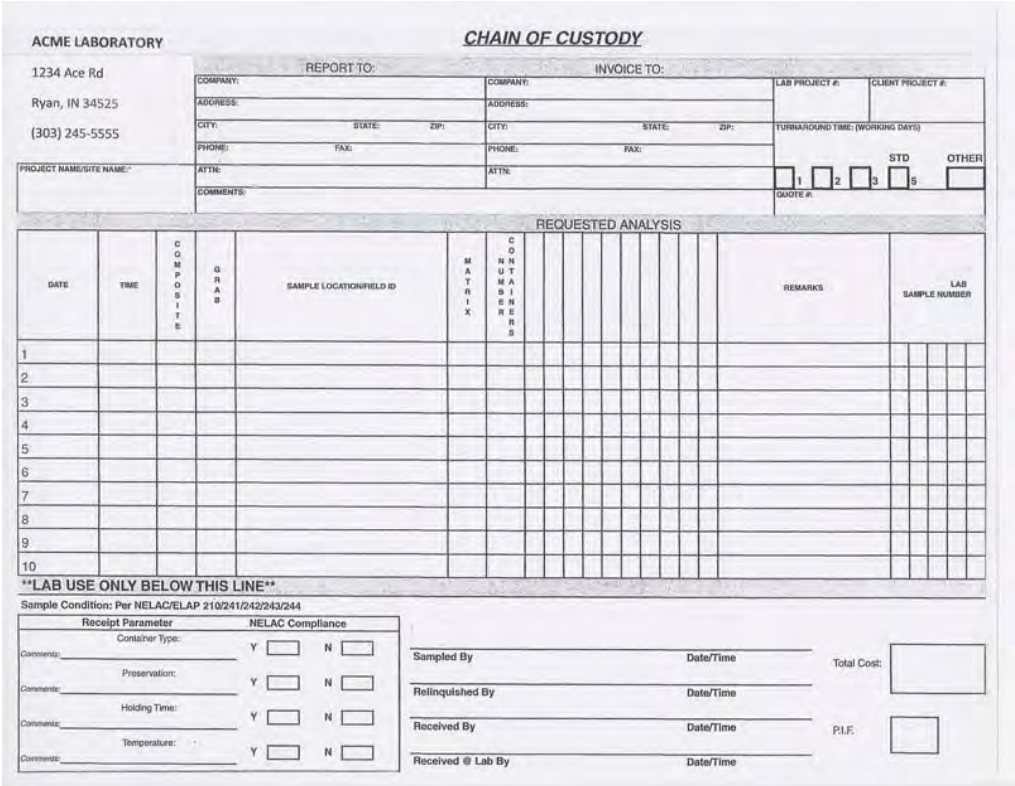
Prior to affixing a container label to a sample container, and then completing the label, the sampler shall review the project sampling plan/scope of work to ensure that the required label information has been recorded on the label.

Prior to sealing the COC for shipment the sampler shall review the project sampling plan/scope of work to ensure that the form has been fully and accurately completed (e.g., all sample Location / ID information, the appropriate laboratory analyses, and the required turn-around-time for analytical results are requested).

Documentation

If samples are being shipped via courier or via direct delivery then a copy of the signed chain of custody shall be retained. If shipping via other carrier, the copy of the airbill shall be retained for the project records.

An example of a chain of custody form is presented below.



ACME LABORATORY
1234 Ace Rd
Ryan, IN 34525
(303) 245-5555

CHAIN OF CUSTODY

REPORT TO: COMPANY: ADDRESS: CITY: STATE: ZIP: PHONE: FAX: ATTN: COMMENTS:

INVOICE TO: COMPANY: ADDRESS: CITY: STATE: ZIP: PHONE: FAX: ATTN:

LAB PROJECT #: CLIENT PROJECT #: TURNAROUND TIME: (WORKING DAYS) STD OTHER 1 2 3 5 QUOTE #:

PROJECT NAME/SITE NAME:

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	# CONTAINERS	REMARKS	LAB SAMPLE NUMBER
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance
Container Type: Comments:	Y N
Preservation: Comments:	Y N
Holding Time: Comments:	Y N
Temperature: Comments:	Y N

Sampled By Date/Time
Relinquished By Date/Time
Received By Date/Time
Received @ Lab By Date/Time

Total Cost:
P.I.F.

APPENDIX B

DATA QUALITY OBJECTIVE FORMS

DATA QUALITY OBJECTIVES FORM – COMPREHENSIVE SOIL SAMPLING

Site Name/Location: Loucks Road Extension (BCP Site # C734145)
Town of Dewitt
Onondaga County, New York

Sampled Media:

__ Groundwater __Sediment __Surface water **X** Soils __Waste Material

Sample Objectives: Determine nature and extent of soil contamination.

Data Use:

X Site Characterization __Health and Safety __Monitoring
__Risk Assessment __Evaluate Remediation Alternatives __Disposal

Data Types:

X SW-846 __ TCLP __ SCLP __ Other: _____

X TCL VOCs **X** TCL SVOCs **X** TAL Metals **X** PCBs **X** Herbicides **X** Pesticides
X Cyanide __Mercury __ Lead __TPH **X** Other: 1,4-Dioxane

Groundwater Field Parameters:

__ pH __ Sp. Cond __ Turb __ Temp __ Do __ ORP

Level of Analysis:

X Level I: Field Screening
Portable instruments providing real-time data
1. Photo-Ionization Device (PID)

__ Level II: Field Analysis
Portable analytical instruments in an on-site laboratory or transported to site
1. Groundwater multi-meter for field parameters

__ Level III: ASP Analytical Methods
Samples will be analyzed in accordance with NYSDEC-ASP 1995

X Level IV: ASP Reportables/Deliverables
NYSDEC-ASP 1995 Category B Reportables/Deliverables

Sampling Procedures:
Sampling Procedures are described within the Field Sampling Plan (within the text of the Remedial Investigation Work Plan).

Data Quality Factors:
Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

QA/QC Samples:
X Duplicate (Split) **X** Matrix Spike **X** Matrix Spike Duplicate
X Trip Blank __Equipment Blank

DATA QUALITY OBJECTIVES FORM – GROUNDWATER

Site Name/Location: Loucks Road Extension (BCP Site # C734145)
Town of Dewitt
Onondaga County, New York

Sampled Media:

X Groundwater __Sediment __Surface water __ Soils __Waste Material

Sample Objectives: Determine nature and extent of soil contamination.

Data Use:

X Site Characterization __Health and Safety __Monitoring
__Risk Assessment __Evaluate Remediation Alternatives __Disposal

Data Types:

X SW-846 __ TCLP __ SCLP __ Other: _____

X TCL VOCs **X** TCL SVOCs **X** TAL Metals **X** PCBs **X** Herbicides **X** Pesticides
X Cyanide __Mercury __ Lead __TPH **X** Other: 1,4-Dioxane
PFAS

Groundwater Field Parameters:

X pH **X** Sp. Cond **X** Turb **X** Temp **X** DO **X** ORP

Level of Analysis:

__ Level I: Field Screening
Portable instruments providing real-time data
1. Photo-Ionization Device (PID)

X Level II: Field Analysis
Portable analytical instruments in an on-site laboratory or transported to site
1. Groundwater multi-meter for field parameters

__ Level III: ASP Analytical Methods
Samples will be analyzed in accordance with NYSDEC-ASP 1995

X Level IV: ASP Reportables/Deliverables
NYSDEC-ASP 1995 Category B Reportables/Deliverables

Sampling Procedures:
Sampling Procedures are described within the Field Sampling Plan (within the text of the Remedial Investigation Work Plan).

Data Quality Factors:
Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

QA/QC Samples:
X Duplicate (Split) **X** Matrix Spike **X** Matrix Spike Duplicate
X Trip Blank __Equipment Blank

DATA QUALITY OBJECTIVES FORM – INVESTIGATION-DERIVED WASTE

Site Name/Location: Loucks Road Extension (BCP Site # C734145)
Town of Dewitt
Onondaga County, New York

Sampled Media:

X Groundwater __Sediment __Surface water **X** Soils **X** Waste Material

Sample Objectives: To collect data that allows a disposal facility to accept waste material.

Data Use:

__ Site Characterization __Health and Safety __Monitoring
__Risk Assessment __Evaluate Remediation Alternatives **X** Disposal

Data Types:

__ SW-846 __ TCLP __ SCLP **X** Other: As requested by disposal facility

__ TCL VOCs __ TCL SVOCs __ TAL Metals __ PCBs __ Herbicides __ Pesticides
__ Cyanide __Mercury __ Lead __TPH **X** Other: As requested by disposal facility

Groundwater Field Parameters:

__ pH __ Sp. Cond __ Turb __ Temp __ DO __ ORP

Level of Analysis:

__ Level I: Field Screening
Portable instruments providing real-time data
1. Photo-Ionization Device (PID)

__ Level II: Field Analysis
Portable analytical instruments in an on-site laboratory or transported to site
1. Groundwater multi-meter for field parameters

X Level III: ASP Analytical Methods
Samples will be analyzed in accordance with NYSDEC-ASP 1995

__ Level IV: ASP Reportables/Deliverables
NYSDEC-ASP 1995 Category B Reportables/Deliverables

Sampling Procedures:
Sampling Procedures will be dictated by the disposal facility.

Data Quality Factors:
Analytical Detection Limits will be consistent with the requirements of the disposal facility.

QA/QC Samples:

__ Duplicate (Split) __ Matrix Spike __ Matrix Spike Duplicate
__ Trip Blank __Equipment Blank

DATA QUALITY OBJECTIVES FORM – SHALLOW SOILS

Site Name/Location: Loucks Road Extension (BCP Site # C734145)
Town of Dewitt
Onondaga County, New York

Sampled Media:

__ Groundwater __Sediment __Surface water **X** Soils __Waste Material

Sample Objectives: Determine nature and extent of shallow soil contamination.

Data Use:

X Site Characterization __Health and Safety __Monitoring
__Risk Assessment __Evaluate Remediation Alternatives __Disposal

Data Types:

X SW-846 __ TCLP __ SCLP __ Other: _____

__ TCL VOCs __ TCL SVOCs __ TAL Metals **X** PCBs __ Herbicides __ Pesticides
__ Cyanide __Mercury __ Lead __TPH __ Other: _____

Groundwater Field Parameters:

__ pH __ Sp. Cond __ Turb __ Temp __ DO __ ORP

Level of Analysis:

__ Level I: Field Screening
Portable instruments providing real-time data
1. Photo-Ionization Device (PID)

__ Level II: Field Analysis
Portable analytical instruments in an on-site laboratory or transported to site
1. Groundwater multi-meter for field parameters

__ Level III: ASP Analytical Methods
Samples will be analyzed in accordance with NYSDEC-ASP 1995

X Level IV: ASP Reportables/Deliverables
NYSDEC-ASP 1995 Category B Reportables/Deliverables

Sampling Procedures:
Sampling Procedures are described within the Field Sampling Plan (within the text of the Remedial Investigation Work Plan).

Data Quality Factors:
Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

QA/QC Samples:

X Duplicate (Split) **X** Matrix Spike **X** Matrix Spike Duplicate
X Trip Blank __Equipment Blank

DATA QUALITY OBJECTIVES FORM – SOIL PILES

Site Name/Location: Loucks Road Extension (BCP Site # C734145)
Town of Dewitt
Onondaga County, New York

Sampled Media:

__ Groundwater __Sediment __Surface water **X** Soils __Waste Material

Sample Objectives: Determine nature and extent of soil contamination.

Data Use:

X Site Characterization __Health and Safety __Monitoring
__Risk Assessment __Evaluate Remediation Alternatives __Disposal

Data Types:

X SW-846 __ TCLP __ SCLP __ Other: _____

X TCL VOCs **X** TCL SVOCs **X** TAL Metals **X** PCBs **X** Herbicides **X** Pesticides
X Cyanide __Mercury __ Lead __TPH __ Other: _____

Groundwater Field Parameters:

__ pH __ Sp. Cond __ Turb __ Temp __ Do __ ORP

Level of Analysis:

X Level I: Field Screening
Portable instruments providing real-time data
1. Photo-Ionization Device (PID)

__ Level II: Field Analysis
Portable analytical instruments in an on-site laboratory or transported to site
1. Groundwater multi-meter for field parameters

__ Level III: ASP Analytical Methods
Samples will be analyzed in accordance with NYSDEC-ASP 1995

X Level IV: ASP Reportables/Deliverables
NYSDEC-ASP 1995 Category B Reportables/Deliverables

Sampling Procedures:
Sampling Procedures are described within the Field Sampling Plan (within the text of the Remedial Investigation Work Plan).

Data Quality Factors:
Analytical Detection Limits will be consistent with ASP-Contract Required Quantization Limits (CRQLs).

QA/QC Samples:
X Duplicate (Split) **X** Matrix Spike **X** Matrix Spike Duplicate
X Trip Blank __Equipment Blank

APPENDIX C

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

Remedial Investigation Work Plan
Loucks Road Extension Site
Town of Dewitt, New York

EMERGENCY CONTACT NUMBERS		
Emergency Response Number	911	
Poison Control Center	(800) 222-1222	
State Police (North Syracuse)	(315) 455-2826	
NEAREST HOSPITAL		
St. Joseph's Hospital 301 Prospect Avenue Syracuse, New York 13203	(315) 448-5111	
OWNER		
Woodbine Business Park, Inc. (315) 471-7400	Owner Representative	Brian St. Laurent: (315) 569-7435 (cell)
ENVIRONMENTAL CONSULTANT		
Bradford Engineering, DPC (315) 529-0482	Field Manager	H. Nevin Bradford, P.E.
Asbestos & Environmental Consulting Corporation (AECC) (315) 432-9400	Project Manager	Richard McKenna
	Safety Coordinator	Bryan Airel: (315) 416-9290 (cell)
	Head Field Technician	Drew Brantner
DRILLING CONTRACTOR		
TBD	HSO	TBD
	Supervisor	TBD
	Operator	TBD

April 2018

REVISION #	DATE	SUMMARY OF REVISION
01	February 2019	Update contacts/responsibilities; Section 8.2 – Add temporary barrier requirement

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FIGURES

APPENDICES

1.0 INTRODUCTION

A Brownfield Cleanup Program site investigation is being performed at the site (See Figure 1) as a result of the detection of polychlorinated biphenyls (PCBs) in site soils.

This project-specific Health and Safety Plan (HASP) sets forth requirements for maintaining the health and safety of persons at the Site. This HASP addresses general health and safety issues related to the presence of specific chemical and physical hazards that may be encountered during performance of the work activities at the Site. Any Contractors or Subcontractors are required to prepare and maintain their own project-specific HASP that incorporates the minimum requirements of this HASP.

An Emergency Response Plan is included at the end of this Section, which presents the procedures to be followed in the event of an emergency situation.

2.0 GENERAL DEFINITIONS

The following definitions shall apply to and are used throughout the HASP:

Contamination Reduction Zone – Area between the Exclusion Zone and Support Zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.

Contractor – Any contractor responsible for performing work that will disturb contaminated Site soils or involve management of other contaminated waste streams such as decontamination residues.

Environmental Consultant – A consultant to the Owner that will specialize in the environmental aspects of the project, namely preparation and implementation of the Remedial Investigation Work Plan, collection of soil samples, collection of groundwater samples, oversight of contractor activities, and decontamination of equipment at the end of the project.

Exclusion Zone – Any portion of the Site where hazardous substances are present, or may reasonably be suspected to be present, in the air, water, or soil.

HSO – The Health & Safety Officer is a qualified professional designated by the Consultant who is responsible for the execution and maintenance of the HASP.

Monitoring – The use of field instrumentation to measure the levels of contaminants. Monitoring will be conducted, if deemed necessary (i.e., excessive airborne dust and particulates), to evaluate potential exposures to chemical and physical hazards.

On-site personnel – All consultant, contractor, and subcontractor personnel working at the Site.

PPE – Personal Protective Equipment; clothing / gear worn by personnel within the work area that is designed to reduce exposure to chemical and / or physical hazards.

Project – All on-site work performed at the Site involving potentially contaminated soil disturbance (i.e., investigations and potential interim remedial measures).

Site – The subject property where the disturbance of potentially contaminated soil may occur.

Subcontractor – All subcontractors to the Contractor hired to work on this project.

Support Zone – The remainder of the Site outside of the Contamination Reduction Zone and Exclusion Zone. Support equipment is located in this zone.

Visitor – All other personnel, excluding the on-site personnel.

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3.0 RESPONSIBILITIES

Implementation of the HASP will be accomplished through an integrated team effort. The following key personnel will be involved with this project:

OWNER		
Woodbine Business Park, Inc. (WBP) (315) 471-7400	Owner Representative	Brian St. Laurent
ENVIRONMENTAL CONSULTANTS		
Bradford Engineering, DPC (315) 529-0482	Field Manager	H. Nevin Bradford, P.E.
Asbestos & Environmental Consulting Corporation (AECC) (315) 432-9400	Safety Coordinator	Bryan Airel
	Project Manager	Richard McKenna
	Head Field Technician	Drew Brantner
DRILLING / EXCAVATION CONTRACTOR		
TBD	HSO	
	Supervisor	
	Operator	
GOVERNMENTAL AGENCIES		
US Environmental Protection Agency (USEPA)		TBD
NYS Department of Environmental Conservation (NYSDEC) (315) 426-7524		Harry Warner
NYS Department of Health (NYSDOH) (518) 402-7860		Arunesh (Runey) Ghosh
Onondaga County Health Department (315) 435-3252		TBD

This HASP will be periodically reviewed by all parties during the project to verify that it is in accordance with the operations conducted at the site. Changes in site conditions or changes in the work tasks at the site will necessitate a review and modification of the HASP. The Contractor's HSO shall contact the Environmental Consultant and Decontamination Contractor if site conditions change that warrant modifications to the HASP, and vise versa. Changes, modifications, and amendments to the HASP will be made in the form of addenda, and will be attached to the HASP.

All parties to the project will perform their duties in a manner consistent with generally accepted practices, and will be responsible for the following (of their own employees) during the project:

- Verification that medical examinations and training requirements for all personnel are current
- Reviewing the HASP with all on-site personnel
- Implementation and maintenance of the HASP
- Providing all on-site personnel with proper PPE
- Compliance with applicable state and federal health and safety standards

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The HSO for this project is designated with the following responsibilities:

- Maintain a daily log book for recording all significant health and safety activities
- Have authority to suspend work due to health or safety-related concerns
- Provide on-site technical assistance and conduct health and safety briefings at the Site
- Verify that first aid kits, eye wash kits, and fire extinguishers are at the Site
- Verify that on-site personnel have received the necessary training and physical examinations
- Verify that on-site personnel have been provided with and are using the required PPE
- Review of the adequacy of the HASP and amend the HASP as necessary during the project
- Prepare addenda to the HASP and maintain required documents for recordkeeping purposes

4.0 SITE HAZARDS EVALUATION

4.1 CHEMICAL HAZARDS

The site soils have been sampled for PCBs. No sampling for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), heavy metals, PCBs, pesticides, and herbicides has been conducted to date. The associated laboratory analysis and on-site observations revealed that the following chemicals / materials of concern exist at the Site:

- PCBs

A fact sheet and Safety Data Sheet for PCBs are presented in Appendix A.

At this time PCBs pose the only known health threat at the Site. In certain areas, PCB concentrations are above the threshold for hazardous (TSCA) waste (50 mg/kg or ppm). One sample was observed to contain PCBs in excess of 4,000 ppm. As the investigation progresses and additional data is collected for the other classes of chemicals, this HASP shall be updated to reflect this information.

PCBs at the Site may enter the human body in a variety of ways. The chemical routes of exposure anticipated from the remedial activities at this Site include:

Absorption - Dermal (skin) contact with impacted soil on-site resulting in absorption of chemicals of concern through the skin and into the blood stream. Proper use of PPE as specified later in this Section will minimize risks of exposure at the Site.

Ingestion - Chemicals / materials of concern can come in direct contact with the mouth from soil or other contaminated areas (PPE, skin, tools, etc.) and enter the bloodstream through the stomach lining. Proper care in handling PPE and tools, refraining from eating and drinking at the Site, and frequent hand washing with soap and water will minimize risks of exposure.

Inhalation - PCBs attached to dust and particulates, can be entrained by wind and become airborne across the Site and be subsequently inhaled through the nose and / or mouth. This exposure route is the most likely way for worker exposure to occur. The Contractor shall employ methods that minimize the creation of dust and utilize dust suppression techniques to minimize dust and particulates. Respirators with appropriate organic cartridges should be available to on-site workers in case volatile compounds become a nuisance or health hazard. The Contractor is responsible for any personal air monitoring of employees, as deemed necessary.

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4.2 PHYSICAL HAZARDS

Based upon the anticipated field activities, the following potential hazardous conditions may exist:

- The use of typical mechanical equipment such as drill rigs and sampling vehicles can create a potential for crushing and pinching hazards due to movement and positioning of the equipment, movement of lever arms and hydraulics, and entanglement of clothing and appendages in exposed drives and tracks. Mechanical equipment can also create a potential for impact of steel tools, masts, and cables should equipment rigging fail, or other structural failures occur during hydraulic equipment operation. Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc. The mechanical equipment stated above represents typical equipment that is ordinarily used during this scope of work, but is not meant to be an all-inclusive list. Similar precautions should be used around other mechanical equipment deployed to the Site that is not listed above.

- The contractor is responsible for ensuring compliance with OSHA's construction standard for excavations (29 CFR 1926 Subpart P), and for designating the Competent Person responsible for selecting and implementing the appropriate protective system(s), assuring appropriate means of access and egress for excavations greater than four (4) feet in depth (not anticipated for this project), and for ensuring that potential atmospheric and physical hazards associated with any excavation / trenching activities are completed in accordance with Subpart P and other applicable OSHA Standards as applicable.

- Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; cause pain, physical damage to the ear, and temporary and / or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA, hearing protection will be required with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise levels below levels of concern.

- Personnel may be injured during physical lifting and handling of heavy equipment, construction materials, or containers.

- Personnel may encounter slip, trip, and fall hazards associated with excavations, manways, and construction debris and materials. Precautionary measures should be taken by identifying and removing slip, trip, and fall hazards prior to commencing work. In the event slip, trip, and fall hazards cannot be removed or minimized, site workers will be shown the location of the physical hazard and be asked to avoid it during work activities.

- The potential for fire and / or explosion emergencies is always present on the Site. Field vehicles will be equipped with a fire extinguisher. Employees must be trained in the proper use of fire suppression equipment. However, large fires that cannot be controlled with a fire extinguisher should be handled by professionals. The proper authorities should be notified in these instances.

- Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause injury to exposed body surfaces or result in a profound generalized cooling which can cause death. Areas of the body such as fingers, toes, and ears,

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are the most susceptible to cold stress. Ambient air temperature and wind velocity are two factors which influence the development of a cold weather injury. Local injury resulting from exposure to cold temperatures is known as "frostbite." There are several degrees of damage in which frostbite of the extremities can be categorized, as follows:

  - Frost nip or incipient frostbite is characterized by sudden bleaching or whitening of the skin.
  - Superficial frostbite occurs when the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
  - Deep frostbite is characterized by tissues that are cold, pale, and solid; this is an extremely serious injury.

- Heat stress is another potential hazard condition that may arise. Heat stress can result from a number of contributing factors, including environmental conditions, clothing, and workload as well as the physical condition of the individual. Since heat stress is one of the most common injuries / symptoms associated with outdoor work conducted with direct solar load, and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Signs and symptoms of heat-related illnesses which all on-site personnel should be aware, include the following:

  - Heat rash may result from continuous exposure to heat or humid air.
  - Heat cramps are caused by heavy sweating and may include muscle spasms and pain in the hands, feet, and abdomen.
  - Heat exhaustion is indicated by pale, cool, and moist skin; heavy sweating; dizziness; nausea; and fainting.
  - Heat stroke is indicated by red, hot, and unusually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; rapid pulse; and coma. Immediate action must be taken to cool the body before serious injury or death occurs.

- It should be noted that there are no known overhead or underground utilities within or adjacent to the Work Areas. Utility location reports are provided in Attachment B.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personnel will be required to wear Level D and Modified Level D PPE ensembles, at a minimum. The following PPE ensembles shall be worn by on-site personnel for the following tasks:

Level D Protection, as listed below, shall be worn by on-site personnel at all times when tasks are performed which DO NOT INVOLVE dermal exposure, or contact with chemical hazards:

- Standard outer garments (i.e. long pants and long-sleeve shirt)
- Durable leather steel-toed work boots
- Rubber boots worn over work boots
- Durable leather gloves
- Eye protection
- Hard hat
- Hearing protection

Modified Level D Protection, as listed below, shall be worn by on-site personnel at all times when tasks are performed which INVOLVE dermal exposure or contact with chemical hazards and/or during excavation of PCB soils with concentrations greater than 50 ppm:

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- Disposable coveralls worn over standard outer garments. Personnel will frequently verify the integrity of their coveralls by checking for holes or tears.
- Durable leather steel-toed work boots
- Disposable nitrile gloves. Personnel will frequently verify the integrity of their gloves by checking for holes or tears.
- Rubber boots worn over work boots
- Eye protection
- Hard hat
- Hearing protection

Respirator use is not anticipated for use on this project. If respiratory protection becomes necessary, a determination shall be made regarding each person's physical ability to wear a respirator. Consequently, persons required to wear respirators must provide the Contractor's HSO with current documentation (not older than 6 months) regarding their physical condition and ability to wear a respirator, as certified by a qualified physician. Failure to provide current, complete respirator certification documentation will be sufficient grounds to preclude personnel from conducting work activities where respiratory protection is required.

6.0 PERSONNEL TRAINING

6.1 REQUIREMENTS AND RESPONSIBILITIES

All on-site personnel and visitors will be trained commensurate with their job responsibilities and in accordance with Occupational Safety and Health Administration (OSHA) training and medical surveillance requirements as specified in 29 CFR 1910.120. The Contractor is responsible for providing such training prior to personnel being allowed to engage in activities that could expose them to health and safety hazards. The HSO has the responsibility to assure that this training is provided for the site-conditions and such training is updated, as needed. The HSO and Contractor's on-site Supervisor will be trained in basic first aid, and at least one of these individuals will be present during each work shift while personnel are at the Site.

6.2 SITE ORIENTATION MEETING

The Contractor will be responsible for notifying all on-site personnel of required attendance at a site orientation meeting, which will be organized by the Contractor's HSO. Any subcontractor personnel will also be required to attend the site orientation meeting as well as any other periodic health and safety meeting specified by the HSO. Personnel attending the site orientation meeting are to sign a Site Orientation Meeting Attendance Acknowledgment Form. The following is a listing of general site orientation training topics:

- Names and responsibilities of key personnel
- Safe work practices
- Personal protective equipment
- Chemical and physical hazards
- Site equipment Medical surveillance
- Site hazards
- Site control measures
- Decontamination procedures
- Standard operating procedures
- Emergency response plan

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6.3 DOCUMENTATION / RECORDKEEPING

OSHA regulations require medical surveillance in the form of annual medical examinations for certain types of work involving exposure to hazardous or toxic substances. All on-site personnel, visitors, and subcontractors are required to have documented proof on file of OSHA training and medical surveillance requirements as specified in 29 CFR 1910.120 to demonstrate compliance with the training requirements specified in this Section. The HSO is responsible to check all personnel to ensure training is kept current during the project.

7.0 MEDICAL CLEARANCE

Medical clearance refers to OSHA requirements for annual physical reports performed by a licensed physician, which document a worker's physical ability to perform specific job duties. Medical clearance is not required for on-site personnel or visitors at the Site, except for OSHA medical surveillance requirements for workers within the Exclusion Zone or Contamination Reduction Zone.

8.0 STANDARD OPERATING PROCEDURES

Potential chemical and physical hazards exist at the Site. This Section presents Standard Operating Procedures (SOPs) that will be followed during the project. Specific precautions to avoid the potential hazards for each task are presented herein.

8.1 GENERAL SOPS

Workers shall adhere to the established SOP for their respective specialties. Work at the Site will be conducted according to established procedures and guidelines for the safety and health of all involved. General SOPs at the Site include the following:

- All questions should be referred to the Contractor's HSO or Project Manager.
- All on-site personnel will be trained and briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- Inspections of the Site will be conducted to ensure compliance with the HASP, and if any change in operation occurs, the HASP will be modified to reflect any change.
- Be observant of not only one's own immediate surrounding but also that of others.
- On-site personnel in the work zone will act as safety backup to each other, and on-site personnel outside the work zone will provide emergency assistance when necessary.
- Use extra precautions when working near heavy equipment.
- Communications using hand signals or other means will be maintained between on-site personnel, the HSO, and the Project Manager at all times.
- Breaks should be planned to prevent heat, cold, stresses, accidents, and fatigue.
- Work areas for various operational activities will be established.
- Strict pedestrian and vehicular traffic control will be maintained on-site.
- Entrance / exit locations and emergency escape routes will be designated and delineated.
- On-site personnel and equipment in each Work Area will be minimized to maintain effective Site operations.
- Required PPE ensembles must be worn by all on-site personnel entering work areas designated for wearing PPE. At minimum, hard hat, safety glasses, steel-toe boots, durable leather gloves, and hearing protection will be worn on the project Site.
- Work Areas and decontamination procedures will be established based on expected Site conditions.

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- Plan work procedures and decontamination areas to minimize contamination exposure.
- Contaminated equipment shall not be placed on unprotected surfaces.
- Procedures for leaving a Work Area will be planned prior to entering the Site.
- All electrical equipment (power tools, extension cords, instruments, etc.) will conform to 29 CFR 1926.400 Subpart K.
- Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be in accordance with OSHA 29 CFR 1926.150 Subpart F.

Violation of these SOPs will result in immediate dismissal from the Site.

8.2 SITE CONTROL MEASURES

Site control measures will minimize potential contamination of on-site personnel, protect the public from potential on-site hazards, and prevent vandalism of equipment and materials. Site control measures also enhance response in emergency situation. For this project, the primary site control measure will be a temporary fence or other barrier installed along the Site boundary for the duration of the project.

Areas where intrusive work will occur will be routinely divided into three distinct areas: an Exclusion Zone, a Contamination Reduction Zone (CRZ), and a Support Zone (see Figure 1).

Exclusion Zone

The Exclusion Zone will be designated as the area where the highest potential for exposure by dermal or inhalation routes exists. The Exclusion Zone coincides with areas being excavated. PPE is required and a daily log will be kept of all personnel entering this zone.

The Exclusion Zone for work areas will be demarcated with barrier tape.

Approval for entry into the Exclusion Zone will require compliance with OSHA training and medical surveillance requirements (29 CFR 1910.120). Subcontractor and vendor equipment will not be permitted to enter the Exclusion Zone without prior authorization and will be subject to Site decontamination procedures. All personnel and equipment shall be decontaminated when leaving the Exclusion Zone. No eating, drinking, or smoking will be permitted in the Exclusion Zone.

Contamination Reduction Zone (CRZ)

The Contractor will establish the CRZ in an area between the Exclusion Zone and Support Zone. Approval for entry into the CRZ will require compliance with OSHA training and medical surveillance requirements (29 CFR 1910.120). Access to the Exclusion Zone will be through the CRZ. The CRZ will be designated as the area immediately adjacent to and surrounding the Exclusion Zone. The probability of dermal and inhalation exposure is lower in the CRZ than in the Exclusion Zone. The CRZ includes facilities for personnel and equipment decontamination. PPE worn in the Exclusion Zone may not be worn outside the CRZ, except during emergencies. No eating, drinking, or smoking will be permitted in the CRZ.

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Support Zone

The Support Zone includes all areas outside the CRZ and Loading Zone. The exposure potential in the Support Zone is minimal. The Support Zone provides a changing area for personnel entering the CRZ and Exclusion Zone, as well as an area for the storage of clean equipment and materials. Protective clothing worn in the Exclusion Zone will not be allowed to be worn in the Support Zone, except in emergencies. It is the responsibility of the Project Manager to control access to the Site and to assure proper security. Any evidence of unauthorized entry will be noted in the daily log.

Under no circumstances will the general public be permitted to access the work area. All preapproved visitors will be briefed on the HASP, and shall sign the Daily Site Sign-In / Sign-Out Log. Pre-approved visitors will be permitted in the immediate area of active operations only with approval from the Contractor's HSO or Project Manager. All personal vehicles are restricted to the Support Zone.

8.3 COMMUNICATION PROCEDURES

Personnel in the Exclusion Zone will remain within sight of other project personnel. The commonly used international hand and arm signals are listed below, and will be used when necessary:

Signal	Meaning
Right hand thumbs up	OK, I'm All Right
Right hand thumbs down	No, Negative
Rotating both hands at sides	Situation Under Control
Rotating both hands above head	Need Assistance
Hand gripping throat	Out of Air, Cannot Breathe
Both hands placed on hips	Leave Area Immediately
Rotating both hands at knees	Situation Grave, Evacuate Immediately
Both hands placed on top of head	Returning to Support Zone

8.4 DECONTAMINATION PROCEDURES

On-site personnel performing remediation tasks under the Modified Level D PPE ensemble will perform decontamination operations in accordance with the following steps:

- Remove re-usable boot covers, or discard disposable boot covers.
- Remove coveralls first (if applicable), then remove nitrile gloves and place in the disposal container staged in the CRZ. All disposable PPE (gloves, coveralls), rags, cloths, etc. will be containerized separately from general refuse, and disposed of in accordance with the applicable regulations.
- Remove and discard inner gloves.
- Proceed to the Support Zone bringing decontaminated tools and sampling containers.
- Wash hands, face, and other exposed skin with soap and water. Shower and shampoo as soon as possible at the end of the work day, before any social activities.

- Place non-disposable coveralls in plastic bags prior to leaving the Site and prior to entering any vehicle.
- Launder non-disposable clothing worn in Exclusion Zone prior to reuse, separately from other laundry items. Impermeable items such as vinyl boots do not need to be laundered prior to reuse; however, they should either be kept in the CRZ or placed in a sealed container prior to leaving the CRZ.

8.5 PERIODIC HEALTH AND SAFETY MEETINGS

The HSO will conduct weekly health and safety meetings. These meetings will be a review of existing protocols as well as a means to update personnel on new Site conditions. The meetings will also provide an opportunity for on-site personnel to discuss health and safety concerns. Topics for discussion may include, but are not limited to, the following:

- Review of the type and frequency of environmental and personal monitoring
- Task-specific levels of protection and anticipated potential for upgrading
- Review of existing and new health and safety issues
- Review of emergency procedures

9.0 ACCIDENT AND EMERGENCY RESPONSE PLAN

This Section includes procedures and methods of evaluating and addressing medical, fire, and other emergency situations which may occur at the Site. In any unknown situation, always assume the worst conditions and plan responses accordingly. All emergency situations require concise and timely actions conducted in a manner that minimizes the health and safety risks to on-site personnel and to the public. All on-site personnel shall be familiar with the Emergency Response Plan.

9.1 RESPONSIBILITIES

The Contractor's HSO and President have the shared responsibility for directing response activities in the event of an emergency or accident, and will be responsible for the following:

- Assess the situation
- Determine required response measures
- Notify appropriate response teams
- Direct on-site personnel during the emergency

The Contractor's HSO or President will coordinate the response activities of on-site personnel with those of public agencies. A list of agencies to be contacted and who may, depending on the nature of the situation, assume authority for emergency response is presented in Section 9.6. This table includes names and telephone numbers of local hospitals, ambulance service, fire and police departments, and other applicable agencies. The HSO will notify emergency response agencies and establish emergency procedures prior to commencing remedial activities at the Site.

9.2 EMERGENCY PROCEDURES

Due to the nature of the tasks to be conducted at the Site, the emergency situations that may occur are most likely limited to personnel accidents (i.e., slip, trip, and fall accidents; equipment related accidents, etc.) requiring first aid. The following procedures shall be followed in the event of an emergency:

- On-site personnel shall report all accidents and unusual events to the HSO.
- The HSO will assess the situation. If off-site assistance and medical treatment is required, the HSO will designate a person to call the proper authorities.
- First-aid or other applicable treatment will be provided by properly trained individuals.

The HSO will inform the Owner of the injury/accident, and an Accident Report Form detailing the causes and consequences of the injury/accident will be submitted to the Project Manager within 48 hours of the incident. The Accident Report Form shall include:

- Names and social security numbers of accident victims and witnesses
- Date and time of accident
- Location, cause, and duration of accident
- A description of corrective actions implemented
- Off-site persons and agencies notified and time of arrival at the Site.

Personnel shall make all reasonable attempts to conduct themselves in a calm manner in the event of an accident.

9.3 ACCIDENT AND INJURIES

Every accident is a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at unnecessary risk. Several types of emergencies are outlined in the following subsections. These are not intended to cover all emergency situations.

If a person working on the Site is physically injured, basic first-aid procedures will be followed. Depending on the severity of the injury, outside medical assistance may be sought. If the person can be moved, the person will be taken outside of the Work Area, PPE will be removed, and first aid administered. If necessary, transportation to a medical facility will be provided. If the person can only be moved by emergency medical personnel, the HSO will decide what type of PPE (if any) will be required to be worn by emergency personnel.

If the injury to on-site personnel involves chemical exposure, the following first aid procedures will be initiated as soon as possible:

Eye Exposure - If solid or liquid gets into the eyes, wash eyes immediately at the emergency eyewash station using water and lifting the lower and upper lids occasionally. This emergency eyewash station shall be a portable station provided by the Contractor and set up within the CRZ. If an acute exposure is identified, then obtain medical attention immediately. Otherwise, consultation with a doctor shall be discretionary based on the severity of the incident.

Skin Exposure - If solid or liquid gets on the skin causing irritation or pain, wash skin immediately at the emergency eyewash station using water. If an acute exposure is identified, then obtain medical attention immediately. Otherwise, consultation with a doctor shall be discretionary based on the severity of the incident.

Inhalation – In the rare event that a person inhales large amounts of organic vapor or dust, and is overcome, move the person to fresh air at once. Obtain medical attention immediately. If breathing has stopped, appropriately trained personnel and/or medical personnel should perform cardiopulmonary resuscitation. Keep the affected person warm and at rest.

Ingestion - If solid or liquid is swallowed, medical attention must be obtained immediately and the Poison Control Center consulted.

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9.4 FIRE

On-site personnel will be knowledgeable in fire-extinguishing techniques. They will be instructed in proper use and maintenance of the fire extinguishers supplied at the work areas. Fire extinguishers should be used only for small fires which are in the early stages of development. Where the fire cannot be controlled through extinguisher use, the area should be evacuated immediately, and the local fire department should be called to extinguish the fire. Fire extinguishers shall be provided by the Contractor.

9.5 EMERGENCY EVACUATION

In extraordinary circumstances, emergency evacuation of the Site may be necessary. On-site personnel will be notified of the need to evacuate verbally or by signaling with an air horn. If the situation is deemed an emergency, personnel will be instructed to leave the Site immediately, using the closest available evacuation route; otherwise, personnel will be expected to go through normal decontamination procedures before leaving the Site.

In either case, personnel will be instructed to meet at a central location to be determined by the HSO prior to the start of Work. A head count will be made to ensure that all personnel are safe and accounted for.

The HSO will contact appropriate response agencies, as warranted. Motorized equipment / machinery will be shut off before the Site is evacuated.

(continued on next page)

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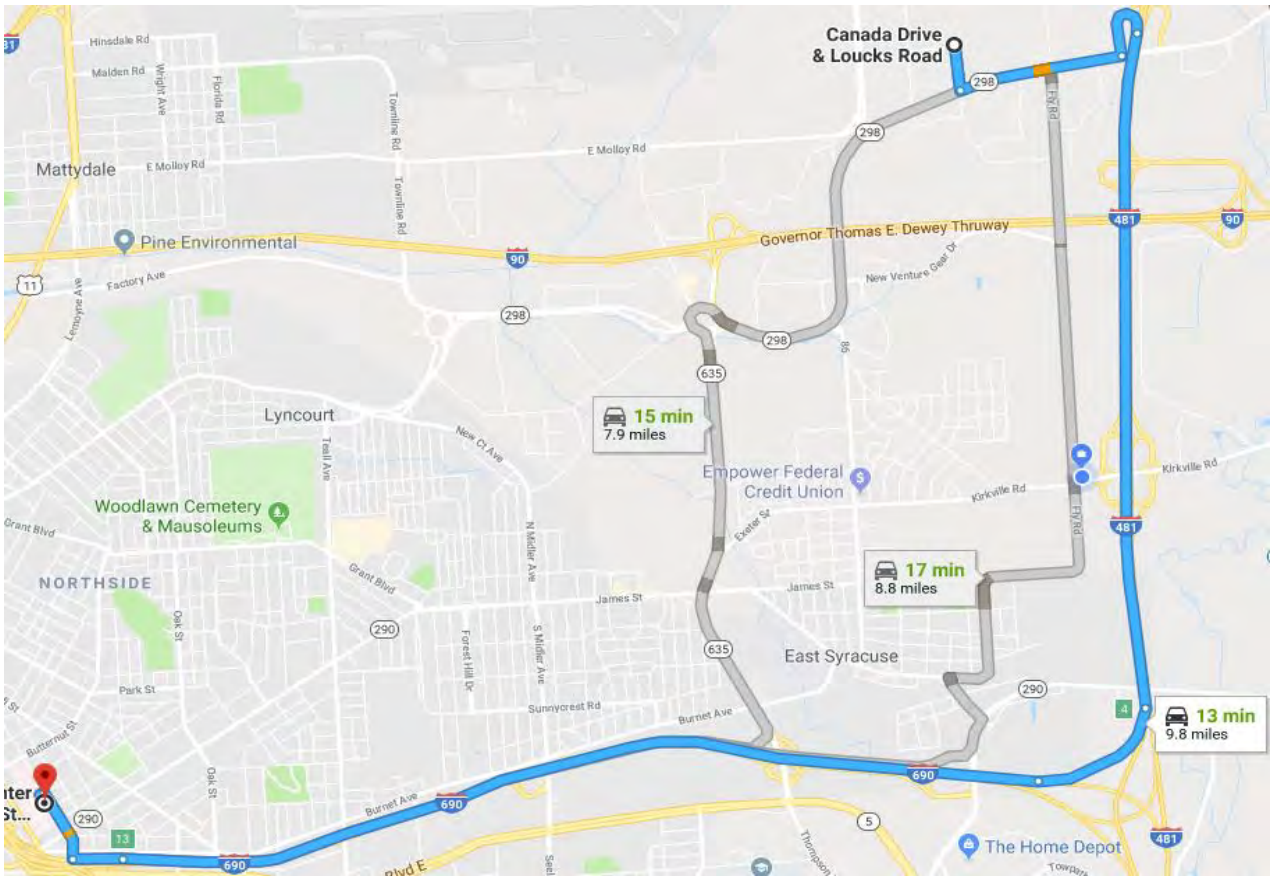
9.6 EMERGENCY RESPONSE AND AREA HOSPITALS

In case of emergency, call 911 or the appropriate individual authority:

EMERGENCY CONTACT NUMBERS	
Nearest Hospital	St. Joseph's Hospital 301 Prospect Avenue Syracuse, New York 13203
Emergency Response Number	911
Poison Control Center	(800) 222-1222
State Police (North Syracuse)	(315) 455 2826

Directions to Nearest Hospital (Distance ~ 9.8 miles, Time ~ 13 minutes)

1. Travel south on Loucks Road Extension
2. Left onto State Route 298
3. Left onto I-481 South on-ramp
4. Take Exit 4 (I-690 West)
5. Take Exit 13 (Townsend Street)
6. Right onto North Townsend Street
7. In 500 stay left on North Townsend Street
8. In 0.3 miles continue straight on North Townsend Street. DO NOT TURN LEFT ON UNION STREET TO MAIN HOSPITAL FACILITY.
9. In 0.1 miles, St. Joseph's Hospital Emergency Room will be on left



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APPENDIX D

COMMUNITY AIR MONITORING PLAN

COMMUNITY AIR MONITORING PLAN

Remedial Investigation Work Plan
Loucks Road Extension Site
Town of Dewitt, New York

April 2018

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FIGURES

1.0 INTRODUCTION

A Community Air Monitoring Plan (CAMP) requires real-time observation / monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites.

The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and / or work shutdown.

Continuous monitoring will be required for all ground intrusive activities, including but not limited to, soil excavation and handling, trenching, and the installation of monitoring wells.

2.0 GENERAL SITE CONDITIONS

The prevailing wind generally blows from west to east. However, monitoring locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. The attached Figure 1 illustrates the likely locations of monitoring stations associated with various work areas.

At this time, PCBs pose the only known health threat at the Site. In certain areas, PCB concentrations are above the threshold for hazardous (TSCA) waste (50 mg/kg or ppm). One sample was observed to contain PCBs in excess of 4,000 ppm. Due to PCBs' low volatility, any airborne exposures to PCBs are likely to be associated with their transport on dust particles (i.e. – not due to off-gassing). Therefore, monitoring of particulates will serve as an indirect method of monitoring for potential airborne concentrations of PCBs.

As the investigation progresses and additional data is collected for other classes of chemicals (SVOCs, metals, etc.), this CAMP will be updated to reflect this information.

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e. – exclusion zone) on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring of VOCs will be performed using a photo-ionization detector (PID), which will be calibrated daily. The PID will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and

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monitoring continued. After these steps, work activities will resume provided that the total organic vapor level half the distance to the nearest potential receptor or residential / commercial structure (but not less than 20 feet), is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

All 15-minute readings will be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

4.0 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area or exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using a DUSTTRAK™ Aerosol Monitor Model 8520 (or similar). The device will be capable of measuring particulate matter less than 10 micrometers in size (PM-10), integrating over a period of 15 minutes for comparison to the airborne particulate action level, and equipped with an audible alarm to indicate exceedance of the following action levels:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level, and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and an evaluation of activities will be initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

In addition, fugitive dust migration will be visually assessed during all work activities.

All readings will be recorded and be available for NYSDEC and NYSDOH review.

5.0 MONITORING DURING NON-INTRUSIVE ACTIVITIES

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

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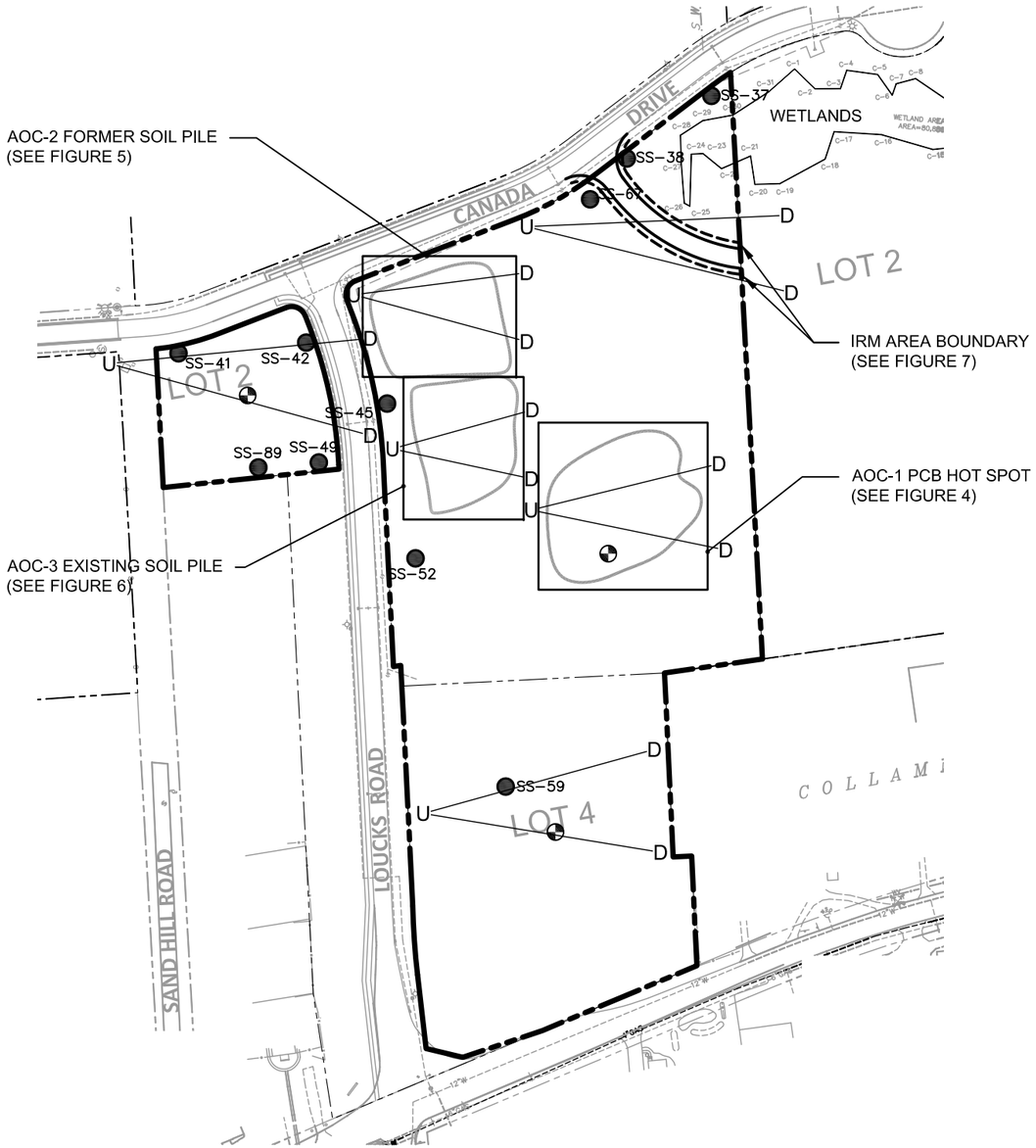


LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- APPROXIMATE WORK AREA BOUNDARY
- PROPOSED INDIVIDUAL BORING LOCATION
- PROPOSED GROUNDWATER WELL LOCATION
- U — EXAMPLE UPWIND MONITORING LOCATION
- D — EXAMPLE DOWNWIND MONITORING LOCATION

NOTES:

1. BASE MAP MODIFIED FROM ELECTRONIC DRAWING FILES PROVIDED BY CLIENT.
2. FOR ILLUSTRATIVE PURPOSES ONLY. MONITORING LOCATIONS WILL BE ADJUSTED BASED ON WORK LOCATIONS AND ATMOSPHERIC CONDITIONS.

0 200' 400'

GRAPHIC SCALE

AECC
ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
DRAWN:	MAY 2018
DRAWN BY:	HS
CHECKED BY:	RM
FILE NAME:	

EXAMPLE AIR MONITORING LOCATIONS

LOUCKS ROAD EXTENSION
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

FIGURE
CAMP 1

APPENDIX E

COMMUNITY PARTICIPATION PLAN

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Loucks Road Extension Site

August 2017

REVISION #	DATE	SUMMARY OF REVISION
01	February 2019	Update project contacts and site contact list

BCP Site # C734145
Loucks Road Extension
Town of Dewitt
Onondaga County, New York

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Woodbine Business Park, Inc. ("Applicant")**
Site Name: **Loucks Road Extension ("Site")**
Site Address: **Loucks Road Extension / Canada Drive**
Site County: **Onondaga County**
Site Number: **C734145**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that

provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

Citizen Participation Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

The significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at:
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

The primary stakeholders related to the major issues of public concern will be the occupants of adjacent properties.

As detailed in Section 4 – Site Information, the contaminant of concern is PCBs, which are a suspected carcinogen. The use of PCBs was banned in the 1970s. Although other chemicals such as petroleum, heavy metals, and pesticides are not anticipated, they will be tested for in Site soils and groundwater during the upcoming investigation.

The PCBs in Site soils are not expected to have migrated from the Site to adjacent properties. A previous investigation revealed that the PCBs appear to be limited to surface soils, and therefore they are not anticipated to be found in groundwater. Furthermore, the Site and surrounding properties are served by a municipal potable water supply.

Public access (hiking, hunting, etc.) is not allowed on the property, and thick vegetative cover discourages trespassing. A "nature trail" that was constructed from the Canada Drive cul-de-sac to Ryder Park (to the north) is not within the Brownfield Area. Eight surface soil samples were collected in the area north of the cul-de-sac (not within the Brownfield Area) during the previous investigation. Laboratory analysis revealed that only one of the eight samples contained a detectable concentration of PCBs, and that concentration was less than one-tenth of the applicable State standard for PCBs in soils.

The main portion of the Site will be remediated to Restricted Industrial standards, and the lot at the corner of Loucks Road Extension and Collamer Road (NYS Route 298) will be remediated to Restricted Commercial standards, consistent with the Site's zoning. These restricted standards mean that high-level contamination will be removed from the Site, but low-level contamination will left in place and covered with asphalt or clean soil to prevent the potential for future exposure. This assumes that the investigation verifies that contamination is not migrating from the Site to surrounding properties.

All Site work will be performed by professionals experienced in the investigation and remediation of PCBs. A site-specific Health & Safety Plan will cover work performed at the Site, and a Community Air Monitoring Program will be developed and approved by the NYSDEC and New York State Department of Health. Investigation and remedial activities will be performed during normal business hours. Although dump trailers will be used to haul contaminated soils from the Site, a noticeable increase in traffic is not anticipated. Excavations will likely be shallow and secured to reduce the risk of falls and potential exposures.

The contamination occurred prior to the current Owner taking title to the Site, and the source of the PCB contamination is not known. The community could help supplement knowledge about past practices at the Site that could have resulted in the contamination, such as on-site servicing/repair of agricultural equipment, dumping (illegal or otherwise), or placement of potentially-contaminated fill at the Site.

4. Site Information

Appendix C contains a map identifying the location of the Site.

Site Description

The 12.47-acre Brownfield Area is located at the intersection of Canada Drive and Loucks Road Extension in the Town of Dewitt, in Onondaga County, New York.

The Site is situated in a semi-rural mixed-use area. Surrounding properties consist of undeveloped land (former Waite Dairy farm), warehousing facilities, retail stores, a cemetery, and residential properties.

History of Site Use, Investigation, and Cleanup

The Site has a history of agricultural use (field crops, dairy, and milk plant) until the 1980s. Some sand quarrying in the southern portion of the Site also occurred.

Beginning in April 2008, the Site was cleared and graded, and limited improvements (roadways, storm sewers) were constructed. The Site is mostly covered by weeds, shrubs, and a few trees and wooded areas.

The Site is zoned Industrial, except for the portion bordering the intersection of Loucks Road Extension and Collamer Road (NYS Route 298), which is zoned Business Transitional.

In March 2013, the Owner was notified by a third-party that soils sampled and analyzed at the Site might contain PCBs. Subsequent sampling and analysis by the Owner's consultant confirmed the presence of PCBs. NYSDEC was notified and Spill # 14-00433 was assigned to the Site.

In order to determine the nature and extent of the PCB contamination, the Owner performed additional sampling of surface soils and existing soil piles. More than 100 surface soil samples have been collected within the Brownfield Area and adjacent areas. The results of the investigation reveal widespread PCB contamination across the Site, but generally decreasing radially from a "hot spot" located near the center of the Site.

In addition, a limited number of soil samples at depths up to 2.5 feet below the surface were collected. Generally, the PCB concentrations decrease with increasing depth, which supports the assumption that the PCB contamination is primarily in surface soils. The contamination occurred prior to the current Owner taking title to the Site, and the source of the PCB contamination is not known. Before they were banned in the 1970s, PCBs were typically found in oils and lubricating fluids. A couple theories are that the farmer serviced tractors and other equipment and dumped used PCB-contaminated oils on the ground (which was not uncommon at the time), or that the farmer unknowingly brought in contaminated fill originating from an off-site location.

PCBs are a suspected carcinogen. The anticipated risk to the public from the PCBs at this site is low, since the Site is not located in a well-traveled area and is not developed, and the dense vegetation deters trespassers and prevents erosion from water and wind. Contamination of groundwater is not expected since the contamination appears to be limited to surface soils, and the fact the PCBs do not readily dissolve in groundwater.

5. Investigation and Cleanup Process

Application

The Applicant, Woodbine Business Park, Inc., has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer as defined in New York State Environmental Conservation Law, section 27-1405(1)(b). This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants, and that the Applicant has exercised appropriate care by taking reasonable steps to prevent any current or future discharge and to limit human, environmental, or natural resource exposure. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant has completed a partial site investigation before it entered into the BCP. For the partial investigation, NYSDEC will determine if the data are useable.

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation work plan, which is subject to public comment.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for

public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Work Plan". The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the

remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

PROJECT CONTACTS

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Michael Belveg
Project Manager
NYSDEC Region 7
Division of Environmental Remediation
615 Erie Boulevard West
Syracuse, New York 13204
(315) 426-7400

Stephanie Webb
Public Participation Specialist
NYSDEC Region 7
615 Erie Boulevard West
Syracuse, New York 13204
(315) 426-7403

New York State Department of Health (NYSDOH):

Arunesh (Runey) Ghosh
Project Manager
NYSDOH
Bureau of Environmental Exposure Investigation
Empire State Plaza, Corning Tower
Albany, New York 12237
(518) 402-7860

LOCATIONS OF REPORTS AND INFORMATION

The facilities identified below are being used to provide the public with convenient access to important project documents:

Dewitt Community Library
Shoppingtown Mall
3649 Erie Boulevard East
Attn: Brian J. Barney, Bookkeeper
Phone: (315) 446-3578
Hours:
Monday-Thursday, 10:00am-9:00pm
Friday & Saturday, 10:00am-5:00pm
Sunday, 1:00pm-5:00pm

NYSDEC Region 7
615 Erie Boulevard West
Syracuse, New York 13204
Attn: Michael Belveg
Phone: (315) 426-7400
Hours: Monday-Friday, 8:30am-4:45pm
(call for appointment)

Appendix B -
Site Contact List

ONONDAGA COUNTY

Onondaga County Government
J.Ryan McMahon II, County Executive
John H. Mulroy Civic Center, 14th Floor
421 Montgomery Street
Syracuse, New York 13202
(315) 435-3516

Onondaga County Planning Board
Daniel Cupoli, Chairperson
John H. Mulroy Civic Center, 11th Floor
421 Montgomery Street
Syracuse, New York 13202
(315) 435-2611

TOWN OF DEWITT

Town Board
Edward Michalenko
Supervisor
5400 Butternut Drive
East Syracuse, New York 13057

(315) 446-3910 ext. 5
supervisor@townofdewitt.com

Note: Although the Site has a mailing address of "East Syracuse", the Site is not within the jurisdictional boundaries of the Village of East Syracuse

PUBLIC WATER SUPPLIER

Town of Dewitt Water Department
5400 Butternut Drive
East Syracuse, New York 13057

(315) 446-3734 ext. 4
water@townofdewitt.com

LOCAL NEWS MEDIA

WSYR-TV
James Campagna, News Director
5904 Bridge Street
East Syracuse, New York 13057

(315) 446-9900
assignmentdesk@LocalSYR.com

WSTM / WSTQ / WTVH
Rae Fulkerson, News Director
1030 James Street
Syracuse, New York 13203

(315) 477-9441
news@cnycentral.com

Spectrum News
815 Erie Blvd. East
Syracuse, NY 13210

(315) 234-1000 ext. 2
yournews@charter.com

Syracuse Post Standard
Syracuse Media Group
220 South Warren Street
Syracuse, New York 13202

(315) 470-0011
citynews@syracuse.com
features@syracuse.com

Eagle News
Jason Emerson, Eagle Bulletin Editor
2501 James Street
Suite 100
Syracuse, New York 13206

(315) 434-8889 ext. 340
editor@cazenoviarepublican.com

Appendix B -
Site Contact List

ADJACENT PROPERTY OWNERS

Property Address / Use	Owner Name / Address
201 Canada Drive FedEx Distribution Facility	OCIDA c/o Transportation Invest 7005 Pinegate Road Fairview, PA 16415
145 Canada Drive Non-Auto Dealership	Resun Modspace Inc. c/o Modular Space Corp-TA 1200 Swedesford Road Berwyn, PA 19312
6876 Sandhill Road Multi-Family Apartments	Michael and Sarah Gaulin 4945 Fayetteville Manlius Road Manlius, NY 13104
6874 Sandhill Road Single Family Residence	Alan and Susan Fleming 6874 Sandhill Road East Syracuse, NY 13057
6868 Sandhill Road Single Family Residence	Mary Ellen Forkhamer 6868 Sandhill Road East Syracuse, NY 13057
6541 Collamer Road Two Family Residence	Heatway, LLC PO Box 3456 Syracuse, NY 13220
6542 Collamer Road Mini-Mart	Bhramani, LLC 6542 Collamer Road East Syracuse, NY 13057
6564 Collamer Road Single Family Residence	Harold and Lorraine Vollmer 6686 Loucks Road East Syracuse, NY 13057
6576 Collamer Road Nursery and Greenhouse	David Vollmer 6576 Collamer Road East Syracuse, NY 13057
Collamer Road Cemetery	Collamer Cemetery 6564 Collamer Road East Syracuse, NY 13057

Appendix C - Site Location Map
(see following page)

SITE LOCATION

STORMWATER BASIN

NATURE TRAIL

S.W.A.L.E.

CANADA DRIVE

EXISTING SOIL PILE

LOUCKS ROAD

SAND HILL ROAD

COLLAMER CEMETERY

COLLAMER RD. (NYS RT. 298)

LEGEND:

- BROWNFIELD AREA EXTENT
- PROPERTY LINE
- RIGHT-OF-WAY

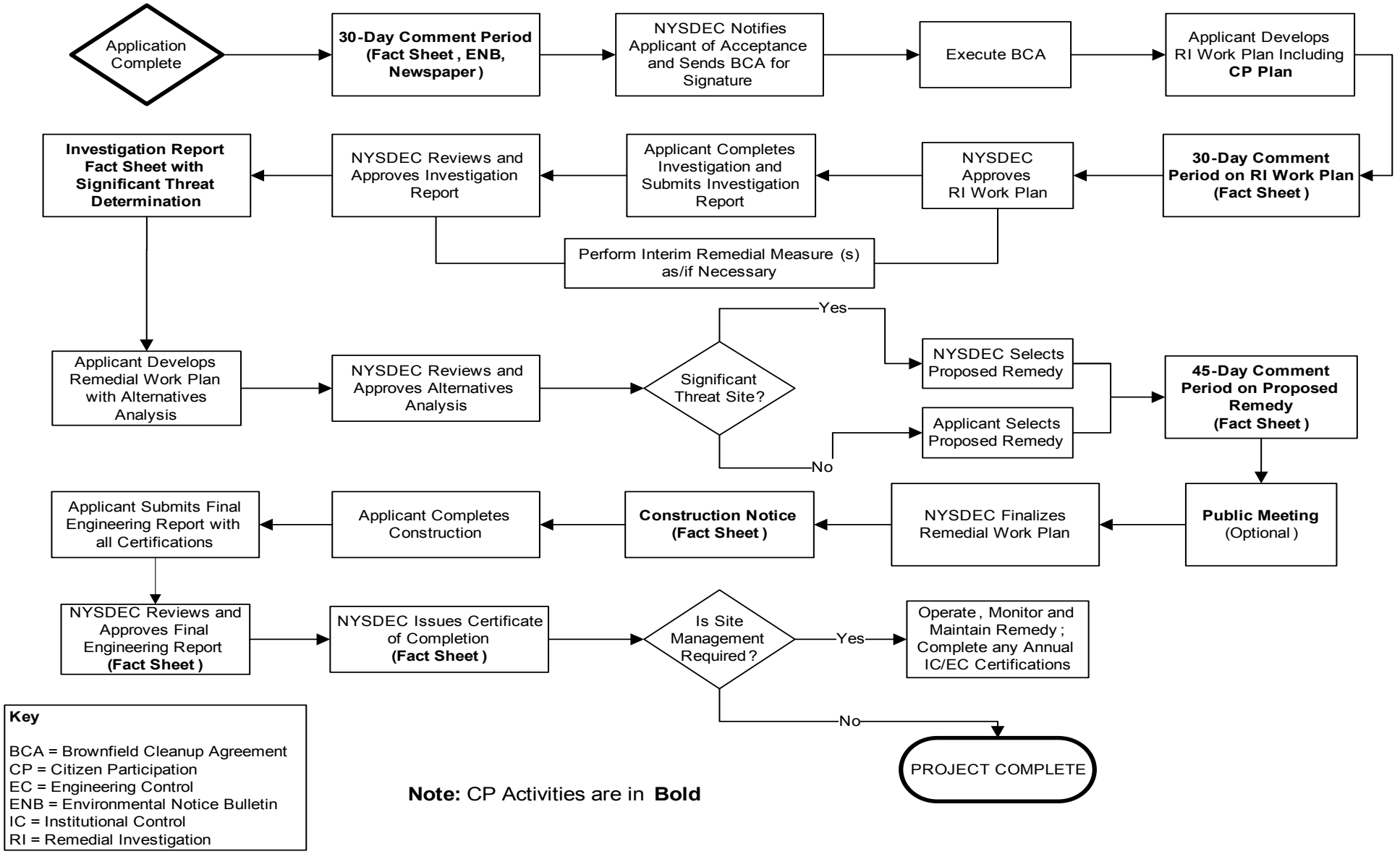
AECC ENVIRONMENTAL CONSULTING
Asbestos & Environmental Consulting Corporation
6308 Fly Road
East Syracuse, NY 13057

PROJECT NO.	17-009
DRAWN:	FEB 2017
DRAWN BY:	HS
CHECKED BY:	RM
FILE NAME:	

APPENDIX C - SITE LOCATION PLAN

LOUCKS ROAD EXTENSION BROWNFIELD AREA
CANADA DRIVE, TOWN OF DEWITT
ONONDAGA COUNTY, NEW YORK

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**