Remedial Action Work Plan
NYSDEC BCP Site #C704058

Location:

Former Stow Manufacturing
435 State Street
Binghamton, New York 13901

Prepared for:

Binghamton Northside Limited Partnership
3D Development Group, LLC
Community Potential, Inc.
4549 Main Street
Suite 100
Amherst, New York 14226

LaBella Project No. 2190179

February 8, 2019

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CERTIFICATIONS

I Daniel P. Noll certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

081996	2/8/19	
NYS Professional Engineer #	Date	Signature

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1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) presents the framework for the completion of remedial action at the Former Stow Manufacturing property located at 435 State Street, City of Binghamton, Broome County, New York. A Site Location Map is included as Figure 1. The Site was entered into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) on April 18, 2017 as Site #C704058 and the applicant, Binghamton Northside Limited Partnership (BNLP), 3D Development Group, LLC, and Community Potential, Inc., are considered a Volunteer.

This RAWP has been prepared in accordance with the NYSDEC BCP Agreement (Index No. C704058-02-17) with BNLP. This RAWP was also completed in accordance with the NYSDEC Division of Environmental Remediation (DER) BCP Guide dated May 2004 and the DER-10 (*Technical Guidance for Site Investigation and Remediation*) dated May 3, 2010.

The proposed remedial actions were identified and evaluated in the Remedial Alternatives Analysis (RAA) Report based on data obtained from the Remedial Investigation (RI) conducted at the Site. The remedial action for the Site will involve a Track 4 restricted residential cleanup. The remedial action will entail:

- **AOC #1** - Removal of Hazardous Waste Levels of Soil in the area of RI boring RISB-10.
- **AOC #2** – Removal of LNAPL from the area of RI well LBA-MW-02R.

2.0 SITE LOCATION, DESCRIPTION AND SETTING

2.1 Site Description

The BCP Site boundary is comprised of an approximate 2.88 acres as shown on Figure 2. The Site is currently undeveloped. A vacant cement block masonry commercial building (approximately 47,644 square foot (i.e., sq. ft.) of which approximately 28,580 sq. ft. of the building was located on the BCP Site) was recently demolished by others.

The anticipated future use of the Site is a mixed use commercial and residential apartment building. Whereas the first (ground) floor will consist of commercial space and residential apartments on the upper floors. A copy of the proposed Site plan is included in Appendix 1.

The Site is bordered by the following properties and detailed on Figure 3:

TABLE 2.1 - Adjacent Properties

Direction	Land Use
North	Gas Station, Commercial Properties
East	Commercial Properties
South	State Street and beyond Binghamton Plate Glass
West	North Way Street and beyond Commercial Properties

2.2 Site History

The BCP Site appears to have been historically utilized for manufacturing purposes since at least the late 1800s to at least 1971 and as a commercial retail and multi-use shopping plaza from at least the mid-1980s to at least the early 2000s. Manufacturing purposes at the Site appear to have included but may not be limited to the following: machine shops, foundry purposes, manufacture of electrical motors/shafts/wire winding, and motor driven tools. Commercial retail and shopping plaza uses appear to have included but may not be limited to the following: restaurants, a day care facility, and Big Lots.

Historical mapping indicates that from at least 1942 to approximately 1948, an apparent wastewater lagoon was located on the northeastern portion of the property. Apparent utilization of the surrounding properties over time has appeared to include but may not be limited to the following: residential, automotive service and repair, commercial retail, restaurants services, and gasoline filling station services.

2.3 Site Geology

The Allegheny Plateau is the primary geologic province for Broome County and is cross-cut by stream and deep river valleys. The area has been shaped by glaciation events that eroded and deposited material. The present Susquehanna River is underlain by the Sonyea group. The Sonyea Group that consists of black shales and mudstones and fine grain sedimentary rock. During the latter stages of glaciation, meltwaters heavily laden with silt, sand, and gravel deposited this material as stratified outwash plains above the bedrock and till. Glacial drift deposits now exceed two-hundred feet (200 feet (ft)) in thickness along the river valley axis, tapering to negligible thicknesses towards the valley walls.

Subsurface conditions typically encountered at the site consist of historic fill materials from depths of 2 to 20 ft below the ground surface (bgs) followed by outwash sand and gravel. The historic fill materials contained concrete, brick, ash, cinders, and asphalt. Depths of fill material varied throughout the Site with total depths of fill material ranging in depth from 10 to 22 ft bgs at the southeastern area of Site and total depths of fill material ranging in depths from approximately 11 to 20 ft bgs at the northeastern portion of the Site. Borings have been advanced to a maximum depth of approximately 62 ft bgs during previous geotechnical investigations without encountering bedrock.

Depth to groundwater at the BCP Site based on RI monitoring wells indicates the shallow overburden water table is between approximately 9 and 18 feet (ft) below ground surface (bgs), varying by location. Groundwater flow at the BCP Site was evaluated during the RI September 2018 groundwater sampling event and indicated groundwater flow to the southwest direction.

3.0 SUMMARY OF CONTAMINATION

The RI was designed to define the nature and extent of the contamination at the Site and based on the RI work, two (2) AOCs were identified. RI sample locations are summarized on Figure 4. The RI conducted at the site included:

- Surface soil sampling at eleven (11) locations and laboratory analysis of thirty-six (36) surface soil samples
- Subsurface investigation at twenty-five (25) boring locations and laboratory analysis of thirty (33) soil samples

- Groundwater monitoring well installation at nine (9) locations and two rounds of groundwater samples from seven (7) wells
- Soil gas point installation and sampling at five (5) locations
- Evaluating the recoverability/recharge of LNAPL in well LBA-MW-02R

The following analysis was performed during the RI:

- Thirty-six (36) surface soil samples were collected during the RI. Fifteen (15) surface soil samples were analyzed for full suite parameters (i.e. volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Metals, Pesticides, and Polychlorinated Biphenyls (PCBs), and eighteen (18) surface soil samples were analyzed for VOCs only.
- Six (6) subsurface soil samples were analyzed for full suite parameters, three (3) subsurface soil samples were analyzed for VOCs and SVOCs, sixteen (16) subsurface soil samples were analyzed for total Lead, and four (4) subsurface soil samples were analyzed for Toxicity Characteristic and Leaching Procedure (TCLP) Metals only.
- Fourteen (14) groundwater samples were collected from seven (7) wells during two groundwater sampling events. Seven (7) groundwater samples were analyzed for full suite parameters during the first groundwater sampling event and during the second groundwater sampling event seven (7) groundwater samples were analyzed for VOCs and Metals and one (1) sample analyzed for SVOCs and PCBs.
- Five (5) soil gas points were sampled and analyzed for VOCs.

3.1 Summary of Area of Concern #1 Contamination - Lead Impacted Soil

The sample collected from boring RISB-10 3'-5' that was tested for TCLP Metals detected lead at a concentration of 6.5 milligrams per liter (mg/l) that is above the Hazardous Waste Regulatory Limit of 5 mg/l. Six (6) soil borings (i.e. RISB-10S and RISB-10S-1 to RISB-10S-5) were completed to define the extent of lead impacted soil as shown on Figure 4. Soil samples were analyzed for total Lead from boring RISB-10S 3'-5' and borings RISB-10S-1 to RISB-10S-5 from depth intervals at 3'-5', 5'-7', and 7'-10'. All results detected concentrations of lead below the 6 NYCRR Part 375-6.8(b) Restricted Use Soil Cleanup Objectives (SCOs) for a Restricted Residential site, except for one sample collected from boring RISB-10S-3 from 5'-7'. Lead was detected in sample RISB-10S-3 5'-7' at 649 ug/kg, which is slightly above the Restricted Residential SCO of 450 ug/kg. As such, an estimated 10 ft square area of lead impacted soil at a depth of 2'-7' is targeted for removal and disposal in the area of boring RISB-10.

3.2 Summary of Area of Concern #2 Contamination – LNAPL

Approximately 1.5 ft of LNAPL was encountered in well LBA-MW-02R. Four borings (i.e. RISB-13, RISB-14, RISB-15, and RISB-19) were installed approximately 25 ft to the north, south, east and west from well LBA-MW-02R as shown on Figure 4. Low to moderate petroleum impacts were observed in borings RISB-14 and RISB-15, as such a well (i.e. LBA-MW-08R and LBA-MW-09R) was installed in each of these borings. LNAPL was not observed in these wells. As such, LNAPL appears limited to the area of well LBA-MW-02R.

A bail down test was conducted at well LBA-MW-02R to determine if recoverable volumes of LNAPL are present in accordance with *USEPA 510-R-96-001 Methods for Evaluating Recoverability of Free Product* (September 1996). Based on the bail down test and in accordance with the USEPA guidance document an estimated 9.2 gallons/day may be recovered. It should be noted that the thickness of LNAPL in wells usually exceeds the thickness that is present in the surrounding soil. Recovery rates based strictly on measured thickness in wells are erroneous and are often significantly greater than the volume of product that was released. Factors affecting recoverability include soil type, depth to groundwater, fluctuation in the water table, etc. In addition, only a fraction of the LNAPL is likely recoverable from the total release. As such, the above result is only intended to indicate that there is a recoverable amount of LNAPL present.

4.0 STANDARDS, CRITERIA, AND GUIDELINES

This section identifies the Standards, Criteria and Guidelines (SCGs) for the Site. The SCGs identified are used in order to quantify the extent of contamination at the Site that requires remedial work based on the cleanup goal. The SCGs to be utilized as part of the implementation of this RAWP are identified below:

Soil SCGs:

- 6 NYCRR Part 375-6.8(b) Restricted Use Soil Cleanup Objectives (SCOs) for a Restricted Residential Site
- NYSDEC Commissioner Policy (CP)-51 Soil Cleanup Guidance

Groundwater SCGs:

- NYSDEC Part 703 Groundwater Standards
- Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values

5.0 SELECTED REMEDY

Based on the RAA Report, this section presents the selected remedy for AOC #1 and AOC #2. The development of this remedy is in accordance with Brownfield Cleanup Program Guide dated May 2004 and NYSDEC DER-10 dated May 2010. The following sub-sections present the methods for implementation of the RAWP.

5.1 Summary of the Remedial Goals

The use for the Site will be classified as restricted residential. As such, at a minimum, the remedy must eliminate or mitigate all significant threats to public health and/or the environment presented by the impacts identified at the Site through the proper application of scientific and engineering principles.

The Remedial Action Objectives (RAOs) for this RAWP are to eliminate or reduce to the extent practicable:

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

5.2 Summary of Remedial Actions

The following sections summarizes remedial actions to address the remaining contamination per AOC at the Site.

5.2.1 AOC #1 Summary of Remedial Actions – Lead Impacted Soil

To address the remaining contamination in AOC #1, excavation and disposal of Lead impacted soil has been selected as the remedial approach. The remedial excavation will focus on the area described below and approximate limits of the proposed excavation is shown on Figure 5. A summary of the steps to be completed as part of the remedial work are outlined below with subsequent sections providing additional details.

1. **Area of Removal** - The estimated lateral extent of soil to be removed is approximately 100 square (sq) feet (ft) as shown on Figure 5. The vertical extent of the removal area is anticipated to extend from 2 ft below the original RI grade (*Note: approximately 2-3 ft of crusher run stone has been placed over this area as part of the development project*) to approximately 7 ft bgs. The total volume of soil to be excavated is approximately 20 cubic yards (cy). However, the exact volume will be based on the conditions observed at the time or removal and confirmation soil sample results encountered at the time of removal.
2. **Staging of Excavated Material** - Excavated materials below the 2 ft bgs from original Site grade will be segregated and placed on and covered with poly sheeting and/or placed in roll-off dumpsters and covered with poly sheeting pending waste characterization and disposal. Groundwater is not anticipated to be encountered during the work.

3. Confirmatory Soil Sampling - Confirmatory soil samples will be conducted in accordance with NYSDEC DER-10 Section 5.4(b)(5)(2). Due to the anticipated size of the excavation, two (2) composite soil sample will be collected from excavation sidewalls and one (1) composite soil sample from the bottom of the excavation and analyzed for total Lead using United States Environmental Protection Agency (USEPA) Method 6010. Sampling activities will be conducted in accordance with LaBella's Quality Control Program as detailed in Section 7.0.
4. Excavation Backfilling - Subsequent to the completion of the excavation and the results of the confirmation soil samples, the excavation will be backfilled with NYSDEC approved imported material and/or the top 2 ft soil removed from the excavation that has been sampled and tested during the RI and determined to meet 6 NYCRR Part 375-6.8(b) Restricted Use Soil Cleanup Objectives (SCOs).
5. Waste Characterization Sampling – Waste characterization sampling will be conducted in accordance with the accepting waste disposal facility.
6. Transportation of Soil to Landfill – Following the remedial excavation and approval from the accepting waste disposal facility, the impacted soil will be transported via Part 360 permitted vehicles and disposed of in accordance with applicable regulations.
7. Waste Stream Tracking – Section 8.0 identifies information and documentation that will be obtained for inclusion into the Final Engineering Report (FER).
8. Temporary Controls and Site Safety - Section 9.0 details information on measures that will be taken to protect site occupants, site workers and the general public.
9. Equipment Decontamination - Section 10.0 details the requirements for the decontamination of equipment.
10. Reporting - Section 12.2 identifies the reporting/documentation to be provided after the soil removal work.
11. Health and Safety and Community Air Monitoring - Appendix 2 provides LaBella's Health and Safety Plan (HASP) and Appendix 3 provides the NYSDOH Generic CAMP for this RAWP.

5.2.2 AOC #2 Summary of Remedial Actions – LNAPL

To address the remaining contamination in AOC #2, a remedial excavation and LNAPL removal at the area of well LBA-MW-02R has been selected as the remedial approach. The remedial excavation and LNAPL removal location is shown on Figure 5. A summary of the steps to be completed as part of the LNAPL removal work are outlined below with subsequent sections providing additional details.

1. Area of Removal - The estimated lateral extent of soil to be removed is approximately 225 sq ft at shown on Figure 5. The vertical extent of the removal area is anticipated to extend from approximately 12 to 15 ft bgs which is anticipated to be the depth of the overburden groundwater table. It is anticipated the excavation will extend about 1 to 2 ft below the top of the overburden groundwater table. The total volume of impacted soil to be excavated is approximately 25 cy. However, the exact volume will be based on the conditions observed at the time of the removal.
2. Soil Screening and Segregation Methods – Visual, olfactory and photoionization detector (PID) soil screening will be performed under the supervision of a Qualified Environmental Professional. Soil will be segregated into classes of materials in stockpiles on Site in accordance with Table 5.2.2 below. Table 5.2.2 describes the anticipated volume of segregated material of each material class and characterization sampling for potential on-Site reuse, if applicable.

3. Staging of Excavated Material - Excavated materials below 2 ft bgs from original Site grade will be segregated in accordance with Table 5.2.2 (see below) and placed on and covered with poly sheeting and/or placed in roll-off dumpsters and covered with poly sheeting pending waste characterization and disposal.
4. Confirmatory Soil Sampling - Confirmatory soil samples will be conducted in accordance with NYSDEC DER-10 Section 5.4(b)(5)(2). Due to the anticipated size of the excavation two (2) soil samples will be collected from the excavation sidewalls and one (1) soil sample will be collected from the bottom of the excavation and analyzed for NYSDEC CP-51 list SVOCs using USEPA Method 8270. Sampling activities will be conducted in accordance with LaBella's Quality Control Program as detailed in Section 7.0.
5. Excavation Dewatering and LNAPL Removal – The groundwater and LNAPL within the excavation will be dewatered into a frac tank to remove the residual LNAPL remaining in the area of well LBA-MW-02R. The excavation is anticipated to be left open and fenced off for a period of approximately 1 to 2 weeks. During this time groundwater from the excavation will be periodically removed when LNAPL or a thick petroleum sheen is observed to be present. When a light sheen remains or the evidence of petroleum in the excavation does not appear visually present for two consecutive days, the excavation will be backfilled and a recovery well will be placed within the excavation. The recovery well will be constructed in accordance with the well detail included in Appendix 4.
6. Excavation Backfilling - Subsequent to the completion of the excavation, the removal of the LNAPL, and the collection of the confirmation soil samples, the excavation will be backfilled with NYSDEC approved imported material, approved material removed from the excavation, and/or the top 2 ft soil removed from the excavation that has been sampled and tested during the RI and determined to meet 6 NYCRR Part 375-6.8(b) Restricted Use SCOs.
7. Waste Characterization Sampling – Waste characterization sampling will be conducted in accordance with the accepting waste disposal facilities.
8. Transportation of Soil to Landfill – Following the remedial excavation and the approval by the accepting waste disposal facility, the impacted soil will be transported and disposed of in accordance with applicable regulations.
9. Disposal of Groundwater – Initially, LaBella will contact the local Municipality to obtain a permit to dispose of the groundwater within the frac tank (subsequent to testing and treatment, if necessary) to the sanitary sewer. If the water in the frac tank cannot be disposed of in the sewer system, it will be transported and disposed off-site in accordance with applicable regulations.
10. Waste Stream Tracking – Section 8.0 identifies information and documentation that will be obtained for inclusion into the Final Engineering Report (FER).
11. Temporary Controls and Site Safety - Section 9.0 details information on measures that will be taken to protect site occupants, site workers and the general public.
12. Equipment Decontamination - Section 10.0 details the requirements for the decontamination of equipment.
13. Reporting - Section 12.2 identifies the reporting/documentation to be provided after the soil removal work.
14. Health and Safety and Community Air Monitoring - Appendix 2 provides LaBella's Health and Safety Plan (HASP) and Appendix 3 provides the NYSDOH Generic CAMP for this RAWP.

TABLE 5.2.2
AOC #2 Excavation Material Segregation and Reuse or Disposal Criteria

Class of Materials	Physical Description	Anticipated Volume	Characterization Sampling	Anticipated Disposal or Reuse
1	Soil or fill Material from 0 to 2 ft of original Site grade, exhibiting PID readings less than 5 ppm, and free of observable LNAPL.	16 cy	Not Applicable as previously characterized during RI.	Reuse on Site within excavation or as clean cover material.
2	Soil or fill material greater than 2 ft bgs of original Site grade, exhibiting PID readings of 5-250 ppm, and free or observable LNAPL.	80 cy	Sample per DER-10 Section 5.4 for on Site reuse. Samples will be analyzed for VOCs, SVOCs, Metals, and PCBs only.	On Site reuse as backfill greater than 2 ft bgs or placement into soil berm under 2 ft of soil that meets the SCGs pending analytical results. If results are above the SCGs, the material will be disposed off-site as non-hazardous waste.
3	Soil or fill material greater than 2 ft bgs of the original Site grade, exhibiting PID readings greater than 250 ppm, and observable LNAPL.	25 cy	Sample per disposal criteria per Section 8.0.	Off Site disposal as non-hazardous waste.

After the above remedial work is completed, LaBella will monitor the recovery well for LNAPL for a period of 3 months. It is anticipated the remedial work above will be sufficient to remove the majority or all of the LNAPL present, however, if residual LNAPL or significant sheen remains, passive methods will be used to remove the remaining LNAPL. Procedures for addressing residual LNAPL is detailed below.

1. LNAPL Removal Plan - The thickness of LNAPL will be evaluated monthly using a bailer as attempts to estimate the thickness of the LNAPL using an oil/water interface probe can sometimes be hampered or misrepresented due to the LNAPL coating/fouling the probe sensor. As such, a designated bailer will be lowered into the well and allowed to fill and then removed. The thickness of the LNAPL in the bailer and date and time of the measurement will be recorded during each monitoring event. If LNAPL or a thick sheen is present, passive removal of LNAPL will be conducted with absorbent socks (*PIG® Monitoring Well Skimming Sock*, or similar). The *PIG® Monitoring Well Skimming Sock* (or similar) is about 3 in. in diameter by 24 in. long and is capable of absorbing approximately 0.21 gallons of the LNAPL. Refer to Appendix 5 for product information. The absorbent sock(s) will be removed approximately two (2) weeks prior to the next scheduled monitoring event (i.e. monthly) and visual observations will be recorded. If measureable LNAPL is still present in the well, a new absorbent sock will be placed in the well. Absorbent socks will be replaced monthly until measureable amounts if LNAPL or a thick petroleum sheen have been removed. If absorbent socks do not appear to be effective, other methods may be used to remove LNAPL such as pumping and bailing.
2. Storage of LNAPL Containing Absorbent Socks – Absorbent socks will be placed in a 55-gallon drums pending waste characterization and disposal.
3. Waste Characterization Sampling – Waste characterization sampling will be conducted in accordance with the accepting waste disposal facility.
4. Transportation and Disposal of LNAPL – The used absorbent socks will be transported and disposed of in accordance with applicable regulations.
5. Waste Stream Tracking – Section 8.0 identifies information and documentation that will be obtained for inclusion into the Final Engineering Report (FER).
6. Temporary Controls and Site Safety – Section 9.0 details information on measures that will be taken to protect site occupants, site workers and the general public.

7. Reporting - Section 12.2 identifies the reporting/documentation to be provided after the soil removal work.
8. Health and Safety and Community Air Monitoring - Appendix 2 provides LaBella's Health and Safety Plan (HASP). Community air monitoring is not anticipated to be required during monitoring for residual LNAPL monitoring.

6.0 HEALTH AND SAFETY AND COMMUNITY AIR MONITORING PLAN

A site-specific Health and Safety Plan (HASP) has been prepared for the field work described in this Work Plan. This HASP is included in Appendix 2. All LaBella personnel will be required to follow the procedures in the HASP. Subcontractors, will have access to a copy of the HASP, however, they are responsible to provide their own safety procedures and monitoring for their own personnel.

The NYSDOH Generic Community Air Monitoring Plan (CAMP) and Fugitive Dust and Particulate Monitoring will be utilized for this RAWP and is included as Appendix 3. The CAMP describes required VOC vapor and/or particulate monitoring that will be conducted during intrusive Site investigation activities. The intent of this CAMP is to provide for a measure of protection of the downwind communities from potential airborne releases of constituents of concern during applicable remedial activities.

7.0 QUALITY CONTROL PLAN

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 6. Sampling will include the collection of a sample duplicate and a matrix spike/matrix spike duplicate (MS/MSD) as part of the quality assurance/quality control plan. In addition, a NYSDEC Analytical Services Protocol (ASP) Category B data deliverable will be generated by the laboratory and a data usability summary report (DUSR) will be developed. The DUSRs will include the laboratory data summary pages showing corrections made by the data validator and each page will be initialed by the data validator. The laboratory data summary pages will be included even if no changes were made.

8.0 WASTE STREAM TRACKING AND VERIFICATION

The following documentation will be kept in relation to waste streams:

- Correspondence from the facility accepting the waste stream
- Waste profiles
- Waste characterization sampling and analytical results
- Manifests
- Bills of lading
- Weight tickets

The tracking information will be provided in the Final Engineering Report (FER) (See Section 12.2 for details).

9.0 TEMPORARY CONTROLS AND SITE SAFETY

Water mist and other suitable methods to limit the spread of dust, dirt and vapors/odors shall be used as deemed necessary by the guidelines provided in the CAMP (Appendix 3). The methods to control fugitive dust, dirt, and vapors/ odors may include one or more of the following:

- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Reducing excavation sizes.
- Immediately placing any investigation-derived waste in drums and/or covering with plastic sheeting.
- Temporarily covering the excavation with poly sheeting overnight, if needed, based upon the readings obtained from the CAMP.
- Covering portions of the excavation not actively being worked with poly sheeting to further suppress particulate and vapor migration.
- Using vapor suppression products such as 'BioSolve,' if necessary, as a vapor mitigation agent.
- Providing and maintaining all equipment needed to control dust, vapors, and odors prior to starting the excavation.

The RAWP will consist of safely containing the project work area, maintaining traffic and access to the Site as needed to ensure public safety.

In order to protect pedestrians as well as Site workers from the hazards associated with completing the excavation work, appropriate precautionary measures will be taken to provide adequate safety measures. These safety measures will include (note: some of these measures may not be necessary for smaller excavations):

- Placing orange plastic construction/snow fencing or temporary chain link fencing around the work area to establish an exclusion zone.
- Establishing a contaminant reduction zone for personal decontamination (removal of personal protective equipment) and decontamination pad for equipment.
- Placing orange plastic construction/snow fencing around any excavation required to be left open overnight.
- Donning high visibility vests, hard hats, and safety glasses on-site during IRM activities.
- Adhering to the Site-specific Health & Safety Plan included in Appendix 2 of this RAWP.

10.0 DECONTAMINATION OF EQUIPMENT

The equipment for the excavation area is anticipated to contact only the impacted material with the excavator bucket. As such, the bucket will be decontaminated over the excavation (with brushes, shovels, and/or a power washer) and a decontamination pad is not anticipated to be necessary. However, in the event that a decontamination pad is required, the decontamination pad will be constructed in the work zone. The decontamination pad will consist of:

- Two layers of a minimum of 6-mil polyethylene sheeting at a minimum of ten feet in length by ten feet wide.
- A pressure washer available to rinse off equipment with a potable water source provided by the Applicant.
- Brooms, brushes, etc.

To prevent cross-contamination to surrounding areas, vehicles (excavators, drill rigs, etc.) and equipment that contact contaminated material will be decontaminated prior to leaving the exclusion zone (this includes when moving from one excavation area to another). Water will be containerized from the decontamination pad will be containerized in drums or a poly tank and disposed of in accordance with applicable regulations. Section 8.0 identifies information and documentation regarding waste stream tracking that will be obtained for inclusion into the Final Engineering Report (FER).

11.0 ENGINEERING CONTROLS

EC are not anticipated to be required for the Site remedy.

12.0 SCHEDULE AND REPORTING (DELIVERABLES)

12.1 Schedule

An anticipated Site remedy and including the Final Engineering Report (FER) schedule is provided in Table 12.1 (attached), and is based on the date the final RAWP is approved by the NYSDEC.

12.2 Reporting

Final Engineering Report
The information and laboratory analytical data obtained during the remedy will be included in the FER. The FER will be completed in accordance with DER-10.

Site Management Plan/Institutional Controls
The remedy for the Site assumes that a SMP will be utilized for long-term management of the residual impacts at the Site.

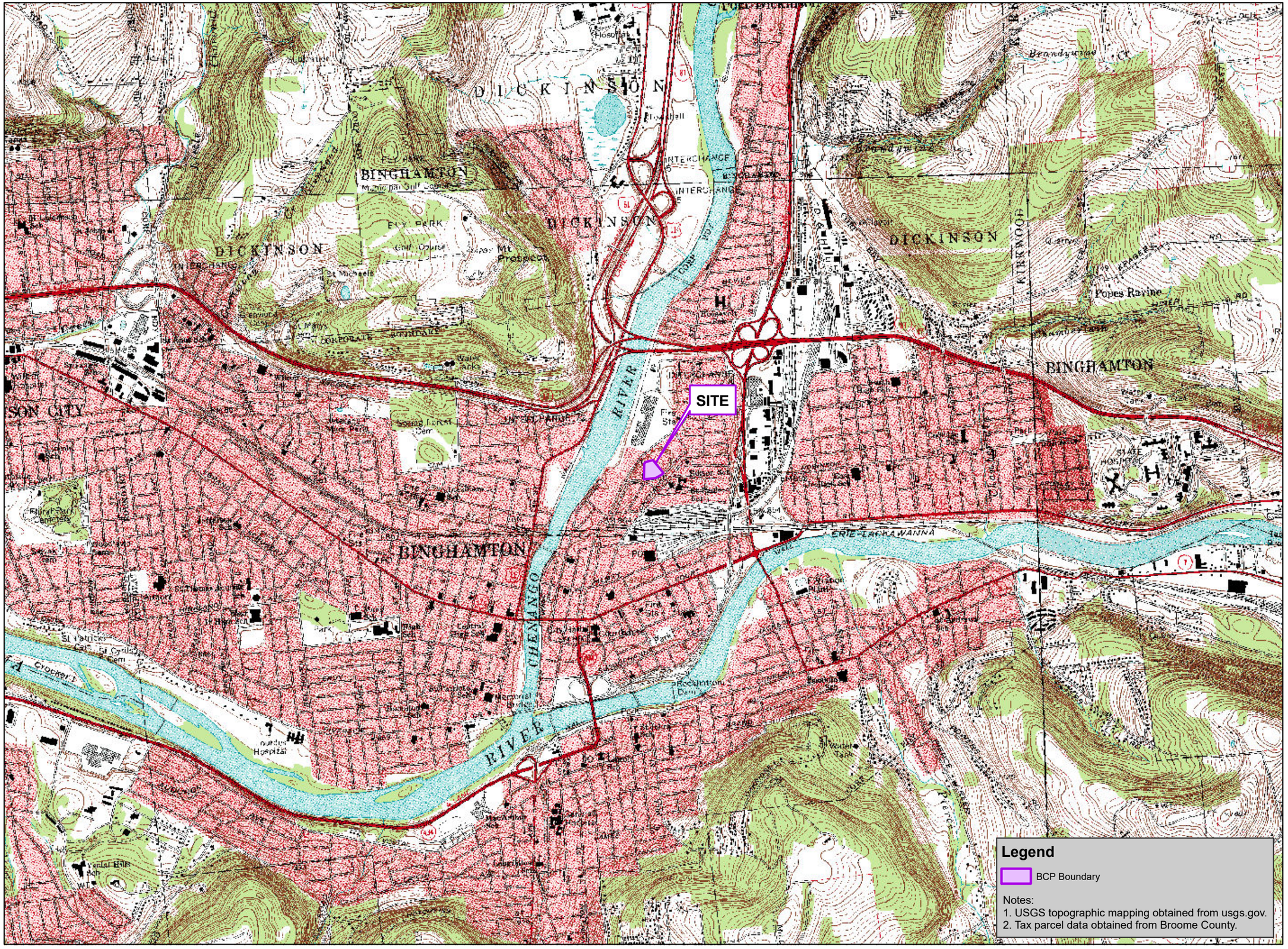
TABLES

TABLE 12.1

Anticipated Schedule

Task	Month								
	1	2	3	4	5	6	7	8	9
AOC #1 - Lead Impacted Soil									
Mobilize Equipment	X								
Excavation and Staging of Lead Confirmation Soil	X								
Confirmation Soil Sampling	X								
Receipt of Confirmation Results	X								
Backfilling of Excavation		X							
Transpiration and Disposal of Lead Impacted Soil		X							
AOC #2 - LNAPL Removal									
Mobilize Equipment	X								
Excavation and LNAPL Removal	X								
Receipt of Confirmation Results	X								
Backfilling of Excavation and Installation of Recovery Well		X							
Transpiration and Disposal of Impacted Soil		X							
Passive LNAPL Extraction		X	X	X					
Project Deliverables									
Submit Draft Final Engineering Report									
Receive NYSDEC Approval of Final Engineering Report								X	X

FIGURES



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PROJECT:
REMEDIAL ACTION WORK PLAN

FORMER STOW MANUFACTURING
NYSDEC BCP SITE #C704058
435 STATE STREET
BINGHAMTON, NEW YORK

CLIENT:
BINGHAMTON NORTHSIDE LIMITED PARTNERSHIP

TITLE:
SITE LOCATION MAP

N
W E
S

0 1,100 2,200 Feet

1 inch = 2,000 feet

Intended to print as 11" x 17"

Monday, January 21, 2019

2190179

FIGURE 1

Path: I:\Binghamton Northside Ltd\2190179 - 435 State St Env. Monitoring\Drawings\RAWP Drawings\Figure 2 - BCP Site Map.mxd

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PROJECT:
REMEDIAL ACTION WORK PLAN

FORMER STOW MANUFACTURING
NYSDEC BCP SITE #C704058
435 STATE STREET
BINGHAMTON, NEW YORK

CLIENT:
BINGHAMTON NORTHSIDE LIMITED PARTNERSHIP

TITLE:
BCP SITE MAP

N
W E
S

0 50 100 Feet

1 inch = 100 feet

Intended to print as 11" x 17"

Friday, February 8, 2019

2190179

FIGURE 2

Adjacent:
8 W State Street
Tax ID # 144.82-1-3
Owner: BINGHAMTON LOCAL DEVLMT C
Owner Address:
38 Hawley Street
Binghamton, NY 13901

Adjacent:
12 W State Street
Tax ID # 144.82-1-4
Owner: BINGHAMTON LOCAL DEVLMT C
Owner Address:
38 Hawley Street
Binghamton, NY 13901

Adjacent:
8 W State Street
Tax ID # 144.82-1-2
Owner: UNITED REFINING CO OF PA
Owner Address:
P.O. Box 780
Warren, PA 16365

Adjacent:
435 State Street
Tax ID # 144.82-1-9
Owner: BINGHAMTON LOCAL DEV CORP
Owner Address:
38 Hawley Street
Binghamton, NY 13901

Nearby:
6 West State Street
Tax ID # 144.82-1-10
Owner: "BMEJ, LLC"
Owner Address:
P.O. Box 5721 1219 Campvi
Endicott, NY 13760

Nearby:
4 West State Street
Tax ID # 144.82-1-11
Owner: CARDINAL HESCOTT and MAXINE REID
Owner Address:
24 Tompkins Street
Binghamton, NY 13903

Nearby:
297 Chenango Street
Tax ID # 144.82-2-35
Owner: EDUARDO MATESANZ
Owner Address:
66 Sunset Drive
Binghamton, NY 13905

WEST STATE STREET

NORTH WAY STREET

FORMER BUILDING
[DEMOLISHED]

STATE STREET

CHENANGO STREET

Nearby:
289 State Street
Tax ID # 144.82-2-36
Owner: HRD ENTERPRISES LLC and E and B KRADJIAN LLC
Owner Address:
84 Court Street
Binghamton, NY 13901

Nearby:
2 West State Street
Tax ID # 144.82-1-12
Owner: RONALD W PHELPS and DOUGLAS SHAVER
Owner Address:
2 West State Street
Binghamton, NY 13901

Nearby:
269 Chenango Street
Tax ID # 144.82-2-39
Owner: PAUL M FISCHER
Owner Address:
269 Chenango Street
Binghamton, NY 13901

Nearby:
273 Chenango Street
Tax ID # 144.82-2-37
Owner: PAUL M FISCHER
Owner Address:
269 Chenango Street
Binghamton, NY 13901

Legend

- Former Building
- BCP Site Boundary
- Nearby Parcels
- Adjacent Parcels

Sources:
1. Parcel boundaries provided by Broome County
2. Parcel data cross checked using Broome County's 'Parcel Mapper' website.
3. Roads: US Census TIGER/Line Shapefiles
4. April 2009 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.

Path: I:\Binghamton Northside Ltd\2190179 - 435 State St Env. Monitoring\Drawings\RAWP\Figure 3 - Adjacent Parcels.mxd

LaBella
Powered by partnership.

PROJECT:
REMEDIAL ACTION WORK PLAN

FORMER STOW MANUFACTURING
NYSDEC BCP SITE #C704058
435 STATE STREET
BINGHAMTON, NEW YORK

CLIENT:
BINGHAMTON NORTHSIDE LIMITED PARTNERSHIP

TITLE:
NEARBY AND ADJACENT PARCEL INFORMATION

N
W E
S

0 50 100 Feet

1 inch = 100 feet

Intended to print as 11" x 17"

Monday, January 21, 2019

2190179

FIGURE 3

Legend

- RI Surface Soil Grab Sample
- RI Surface Soil Sample
- RI Soil Gas Point
- RI Soil Boring
- RI Soil Boring/Well
- Former Building
- BCP Boundary

Notes:
1. Tax parcel data obtained from Broome County.
2. 2011 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
3 All locations measured with GPS and should be considered approximate.

LaBella
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300 STATE STREET
ROCHESTER, NY 14614
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F: (585) 454-3066
www.labellapc.com

N
W E
S

0 15 30 Feet
1 inch = 30 feet

PROJECT / CLIENT

REMEDIAL ACTION WORK PLAN
NYSDEC BCP SITE #C704058
FORMER STOW MANUFACTURING
435 STATE STREET
BINGHAMTON, NEW YORK

BINGHAMTON NORTHSIDE LIMITED PARTNERSHIP

DRAWING TITLE

REMEDIAL INVESTIGATION
EXPLORATION LOCATIONS

DESIGNED BY: MFP
DRAWN BY: MFP
REVIEWED BY: MFP

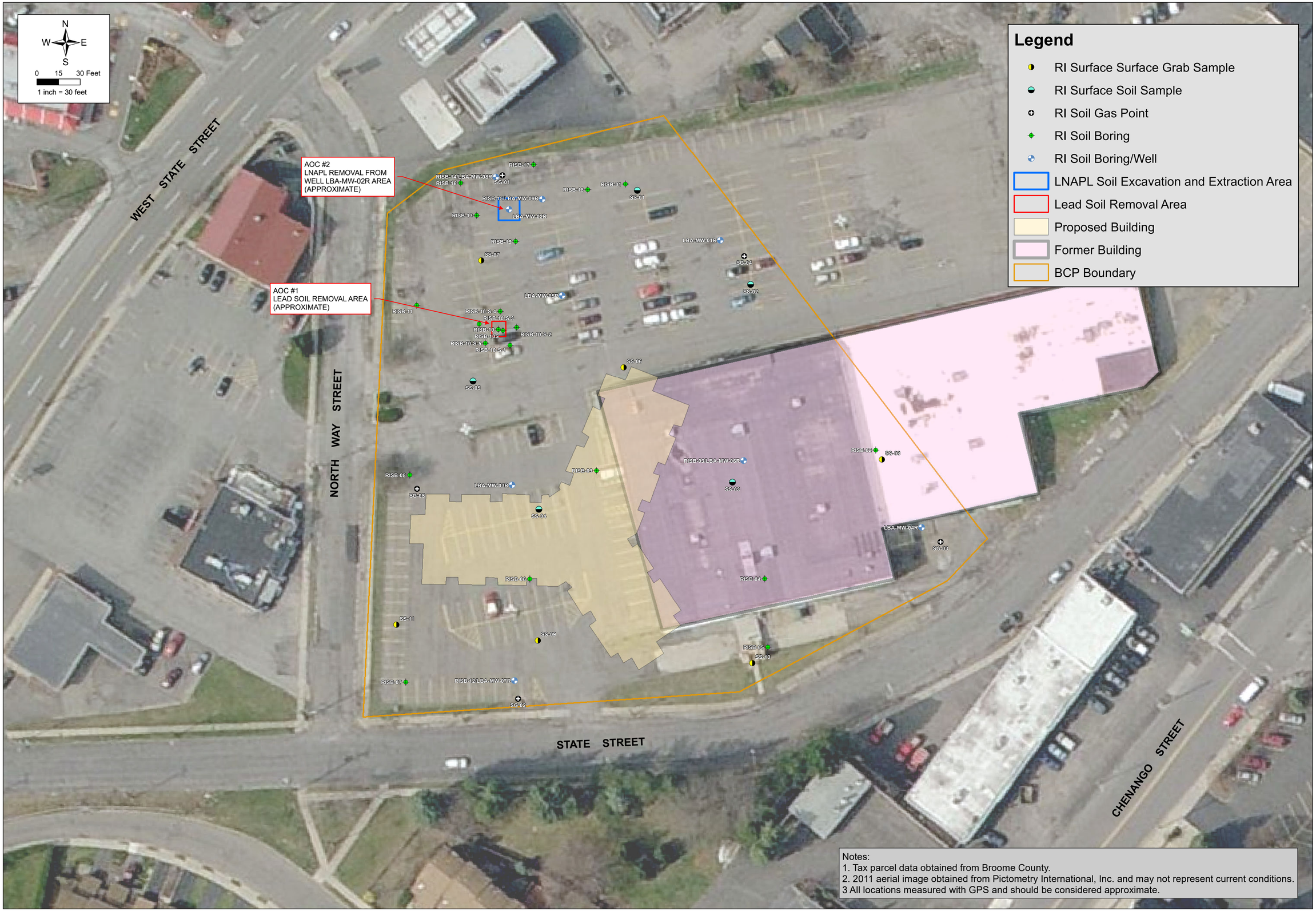
ISSUED FOR
FINAL
Monday, January 21, 2019

PROJECT/DRAWING NUMBER

[2190179]

[FIGURE 4]

Path: I:\Binghamton Northside, Ltd\2190179 - 435 State St Env. Monitoring\Drawings\RAWP\Figure 4 - RI Testing Locations.mxd



Notes:
1. Tax parcel data obtained from Broome County.
2. 2011 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
3 All locations measured with GPS and should be considered approximate.

Path: I:\Binghamton Northside Ltd\2190179 - 435 State St Env. Monitoring\Drawings\RAWP\Figure 5 - AOCs.mxd

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STATE OF NEW YORK
DANIEL P. ROLL
No. 031818
LICENSED PROFESSIONAL ENGINEER

PROJECT / CLIENT
REMEDIAL ACTION WORK PLAN
NYSDEC BCP SITE #C704058
FORMER STOW MANUFACTURING
435 STATE STREET
BINGHAMTON, NEW YORK
BINGHAMTON NORTHSIDE LIMITED PARTNERSHIP

DRAWING TITLE
REMEDIAL AREAS OF CONCERN

DESIGNED BY: MFP
DRAWN BY: MFP
REVIEWED BY: MFP

ISSUED FOR
FINAL
Monday, January 21, 2019

PROJECT/DRAWING NUMBER
[2190179]
[FIGURE 5]

APPENDIX 1

Site Plan for Future Development

GRADING, DRAINAGE & UTILITY NOTES

1. MEET EXISTING LINE AND GRADE OF ADJOINING SURFACE.
2. CONNECT NEW WATER SERVICE TO BUILDING FROM CURB BOX. CURB BOX AND ASSOCIATED WATER MAIN CONNECTION TO THE MAIN LOCATED IN WEST STATE STREET TO BE PERFORMED BY CITY OF BINGHAMTON WATER DEPARTMENT.
3. CONNECT NEW FIRE PROTECTION WATER SERVICE TO BUILDING FROM EXISTING WATER MAIN IN WEST STATE STREET. VALVE TAP AND SLEEVE TO BE PROVIDED AND INSTALLED BY THE CITY OF BINGHAMTON WATER DEPARTMENT. CONTRACTOR SHALL INSTALL LATERAL FROM THE MAIN TO THE BUILDING. COORDINATE WITH CITY OF BINGHAMTON WATER DEPARTMENT
4. PROPOSED CURB SHALL MATCH TOP AND FACE OF EXISTING CURB.
5. ALL LATERAL SEWER CONNECTIONS SHALL BE PERFORMED BY A LICENSED PLUMBER. OBTAIN STREET CUT PERMIT. CONTACT CITY OF BINGHAMTON ENGINEERING PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL PROVIDE EXTERIOR DROP CONNECTION AT EXISTING SANITARY MANHOLE IN NORTH WAY STREET. REFER TO EXTERIOR DROP MANHOLE CONNECTION DETAIL 6/L6.1.
6. UNDERGROUND ELECTRIC SERVICE - REFER TO ELECTRICAL DRAWINGS.
7. REFER TO PLUMBING DRAWINGS FOR CONTINUATION INSIDE BUILDING.
8. GAS SERVICE - REFER TO PLUMBING DRAWINGS.
9. INSTALL COMMERCIAL SERVICE TRAP & VENT PER DETAIL 7/L6.1.
10. INSTALL WATER GATE VALVE PER DETAIL 2/L6.1.
11. INSTALL THRUST BLOCK PER DETAIL 1/L6.1.
12. INSTALL 8" ROOF DRAIN LATERAL @ APPROXIMATLY 844.50. REFER TO PLUMBING DRAWINGS.

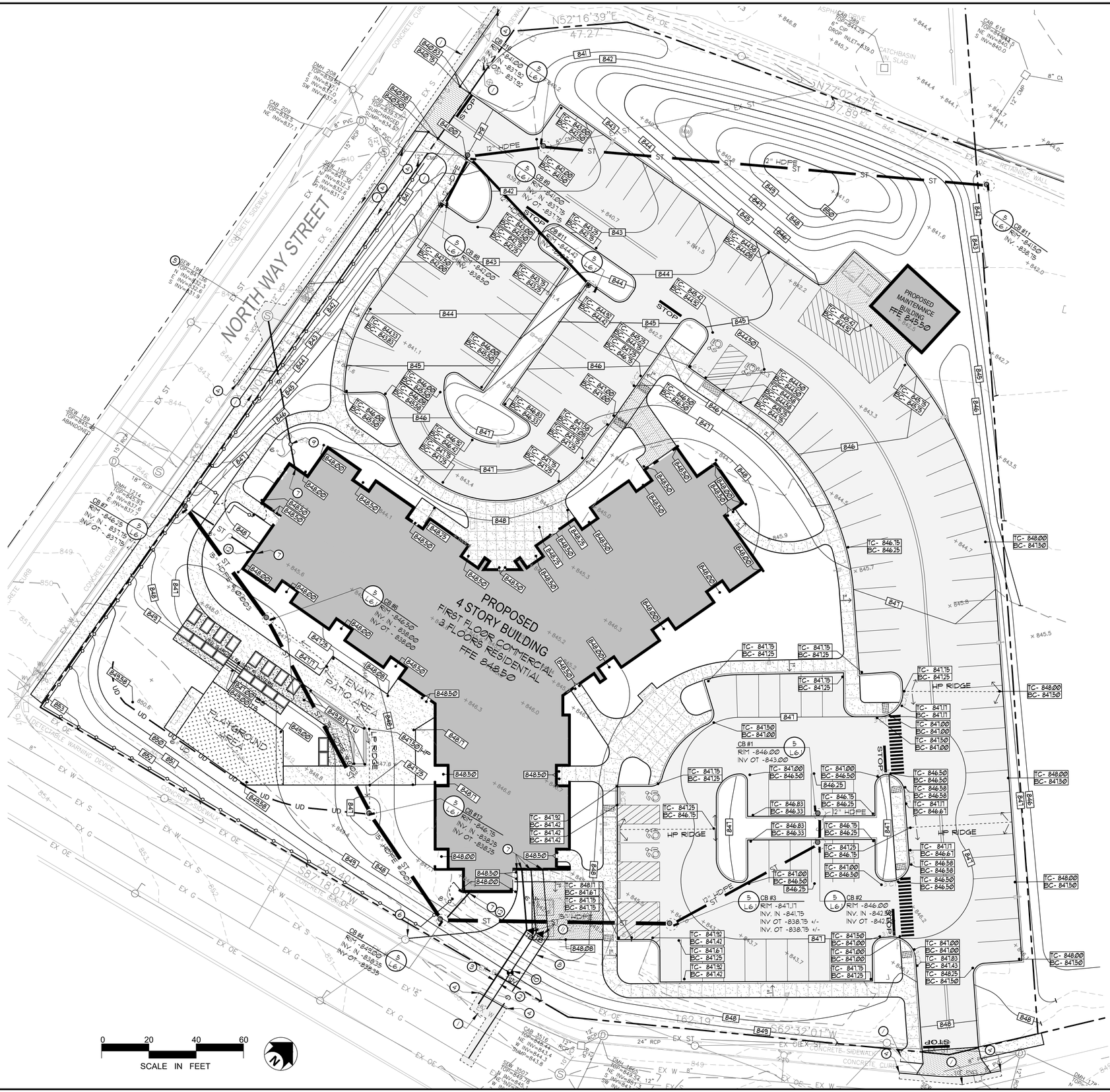
GRADING and UTILITY GENERAL NOTES

REFER TO DRAWING L2.0

1. ANY/ALL FILL REQUIRED BELOW PAVING SUBGRADE SHALL ONLY BE COARSE AGGREGATE FILL OR SUBBASE COURSE MATERIALS.
2. WHEREVER EXISTING STORM STRUCTURES ARE TO BE ABANDONED AND REMOVED, CUT AND PLUG CONNECTING PIPES AND/OR REMOVE PORTIONS OF PIPES WHICH MAY INTERFERE WITH OTHER WORK.
3. ALL CONCRETE PAVING AT ALL DOORS SHALL BE FLUSH WITH BUILDING FLOOR ELEVATION. CONCRETE PAVEMENT SHALL BE DOWELED TO FOUNDATION WALL PER DETAILS.
4. ALL GRAVITY SANITARY SEWER LINES SHALL BE SDR-35 PVC WITH 48" MIN. COVER.
5. CONTRACTOR SHALL COORDINATE ANY DISRUPTIONS TO EXISTING UTILITY SERVICES WITH ADJACENT PROPERTY OWNERS.
6. ALL ELECTRIC AND TELEPHONE EXTENSIONS INCLUDING SERVICE LINES SHALL BE CONSTRUCTED TO THE APPROPRIATE UTILITY COMPANY SPECIFICATIONS. ALL UTILITY DISCONNECTIONS SHALL BE COORDINATED WITH THE DESIGNATED UTILITY COMPANIES.
7. CONSTRUCTION SHALL NOT START ON ANY PUBLIC UTILITY SYSTEM UNTIL WRITTEN APPROVAL HAS BEEN RECEIVED BY THE ENGINEER FROM THE APPROPRIATE GOVERNING AUTHORITY AND THE CONTRACTOR HAS BEEN NOTIFIED BY THE ENGINEER.
8. PRIOR TO THE CONSTRUCTION OF OR CONNECTION TO ANY STORM DRAIN, SANITARY SEWER, WATER MAIN OR ANY OF THE DRY UTILITIES, THE CONTRACTOR SHALL EXCAVATE, VERIFY AND CALCULATE ALL POINTS OF CONNECTION AND ALL UTILITY CROSSINGS AND INFORM KEPLINGER FREEMAN ASSOCIATES (KFA)/RZ ENGINEERING AND THE OWNER/DEVELOPER OF ANY CONFLICT OR REQUIRED DEVIATIONS FROM THE PLAN. NOTIFICATION SHALL BE MADE A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION. KFA AND ITS CLIENTS SHALL BE HELD HARMLESS IN THE EVENT THAT THE CONTRACTOR FAILS TO MAKE SUCH NOTIFICATION.

IMPERVIOUS TABLE

REDEVELOPED PARCEL SIZE	119,609 SF		
IMPERVIOUS TYPOLOGY	EXISTING	PROPOSED	REDUCTION
BUILDING	29,835 SF	18,400 SF	-38 %
ASPHALT	83,514 SF	45,050 SF	-46 %
CONCRETE	2,581 SF	6,580 SF	+254 %
IMPERVIOUS TOTAL	115,930 SF	70,030 SF	-40 %



ZAUSMER·FRISCH SCRUTON & AGGARWAL
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219 BURNET AVENUE / SYRACUSE / NEW YORK 13203
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KEPLINGER FREEMAN ASSOCIATES
LANDSCAPE ARCHITECTURE & LAND PLANNING
6320 FLY ROAD, SUITE 109 EAST SYRACUSE, NEW YORK 13057
PHONE: (315) 445-7980 FAX: (315) 445-7981

PROJECT:
435 STATE STREET DEVELOPMENT
435 WEST STATE STREET
BINGHAMTON, NEW YORK

TITLE:
SITE GRADING, DRAINAGE & UTILITY PLAN

REGISTERED LANDSCAPE ARCHITECT
EDWARD GILBERT KEPLINGER
001835
STATE OF NEW YORK

DATE	SCALE
10-12-16	AS NOTED
PROJECT NUMBER	DRAWN BY
36087	MDL

SHEET NUMBER
L2.0

REVISIONS

10/28/16	MDL	8/15/18	MDL
GENERAL REVISIONS		SITE REVISIONS	
12/7/16	MDL	9/21/18	MDL
MISC. REVISIONS		HCR REVISIONS	
6/5/18	MDL		
BLDG. REVISIONS			
7/5/18	VER		
SITE REVISIONS			

D:\00projects\36087 - ZF Binghamton\CAD\L2.0 - Grading, Drainage & Utility.dwg

APPENDIX 2

Health and Safety Plan

Health and Safety Plan
NYSDEC BCP Site #C704058

LOCATION:

Former Stow Manufacturing
435 State Street
Binghamton, New York 13901

LaBella Project No. 2190179

January 21, 2019

300 State Street, Suite 201 | Rochester, NY 14614 | p 585-454-6110 | f 585-454-3066

Table of Contents

SITE HEALTH AND SAFETY PLAN

Project Title:	435 State Street RIWP
Project Number:	2161856
Project Location (Site):	435 State Street, Binghamton, NY
Environmental Director:	Gregory Senecal, CHMM
Project Manager:	Dan Noll, P.E.
Plan Review Date:	_____
Plan Approval Date:	_____
Plan Approved By:	_____ Mr. Richard Rote, CIH
Site Safety Supervisor:	To Be Determined
Site Contact:	To Be Determined
Safety Director:	Rick Rote, CIH
Proposed Date(s) of Field Activities:	To Be Determined
Site Conditions:	Generally level land
Site Environmental Information Provided By:	LaBella Associates, D.P.C. Phase II Environmental Site Assessments
Air Monitoring Provided By:	LaBella Associates, D.P.C.
Site Control Provided By:	Contractor(s)

EMERGENCY CONTACTS

	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Our Lady of Lourdes	607-798-5111
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Broome County Sheriff	911
Fire Department:	Binghamton Fire Department	911
Site Contact:	To Be determined	
Agency Contact:	NYSDEC – Gary Priscott, PG Finger Lakes Poison Control	607-775-2545 518-402-7860 1-800-222-1222
Environmental Director:	Greg Senecal, CHMM	Direct: 585-295-6243 Cell: 585-752-6480 Home: 585-323-2142
Project Manager:	Dan Noll, P.E.	Direct: 585-295-6611 Cell: 585-301-8458
Site Safety Supervisor:	To Be Determined	
Safety Director	Rick Rote, CIH	Direct: 704-941-2123

MAP AND DIRECTIONS TO THE MEDICAL FACILITY - OUR LADY OF LOURDES HOSPITAL

Estimated Total Time: 9 minutes
Estimated Total Distance: 3.4 miles

Start: 435 State Street, Binghamton, NY 13901

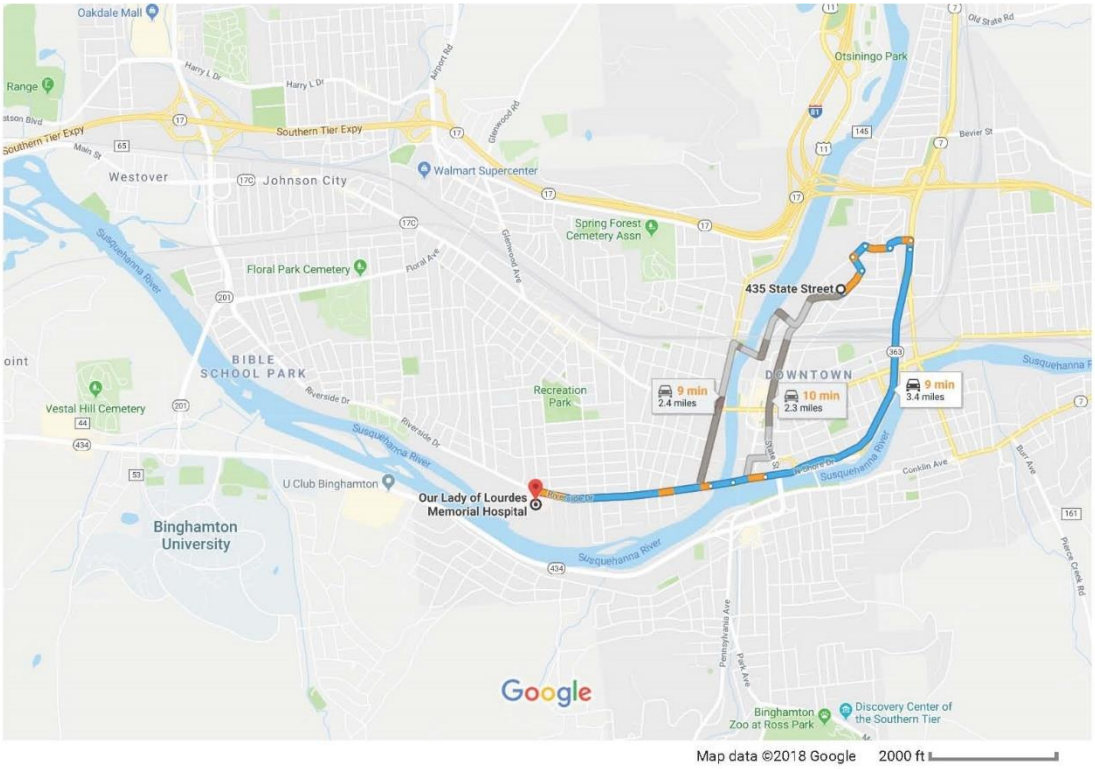
Follow State St, Chenango St and Frederick St to NY-7 S

1. Head northeast on State St toward Chenango St
2. Turn left onto Chenango St
3. Turn right to stay on Chenango St
4. Turn right onto Frederick St
5. Turn left to stay on Frederick St

Follow N Shore Dr to Riverside Dr

6. Turn right onto NY-7 S
7. Continue onto NY-363 S/N Shore Dr
8. Continue onto N Shore Dr
9. Continue onto Memorial Bridge
10. Continue onto Riverside Dr

End: Our Lady of Lourdes Memorial Hospital, 169 Riverside Dr, Binghamton, NY 13905



1.0 INTRODUCTION

The purpose of this Health and Safety Plan (HASP) it to provide guidelines for responding to potential health and safety issues that may be encountered during the Remedial Investigation at 435 State Street, City of Binghamton, Broome County, New York, herein after referred to as the "Site." The Site was entered into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) in April 18, 2017 as Site #C704058 and is considered a Volunteer. This HASP only reflects the policies of LaBella Associates D.P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications and the Community Air Monitoring Plan (CAMP) are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of the HASP were developed in general accordance with 29 CFR 1910 and 29 CFR 1926 and do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or and other regulatory body.

2.0 RESPONSIBILITIES

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The HASP is applicable only to activities of approved LaBella personnel and their authorized visitors. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures.

3.0 ACTIVITIES COVERED

The activities covered under this HASP are limited to the following:

- Management of environmental investigation and remediation activities
- Environmental Monitoring
- Collection of samples
- Management of excavated soil and fill.

4.0 WORK AREA ACCESS AND SITE CONTROL

The contractor(s) will have primary responsibility for work area access and site control. However, a minimum requirement for work area designation and control will consist of:

- Drilling (Geoprobe/Rotary) – Orange cones to establish at least a 10-foot by 10-foot work area
- Test Pitting – Orange cones and orange temporary fencing to establish at least 10-feet of distance between test pit and fencing.
- Surface soil and soil gas sampling - Orange cones to establish at least a 10-foot by 10-foot work area

5.0 POTENTIAL HEALTH AND SAFETY HAZARDS

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and his or her instructions must be followed.

5.1 Hazards Due to Heavy Machinery

Potential Hazard:
Heavy machinery including trucks, excavators, backhoes, etc. will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:
Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required.

5.2 Excavation Hazards

Potential Hazard:
Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:
Personnel must receive approval from the Project Manager to enter an excavation for any reason. Subsequently, approved personnel are to receive authorization for entry from the Site Safety Officer. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable. All excavations will be backfilled by the end of each day. Additionally, no test pit will be left unattended during the day.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 *Cuts, Punctures and Other Injuries*

Potential Hazard:
In any excavation or construction, work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:
The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. The Site Safety Officer is responsible for arranging the transportation of authorized on-site personnel to medical facilities when First Aid treatment in not sufficient. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager. Serious injuries are to be reported immediately to the Site Safety Officer

5.4 *Injury Due to Exposure of Chemical Hazards*

Potential Hazards:
Volatile organic vapors from petroleum products, chlorinated solvents or other chemicals may be encountered during excavation activities at the project work site. Inhalation of high concentrations of organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:
The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm is encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 *Injuries Due to Extreme Hot or Cold Weather Conditions*

Potential Hazards:
Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:
Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

5.6 Potential Exposure to Asbestos

Potential Hazards:
During ground intrusive activities (e.g., test pitting or drilling) soil containing asbestos may be encountered. Asbestos is friable when dry and can be inhaled when exposed to air.

Protective Action:
The presence of asbestos can be identified through visual observation of a white magnesium silicate material. If encountered, work should be halted and a sample of the suspected asbestos should be collected and placed in a plastic sealable bag. This sample should be sent to the asbestos laboratory at LaBella Associates for analysis.

6.0 WORK ZONES

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.4), the following work zones should be established:

Exclusion Zone (EZ):
The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):
The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 DECONTAMINATION PROCEDRUES

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor's disposal container for disposal of PPE.

8.0 PERSONAL PROTECTECTIVE EQUIPMENT (PPE)

Generally, site conditions at this work site require level of protection of Level D or modified Level D. However, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:
Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:
Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 AIR MONITORING

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring identified in this HASP is only intended to monitor air for workers involved with the RI. Please refer to the Site Specific CAMP for further details on air monitoring at the Site required for protection of the Site occupants and neighboring properties.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs), a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. [*Note: Radiation monitoring requirements are identified in 5.7 above.*] Air monitoring of the work areas will be performed at least every 15 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 10 ppm are recorded in the breathing zone, then either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hours of use or more frequently, if necessary. If PID readings are sustained, in the work area, at levels above 10 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If dust concentrations exceed the upwind concentration by 150 µg/m^3 (0.15 mg/m^3) consistently for a 10 minute period within the work area or at the downwind location, then LaBella personnel may not re-enter the work area until dust concentrations in the work area decrease below 150 µg/m^3 (0.15 mg/m^3), which may be accomplished by the construction manager implementing dust control or suppression measures.

10.0 EMERGENCY ACTION PLAN

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible and wait at the assigned 'safe area'. Follow the instructions of the Site Safety Officer.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 MEDICAL SURVEILLANCE

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 EMPLOYEE TRAINING

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the remedial investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

Table
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential	^{232}Thorium Action Level
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69	NA
Anthracene	0.2	0.2	NA	NA	NA	NA	Faint aromatic	NA	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24	NA
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88	NA
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	0.096	10.07	NA
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07	NA
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65	NA
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07	NA
Ethylbenzene	100	100	NA	1	6.7	2,000	Ether	2.3	8.76	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35	NA
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12	NA
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82	NA
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45	NA
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56	NA
Metals										
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	Almond	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	Odorless	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA	NA
Other										
Asbestos	0.1 (f/cc)	NA	1.0 (f/cc)	NA	NA	NA	NA	NA	NA	NA

(a) Skin = Skin Absorption
(b) OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990
(c) ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.
(e) Lower Exposure Limit (%)
(f) Upper Exposure Limit (%)
(g) Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:
1. All values are given in parts per million (PPM) unless otherwise indicated.
2. Ca = Possible Human Carcinogen, no IDLH information.

APPENDIX 3

NYSDOH Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time 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. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. 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 must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. 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 must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX 4

Recovery Well Construction Plan

LaBella
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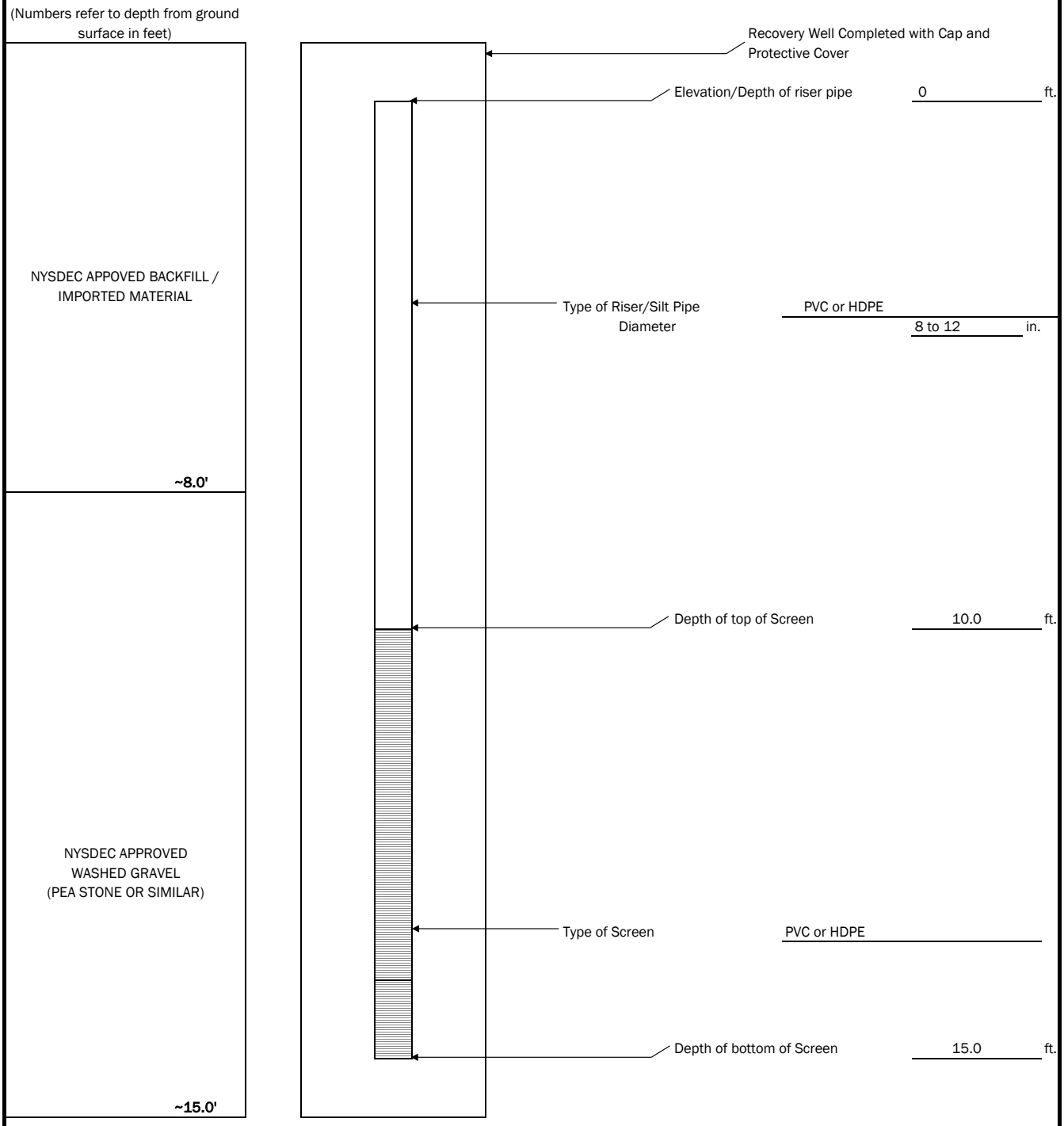
RECOVERY WELL INSTALLATION SPECIFICATION

RECOVERY WELL ID
RW-1

Project: Former Stow Manufacturing, NYSDEC BCP C704058
LaBella Project No.: 2190179
Location: 435 State Street, Binghamton, NY
Client: Binghamton Northside Limited Partnership

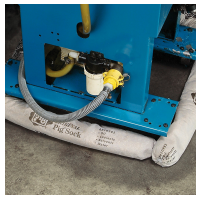


NOTES:
All Depths should be considered approximate. Well screen will be installed to intersect the top of the shallow overburden groundwater table.

Final recovery well installation details will be provided in the Final Engineering Report.

APPENDIX 5

Absorbent Sock Information



PIG® Original Absorbent Sock

PIG218 3" x 24", Absorbs up to 28 oz. per sock, 36 socks

Control your everyday leaks with our most shape-hugging sock.

- Tough and economical, the Original is your best choice for everyday leak protection to keep your floors safe.
- Formable socks hug corners and surround machine bases to absorb machine leaks, contain puddles and help keep workers safe
- Contained corncob filler pulls liquids from the floor for maximum absorbency while making cleanup quick and easy
- Polypropylene skin resists tearing; reduces dust and holds in liquid, even when saturated
- Absorbs most common industrial liquids - oils, water, solvents, coolants and more
- Corncob filler is light-weight and economical to handle general, everyday tasks
- Can be incinerated after use to reduce waste or for fuels blending

Specifications

Fluid Absorbed	Oils, Coolants, Solvents, Water – Universal
Color	Gray
Dimensions	ext. dia. 3" x 24" L
Recycled Content	99% Pre-Consumer Recycled Cellulose Filler
Absorbency	Up to 7.88 gal. per box
Absorbency per	Up to 28 oz. per sock
Configuration	Sock
Filler	Corn Cob
Skin/Outer Mesh	Skin - Polypropylene
Sold as	36 socks per box
Weight	23.2 lbs.
# per Pallet	24
Application	Leaks & Drips, Maintenance
UNSPSC	47131904
Pigalog® Page Number	Page 34

Metric Equivalent

Absorbency per	Up to 828 mL per sock
Absorbency	Up to 29.8 L per box
Dimensions	ext. dia. 7.6cm x 61cm L
Weight	10.5 kg

Technical Information

Technical Documents

White paper – Slip & Fall Prevention Secrets

ORIGINAL PIG® Absorbents

29 CFR 1910.22(a)(2)

New Pig
World's best stuff for leaks, drips and spills.

One Pork Avenue • Tipton, PA 16684-0304
1-855-493-4647 • Fax: 1-800-621-7447• newpig.com • hothogs@newpig.com

Safety Data Sheet

1. Product And Company Identification

Product Identifier: Oil-Only PIG Absorbents (MSD-016)
General Use: Oil-Only PIG Absorbents are designed to confine and absorb oil-based chemicals such as oil, gasoline, kerosene, diesel fuel, vegetable oil, etc., while repelling water and water-based products from machinery, leaks, drips, over-spray and spills.
Specific Product Identifier: PIG Oil-Only Absorbent Mat, PIG FAT MAT Oil-Only Absorbent Mat, PIG Rip-n-Fit Oil-Only Absorbent Mat, PIG 4-in-1 Oil-Only Absorbent Mat, PIG Brown Oil-Only Absorbent Mat, PIG Ham-O Oil-Only Absorbent Mat, PIG Oil-Only UV-Resistant Absorbent Mat, PIG Oil-Only Railroad Absorbent Mat, PIG Absorbent Ground Tarp System, PIG Leak and Drip Pad, PIG Coolant Skimming Pad, PIG Oil-Only Barrel Top Absorbent Mat, PIG UV-Resistant Oil-Only Barrel Top Absorbent Mat, PIG Oil-Only Absorbent Diaper Mat, Oil-Only Mop System, PIG Oil-Only Absorbent Sock, PIG Skimmer Sock, PIG Spaghetti Boom, PIG Oil-Only Absorbent Boom, PIG Dark Oil-Only Absorbent Boom, PIG Skimming Sweep, PIG Sump Skimmer, PIG Monitoring Well Skimming Sock, PIG Rigid Monitoring Well Sock, PIG Skimmer Pillow, PIG Spaghetti Pillow, PIG Printer's Pillow, PIG Poly-Back Oil-Only Absorbent Pillow, PIG Outdoor Pan, PIG PomPom Oil-Mops, PIG Oil-Only Absorbent Valve Wrap, PIG Oil Only Pulp, PIG LeakTrapper Absorbent Bag, PIG LeakTrapper Absorbent Valve Wrap, PIG Oil only heavy Fluids Mat, PIG SunSafe™ UV-Resistant Mat, STAT-MAT Absorbents, Static Dissipative Skimming PIG Mat, PIG Brown Oil Only Poly Back Mat, PIG Oil Only Brown Mat.
Product Description: These white, yellow, blue, green, brown, black, or Multi-Colored absorbents are provided in many forms such as a mat (pad or rolls), spaghetti strips (pads cut into thin strips), pom-pom, pulp (mat ground into a particulate) or may come in a pan.

COMPANY PROFILE:
New Pig Corporation
One Pork Avenue
Tipton, PA 16684-0304
Information Number
1-800-468-4647

EMERGENCY TELEPHONE:
INFOTRAC
200 North Palmetto Street
Leesburg, FL 34748
24 hrs, 7 days/week
1-800-535-5053

Website: www.newpig.com, **Email:** hothogs@newpig.com

2. Hazards Identification

GHS Classification: Not a dangerous substance according to GHS

POTENTIAL HEALTH EFFECTS:
Eye Contact: May cause irritation
Ingestion: No hazard in normal use of product
Inhalation: No hazard in normal use of product
Skin Contact: Not applicable
Chronic: Not applicable

3. Composition/Information on Ingredients

CAS: 9003-07-0	Polypropylene	>97%

May contain one or more of the following:

CAS: None	Brown pigment	<0.3%
CAS: None	Zelec-Anti Static Agent	
CAS: 9003-07-0	Polypropylene: Film, Tywrap, Rope Mesh	
CAS: 9002-88-4	Polyethylene Film, Cord	
CAS: Not Avail.	Grommets, Steel Wire Tie, Aluminum Clip	
CAS: 25038-59-9	Polyester Fleece or Mesh	
CAS: 9003-07-0	Pan: Polypropylene	
CAS: 9002-86-2	Pan: PVC	

4. First Aid Measures

Eye Contact: Flush with water for 15 minutes. If irritation persists, consult a physician.
Ingestion: Not applicable
Inhalation: Not applicable
Skin Contact: Not applicable

5. Fire Fighting Measures

Extinguishing Media: Unused form: Not applicable Used form: that which is compatible to liquid(s) absorbed.
Special Fire Fighting Procedures: Wear a self-contained breathing apparatus and refer to absorbed liquid(s) SDS(s).
Hazardous Combustion Products: When heated above the melting point: carbon monoxide, carbon dioxide, acrolein, ketones, aldehydes and other unidentified organic compounds.
Unusual Hazards: Refer to absorbed liquid(s) SDS(s). The Oil-Only PIG Absorbents do not render liquids nonflammable, neutral or less hazardous.

6. Accidental Release Measures

Spill or Leak Procedures: If material is unused, sweep or pick up and dispose of as a non-hazardous material.

7. Handling and Storage

Handling Precautions: Camouflage pig pattern not recommended for use with solvents or aggressive liquids that may affect printed pattern.
Storage Precautions: Store in a cool, dry place. Shelf Life: Indefinitely - as long as product is kept in a clean, dry place away from direct sunlight.
General: Refer to absorbed liquid(s) SDS(s). The container can be hazardous when empty. Follow label cautions even after the container is empty. Do not re-use empty containers for food, clothing or products for human or animal consumption, or where skin contact can occur.

Safety Data Sheet

8. Exposure Controls/Personal Protection

Engineering Controls: None required
PERSONAL PROTECTION
Eyes: Safety glasses with side shields is a good industrial practice
Respirator: Not required.
Gloves: Not normally required. However, use of cloth, canvas or leather gloves is a good industrial practice.
Other: None required.
OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

	EXPOSURE LIMITS 8 hrs. TWA (ppm)	
	OSHA PEL	ACGIH TLV
None		

9. Physical and Chemical Properties

Appearance: White, yellow, blue, green, brown, black or multi-colored polymer material in a variety of shapes, may also be in a black pan. Interior color may vary.
Odor: No odor **Odor Threshold:** Not applicable
pH: Not applicable
MELTING POINT/Freezing Point**:** >320° F (>160° C)
Initial Boiling Point and Range: Not applicable
Flash Point: Not applicable **Method:** Not applicable
Evaporation Rate: Not applicable
Flammable Limits: Not applicable
Conditions of Flammability: Not established
Explosive Properties: Not applicable
Vapor Pressure: Not applicable
Vapor Density: Not applicable
Relative Density (H_20 = 1): 0.9
Solubility in Water: Insoluble
Auto Ignition Temperature: 675° F (357° C)
Maximum Working Temperature: 170° F (77° C)
Coefficient of Water/Oil Distribution: Not available

10. Stability and Reactivity

General: This is a stable material.
Conditions of Reactivity: Not established
Incompatible Materials: Strong oxidizing agents may degrade product over an extended period of time.
Conditions to Avoid: Not applicable
Hazardous Decomposition: When heated, it may emit toxic fumes.
Hazardous Polymerization: Will not occur

11. Toxicological Information

LD50: Not available
LC50: Not available
Carcinogenicity: IARC: Not established
National Toxicology Program: Not established
OSHA: Not established

11. Toxicological Information (Cont'd)

Reproduction Toxicity: Not available
Teratogenicity: Not available
Mutagenicity: Not available
Synergistic Products: Not available
Irritancy of Product: See Section 2.
Sensitization to Product: Not available

12. Ecological Information

No data available

13. Disposal Considerations

Waste Disposal Method: If unused, no special precautions are necessary. Dispose of in accordance with federal, state and local regulations. In certain types of cleanup applications the nature of the material recovered will classify the resulting spent material as a hazardous component. In such instances the material should be disposed of via an approved hazardous waste disposal service and the appropriate manifesting obtained.

14. Transport Information

DOT (Department of Transportation):
Proper Shipping Name: Not regulated
Hazard Class: Not regulated
Identification Number: Not applicable

15. Regulatory Information

CERCLA (Comprehensive Environmental Response Compensation and Liability Act): No Reportable Quantity
OSHA Hazard Communication Standard, 29 CFR 1910.1200: No listed ingredient
SARA Title III (Superfund Amendments and Reauthorization Act): No listed ingredient
TSCA (Toxic Substances Control Act): Ingredients of this product are on the Inventory list.

16. Other Information

WHMIS Classification: Not a controlled product.
Reason for Issue: Reviewed, changes to Sections 3, 9, 11 & 16.
Prepared by: Dale Gatehouse, Entreprises Krenda Inc.
Approved by: Lisa Baxter, New Pig Corporation
Previous Date of Issue: 03/13/2017
Revised Date: 03/21/2018
SDS Number: MSD-016

The following is in lieu of all warranties, expressed or implied: All information provided is based on testing and data believed to be accurate.

APPENDIX 6

Quality Control Plan

Quality Control Plan (QCP)
NYSDEC BCP Site #C704058

LOCATION:

435 State Street
Binghamton, New York
13901

LaBella Project No. 2190179

January 21, 2019

LaBella
Powered by partnership.

300 State Street, Suite 201 | Rochester, NY 14614 | p 585-454-6110 | f 585-454-3066

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1.0 INTRODUCTION

LaBella's Quality Control (QC) Program is an integral part of its approach to environmental investigations. By maintaining a rigorous QC program, our firm is able to provide accurate and reliable data. QC also provides safe working conditions for all on-site workers.

The Quality Control program contains procedures, which provide for collected data to be properly evaluated, and which document that quality control procedures have been followed in the collection of samples. The quality control program represents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling practices.

Procedures used in the firm's Quality Control program are compatible with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program has been organized into the following areas:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling Techniques
- Sample Handling and Packaging

It should be noted that the Soil Gas Sampling Work Plan (SGS) Work Plan may have project specific details that will differ from the procedures in this QC program. In such cases, the SGS Work Plan should be followed (subsequent to regulatory approval).

2.0 QUALITY CONTROL OBJECTIVES

The United States Environmental Protection Agency (EPA) has identified five general levels of analytical data quality as being potentially applicable to site investigations conducted under CERCLA. These levels are summarized below:

- **Level I** - Field screening. This level is characterized by the use of portable instruments, which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.
- **Level II** - Field analysis. This level is characterized by the use of portable analytical instruments, which can be used on site or in mobile laboratories stationed near a site (close-support labs). Depending upon the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.
-

- **Level III** - Laboratory analysis using methods other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS). This level is used primarily in support of engineering studies using standard EPA-approved procedures. Some procedures may be equivalent to CLP RAS, without the CLP requirements for documentation.

- **Level IV** - CLP Routine Analytical Services. This level is characterized by rigorous QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university laboratories, or other commercial laboratories.
- **Level V** - Non-standard methods. Analyses, which may require method modification and/or development. CLP Special Analytical Services (SAS) are considered Level V.

Unless stated otherwise, all data will be generated in accordance with Level IV. When CLP methodology is not available, federal and state approved methods will be utilized. Level III will be utilized, as necessary, for non-CLP RAS work which may include ignitability, corrosivity, reactivity, EP toxicity, and other state approved parameters for characterization. Level I will be used throughout the SGS for health and safety monitoring activities.

All measurements will be made to provide that analytical results are representative of the media and conditions measured. Unless otherwise specified, all data will be calculated and reported in units consistent with other organizations reporting similar data to allow comparability of data bases among organizations. Data will be reported in µg/L and mg/L for aqueous samples, and µg/kg and mg/kg (dry weight) for soils, or otherwise as applicable.

The characteristics of major importance for the assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. Application of these characteristics to specific projects is addressed later in this document. The characteristics are defined below.

2.1 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

2.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter.

2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

2.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Careful choice and use of appropriate methods in the field will ensure that samples are representative. This is relatively easy with water or air samples since these components are homogeneously dispersed. In soil and sediment, contaminants are unlikely to be evenly distributed, and thus it is important for the sampler and analyst to exercise good judgment when removing a sample.

2.5 *Comparability*

Comparability expresses the confidence with which one data set can be compared to another. The data sets may be inter- or intra- laboratory.

3.0 MEASUREMENT OF DATA QUALITY

3.1. *Accuracy*

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" take the form of EPA standard reference materials, or laboratory prepared solutions of target analytes spiked into a pure water or sample matrix. In the case of GC or GC/MS analyses, solutions of surrogate compounds, which can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination, are used.

In each case the recovery of the analyte is measured as a percentage, correcting for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA supplied known solutions, this recovery is compared to the published data that accompany the solution.

For the firm's prepared solutions, the recovery is compared to EPA-developed data or the firm's historical data as available. For surrogate compounds, recoveries are compared to EPA CLP acceptable recovery tables.

If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate. The analyst or his supervisor must initiate an investigation of the cause of the problem and take corrective action. This can include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For highly contaminated samples, recovery of the matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

3.2. *Precision*

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is sometimes not known to ASC and usually not known to bench analysts, so their usefulness for monitoring analytical precision at bench level is limited. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantitation of precision is impossible.

For EPA CLP analyses, replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD).

- Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.
- RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non homogeneity, analysis of check samples, etc. Follow-up action may include sample reanalysis or flagging of the data as suspect if problems cannot be resolved.
- During the data review and validation process (see Section 9), field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

3.3. Completeness

Completeness for each parameter is calculated as follows:

- The firm's target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the site managers. In planning the field sample collection, the site manager will plan to collect field duplicates from identified critical areas. This procedure should assure 100% completeness for these areas.

3.4. Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area. Within the laboratory, precautions are taken to extract from the sample bottle an aliquot representative of the whole sample. This includes premixing the sample and discarding pebbles from soil samples.

4.0 QC TARGETS

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and RPD of duplicates/replicates are included in the QCP, Analytical Procedures. Note that tabulated values are not always attainable. Instances may arise where high sample concentrations, non homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the firm will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

5.0 SOIL BORING ADVANCEMENT & MONITORING WELL INSTALLATION PROCEDURES

Soil and groundwater sampling shall be conducted in accordance with NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation dated May 3, 2010 and any Site-specific work plans.

Prior to drilling, all drill sites will be cleared with appropriate utility companies to avoid potential accidents relating to underground utilities. Utility drawings will be reviewed, if available.

5.1 Drilling Equipment and Techniques

Direct Push Geoprobe Advanced Borings:

Soil borings and monitoring wells will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four to five-foot macrocore sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four or five-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macrocore sampler will be decontaminated between boring locations using an alconox and water solution.

Prior to initiating drilling activities, the Macrocores, drive rods, and pertinent equipment, will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push Macrocore through overburden soils. Drilling fluids, other than potable water will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a properly calibrated photoionization detector (PID) will be used to screen soil cores retrieved from the Macrocores.

Direct Push Geoprobe advanced groundwater-monitoring wells typically utilize minimum 1.25-inch threaded flush joint PVC pipe with 0.010-in. slotted screen or pre-packed well screens. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF/ASTM approved. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well. Stainless steel wells or pre-packed PVC wells may be used if specified in the work plan and approved by the NYSDEC.

Hollow-Stem Auger Advanced Borings:

The drilling and installation of soil borings and monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/4-inch inside diameter (ID) hollow-stem auger drilling in the overburden, retrieve Macrocore or split-spoon samples, and perform necessary rock coring using NX, NQ, HQ or core barrel size as specified in the project-specific work plan. The borehole may be reamed up to 5 1/2-inch diameter prior to monitoring well installation as cased hole in the bedrock, or may be left as open bedrock hole, with regulatory concurrence. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

Prior to initiating drilling activities, the augers, rods, Macrocore, split spoons, and other pertinent equipment will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Steam cleaning activities will be performed in a designated on-site decontamination area. During and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.
Test borings will be advanced with 4 1/4-inch (ID) hollow stem augers through overburden, and cored with a NX, NQ, HQ or core barrel size as specified in the project-specific work plan sized diamond core barrels in competent rock, driven by truck-, track-, or trailer-mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for project-specific criteria, but must be approved by the NYSDEC. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a (PID) will be used to screen soils retrieved from the split spoons or Macrocores.

Where bedrock wells are required, test borings shall be advanced into rock with NX, NQ, HR (or similar) coring tools. Only water from an approved source shall be used in rock coring. The consultant shall monitor and record the petrology, core recovery, fractures, rate of advance, and water lost or produced in each test boring. The Rock Quality Determination (RQD) value shall be calculated for each 5-foot core. Each core shall be screened with a PID upon extraction. All core samples shall be retained and stored by the consultant in an approved wooden core box for a period of not less than one year.

The method selected may be percussion or rotary drilling. The method and equipment selected must be capable of penetrating the bedrock at each well location to a depth required by the work plan.

Bedrock well installation will involve construction of a rock socket in the weathered bedrock. The socket will be drilled into the top of rock (typically 1-ft. to 5-ft. into the top of rock) at each bedrock well location to allow a permanent steel casing to be grouted securely in place prior to completion of the well. The purpose for this is to provide a seal at the overburden/bedrock interface and into the upper bedrock surface, to prevent the entrance of overburden water into the bedrock. After the grout and casing have set up for a minimum of 12 hours, the remaining bedrock can be NX (or similar) cored through the steel casing to a depth determined by the project-specific work plan.

Bedrock wells will either be open coreholes in the rock or consist of threaded, flush-joint PVC piping. Construction will vary depending on the project and as such, specific construction of the wells will be detailed in the project-specific work plan. Bedrock wells which do utilized PVC piping for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF/ASTM approved.

Screen and riser sections shall be joined by flush-threaded coupling to form watertight unions that retain 100% of the strength of the casing. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well.

5.2 Artificial Sand Pack

When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-in. diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 2-ft. A pre-packed well screen may be used if pre-approved by the NYSDEC.

An artificial sand pack will not be utilized in bedrock wells without screens (i.e., open borehole wells).

5.3 Bentonite Seal

A minimum 2-ft. thick seal will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-ft. seal (e.g., only 1-ft. of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite.

5.4 Grout Mixture

Upon completion of the bentonite seal, the well may be grouted with a non-shrinking cement grout (e.g., Volclay^{R}) mix to be placed from the top of the bentonite seal to the ground surface. The cement grout shall consist of a mixture of Portland cement (ASTM C 150) and water, in the proportion of not more than 7 gallons of clean water per bag of cement (1 cubic foot or 94 pounds). Additionally, 3% by weight of bentonite powder may be added.

5.5 Surface Protection

At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad or locking well cap for stick-up wells. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box or stick-up casing at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap.

5.6 *Surveying*

Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

5.7 *Well Development*

After completion of the well, but not sooner than 24 hours after grouting is completed, development will be accomplished using pumping, bailing, or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Development water will be either properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and/or consultation with the NYSDEC representatives on Site.

The development process will continue until removal of a minimum of 110% of the water lost during drilling, three well volumes; whichever is greater, or as specified in the work plan. In the event that limited recharge does not allow for the recovery of all drilling water lost in the well or three (3) well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

6.0 GEOLOGIC LOGGING AND SAMPLING

At each investigative location, borings will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology (split spoons or Macrocore). Soils will be evaluated for visual and olfactory evidence of impairment (i.e., staining, odors, and elevated PID readings) by a qualified individual. Sampling devices will be decontaminated according to procedures outlined in the Decontamination section of this document. When utilized, split-spoon samplers will be driven into the soil using a minimum 140-pound safety hammer and allowed to free-fall 30-inches, in accordance with ASTM-D 1586-84 specifications. The number of blows required to drive the sampler each 6-inches of penetration will be recorded. When required, samples will be stored in the appropriate bottleware (refer to Section 10) until analysis or deemed unnecessary.

In the event that maximum design depth of investigation is reached and hydrogeologic conditions are not suitable for well installation, the maximum drilling depth may be revised.

Boulders and bedrock encountered during well installation may be cored by standard diamond-core drilling methods using an NX, NQ, HQ size core barrel or other if specified in the project-specific work plan. All rock cores recovered will be logged by a qualified individual, and stored in labeled wooden core boxes. The cores will be stored by the firm until the project is completed or for at least one year. Drilling logs will be prepared by a qualified individual who will be present during drilling operations. One copy of each field boring and well construction log and groundwater data, will typically be submitted as part of the investigation summary report (e.g., Remedial Investigation Report). The RQD value shall be calculated for each 5-foot section. Information provided in the logs shall include, but not be limited to, the following:

- Date(s), test hole identification, and project identification;
- Name of individual developing the log;
- Name of driller and assistant(s);
- Drill, make and model, auger size;
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove material from within the hollow stem augers);
- Standard penetration test (ASTM D-1586) blow counts;
- Field diagram of each monitoring well installed with the depth to bottom of well/ screen, top of screen, length of riser, depth of steel casing, depths of sand pack, bentonite seal, grout, type of well completion etc.;
- Depth of each change of stratum;
- Identification of the material of which each stratum is composed, according to the USCS system or standard rock nomenclature, as appropriate;
- Depth interval from which each sample was taken, sample identification, and sample time;
- Depth at which hole diameters (bit sizes) change;
- Depth at which groundwater is encountered;
- Drilling fluid and quantity of water lost during drilling;
- Depth or location of any loss of tools or equipment;
- Depths of any fractures, joints, faults, cavities, or weathered zones

7.0 GROUNDWATER SAMPLING PROCEDURES

The groundwater in all new monitoring wells will be allowed to stabilize for at least 24-hours following development prior to sampling. Water levels will be measured to within 0.01 feet prior to purging and sampling. Sampling of each well will typically be accomplished in one of two ways; active or passive.

Active Sampling:

Active sampling includes bailing or pumping. Purging will be completed prior to active sampling if specified in the project-specific work plan. During purging, the following will be recorded in field books or groundwater sampling logs:

- date
- purge start time
- weather conditions
- presence of NAPL, if any, and approximate thickness
- pump rate
- pH
- dissolved oxygen
- temperature
- conductivity
- redox
- turbidity
- depth of well
- depth to water
- purge end time
- volume of water purged

In general, wells will be purged until the pH, conductivity, temperature, dissolved oxygen, redox, and turbidity of the water being pumped from the well have stabilized with a turbidity goal of 50 NTU (may be lower for metals analysis).

Passive Sampling:

Groundwater samples will be collected via passive methods (i.e., no-purge) according to the following procedures and in the volumes specified in Table 10-1:

- Samples will be collected via passive diffusion bag (PDB) samplers. PDB samplers are made of low-density polyethylene plastic tubing (typically 4 mil), filled with laboratory grade (ASTM Type II) deionized water and sealed at both ends.
- Pre-filled PDBs will not be stored for longer than 30 days and will be kept stored at room temperature in a sealed plastic bag until ready to use.
- PDBs filled in the field will be used immediately and not stored for future use.
- PDB samplers will only be used to collect groundwater samples which will be analyzed for VOCs.
- Mesh covers will be utilized for open rock holes as to not puncture the PDB and will be secured to the bag using zip-ties.
- PDB samplers will be deployed by hanging in the well at the depth(s) specified in the project-specific work plan. The PDB samplers will be deployed at least 14 days prior to sampling;
- When transferring water from the PDB to sample containers, care will be taken to avoid agitating the sample, since agitation promotes the loss of volatile constituents;
- Gloves will be changed between collection of each PDB and tools used to open the PDB will be decontaminated with an alconox and potable water solution between each PDB;
- Any volume not used will be treated as investigation derived waste;
- Any observable physical characteristics of the groundwater (e.g., color, sheen, odor, turbidity) at the time of sampling will be recorded; and
- Weather conditions (i.e., air temperature, sky condition, recent heavy rainfall, drought conditions) at the time of sampling will be recorded.

8.0 SOIL VAPOR INTRUSION SAMPLING PROCEDURES

Soil vapor intrusion (SVI) sampling is to be conducted in accordance with the *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates. Tracer gas testing is to be conducted for sub-slab sampling points to ensure concentrations of the tracer gas are not detected in the sub-slab at greater than 10% of the concentration detected in the atmosphere. An outdoor air sample is to be collected at an upwind direction as a control. A building inventory should be completed to document building construction information and identify products that may be contributing to the levels in indoor air.

9.0 FIELD DOCUMENTATION

9.1 Daily Logs/ Field Notebook

Daily logs are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. Daily logs may be kept in a project-specific notebook labelled with the project name/ number and contact information.

The daily log is the responsibility of the field personnel and will include:

- Name of person making entry;
- Start and end time of work;
- Names of team members on-site;
- Changes in required levels of personnel protection:
  - Level of protection originally used;
  - Changes in protection, if required; and
  - Reasons for changes.
- Air monitoring locations, start and end times, and equipment identification numbers;
- Summary of tasks completed;
- Summary of samples collected including location, matrix, etc.
- Field observations and remarks;
- Weather conditions, wind direction, etc.
- Any deviations from the work plan;
- Initials/ signature of person recording the information.

As with any data logbooks, no pages will be removed for any reason. If corrections are necessary, these must be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction must be initialed and dated. Corrected errors may require a footnote explaining the correction.

Sample documents, forms, or field notebooks are not to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document. If an error is made on a document assigned to one individual, that individual may make corrections simply by crossing a line through the error and entering the corrected information. The incorrect information should not be obliterated. Any subsequent error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

9.2 Photographs

Photographs will be taken to document the work. Documentation of a photograph is crucial to its validity as a representation of an existing situation. Photographs should be documented with date, location, and description of the photograph.

10.0 INVESTIGATION DERIVED WASTE

Purpose:

The purposes of these guidelines are to ensure the proper holding, storage, transportation, and disposal of materials that may contain hazardous wastes. Investigation-derived waste (IDW) included the following:

- Drill cuttings, drilling mud solids;
- Water produced during drilling;
- Well development and purge waters, unused PDB waters;
- Decontamination waters and associated solids;

Procedure:

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.
2. Place different media in separate drums (i.e., do not combine solids and liquids).
3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.
4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.
5. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.
6. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.
7. For wastes determined to be hazardous in character, be aware on accumulation time limitations. Coordinate the disposal of these wastes with the Owner and NYSDEC.
8. Dispose of investigation-derived wastes as follows;
    - Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels consistent with background, may be spread on-site (pending NYSDEC approval) or otherwise treated as a non-waste material.
    - Soils, water, and other environmental media in which organic compounds are detected or metals are present above background will be disposed as industrial waste or hazardous waste, as appropriate. Alternate disposition must be consistent with applicable State and Federal laws.
    - Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate disposal as industrial wastes
9. If waste is determined to be listed hazardous waste, it must be handled as hazardous waste as described above, unless a contained-in determination is accepted by the NYSDEC.

11.0 DECONTAMINATION PROCEDURES

Sampling methods and equipment have been chosen to minimize decontamination requirements and to prevent the possibility of cross-contamination. Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect samples between composite sample locations will not require decontamination between collection of samples. All drilling equipment will be decontaminated after the completion of each drilling location. Special attention will be given to the drilling assembly and augers.

Split spoons and other non-disposable equipment will be decontaminated between each sampling location. The sampler will be cleaned prior to each use, by one of the following procedures:

- Initially cleaned of all foreign matter;
- Sanitized with a steam cleaner;

OR

- Initially cleaned of all foreign matter;
- Scrubbed with brushes in alconox solution;
- Triple rinsed; and
- Allowed to air dry.

Other sampling equipment including but not limited to low-flow sampling pumps, surface soil sampling trowel, water level meters, etc. will be decontaminated between sample locations using an alconox solution. Consumables including gloves, tubing, bailers, string, etc. will be dedicated to one sample location and will not be reused.

12.0 SAMPLE CONTAINERS

The containers required for sampling activities are pre-washed and ordered directly from a laboratory, which has the containers prepared in accordance with USEPA bottle washing procedures. The following tables detail sample volumes, containers, preservation and holding time for typical analytes.

Table 12.1
Groundwater Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no headspace	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	14 days
Semi-volatile Organic Compounds (SVOCs)	1,000 or 200-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Polychlorinated biphenyls (PCBs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	250-ml HDPE	One (1); fill completely	Cool to 4° C (ice in cooler) Nitric acid to pH <2	180 days (28 for mercury)
Cyanide	1,000-mL HDPE		Cool to 4° C (ice in cooler) Nitric acid to pH <2	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

TABLE 12.2
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days
VOCs via EPA 5035	40 mL vials with sodium bisulfate, methanol, and/or DI water	Three (3), 5 grams each	Cool to 4° C (ice in cooler)	2 days
SVOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
PCBs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14/40 days
Metals	4-oz. glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	180 days (28 for mercury)
Cyanide	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

Table 12.3
Air Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	1 – Liter Summa® Canister	One (1) 1-Liter 1.4- Liter for MS/MSD	N/A	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

13.0 SAMPLE CUSTODY AND SHIPMENT

13.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

AA-BB-CC-DD-EE

AA:	This set of initials indicates an abbreviation for the Site from which the sample was collected.
BB	This set of initials represents the type of sample (e.g., SB for soil boring and MW for monitoring well)
CC:	These initials identify the unique sample location number.
DD:	These initials identify the sample start depth (if soil sample)
EE	These initials identify the sample end depth (if soil sample)

The above sample identification may be modified at the discretion of LaBella. Each sample will be labeled, chemically preserved (if required) and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection when possible. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers. The sample label will give the following information:

- Date and time of collection
- Sample identification
- Analysis required
- Project name/number
- Preservation

Sample tags attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample tags are to be placed on the bottles so as not to obscure any QC lot numbers on the bottles; sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

13.2 Chain of Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during their collection, transportation, and storage through analysis. All chain-of-custody requirements comply with standard operating procedures indicated in USEPA sample handling protocol.

Sample identification documents must be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field notebooks;
- Sample label; and
- Chain-of-custody records.

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

As few persons as possible should handle samples. Sample bottles will be obtained pre-cleaned from the laboratory. Sample containers should only be opened immediately prior to sample collection. The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules. The sample collector will record sample data in the field notebook and/or field logs.

The chain-of-custody record must be fully completed in duplicate, using black carbon paper where possible, by the field technician who has been designated by the project manager as responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints on the chain of custody.

13.3 Transfer of Custody and Shipment

The coolers in which the samples are packed must be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer.

Shipping containers must be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information are entered on the chain-of-custody.

All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment. The other copies are distributed appropriately to the site manager.

13.4 Custody Seals

Custody seals are preprinted adhesive-backed seals. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before shipment. On receipt at the laboratory, the custodian must check (and certify, by completing the package receipt log and LABMIS entries) that seals on boxes and bottles are intact. Strapping tape should be placed over the seals to ensure that seals are not accidentally broken during shipment.

13.5 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- The label should not cover any bottle preparation QC lot numbers.
- All sample bottles are placed in a plastic bag and/or individual bubble wrap sleeves to

minimize the potential for cross-contamination and breaking.

- Shipping coolers must be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- The sample bottles must be placed in the cooler in such a way as to ensure that they do not directly come in contact with other samples. Ice will be added to the cooler to ensure that the samples reach the laboratory at temperatures no greater than 4°C.
- Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material such as sawdust, sand, etc., be used.
- A chain of custody record must be placed in a plastic bag inside the cooler. Custody seals must be affixed to the sample cooler.

13.6 Sample Shipment

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of tape wrapped around the package and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking the seal. Chain of custody seals shall be placed on the container, signed, and dated prior to taping the container to ensure the chain of custody seals will not be destroyed during shipment. In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

Field personnel will make arrangements for transportation of samples to the lab. The lab must be notified as early as possible regarding samples intended for Saturday delivery. The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States DOT in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory and analyzed within the holding times specified by the analytical method for that particular analyte.

All chain-of-custody requirements must comply with standard operating procedures in the USEPA sample handling protocol.

13.7 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples and verifies that the sample identification number matches that on the chain-of-custody record and traffic reports, if required. Pertinent information as to shipment, pickup, and courier is entered on the chain of custody or attached forms.

14.0 DELIVERABLES

This section will describe laboratory requirement and procedures to be followed for laboratory analysis. Samples collected in New York State will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory. When required, analyses will be conducted in accordance with the most current NYSDEC Analytical Services Protocol (ASP). For example, ASP Category B reports will be completed by the laboratory for samples representing the final delineation of the Remedial Investigation, confirmation samples, samples to determine closure of a system, and correlation samples taken using field testing

technologies analyzed by an ELAP-certified laboratory to determine correlation to field results. Data Usability Summary Reports will be completed by a third party for samples requiring ASP Category B format reports. Electronic data deliverables (EDDs) will also be generated by the laboratory in EQUIS format for samples requiring ASP Category B format reports.

NYSDEC DER-10 DUSR requirements are as follows:

a) Background. The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data with the primary objective to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

    1. The development of the DUSR must be carried out by an experienced environmental scientists, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. The DUSR is developed from:

        i. A DEC ASP Category B Data Deliverable; or
        ii. The *USEPA Contract Laboratory Program National Functional Data Validation Standard Operating Procedures for Data Evaluation and Validation.*

    2. The DUSR and the data deliverables package will be reviewed by DER staff. If full third party data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later data on the same data package used for the development of the DUSR.

b) Personnel Requirements. The person preparing the DUSR must be pre-approved by DER. The person must submit their qualifications to DER documenting experience in analysis and data validation. Data validator qualifications are available on DEC's website identified in the table of contents.
c) Preparation of a DUSR. The DUSR is developed by reviewing and evaluating the analytical data package. In order for the DUSR to be acceptable, during the course of this review the following questions applicable to the analysis being reviewed must be answered in the affirmative.

        1. Is the data package complete as defined under the requirements for the most current DEC ASP Category B or USEPA CLP data deliverables?
        2. Have all holding times been met?
        3. Do all the QC data; blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
        4. Have all of the data been generated using established and agreed upon analytical protocols?
        5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?
        6. Have the correct data qualifiers been used and are they consistent with the most current DEC ASP?
        7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

d) Documenting the validation process in the DUSR. Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples

and the analytical parameters, including data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed.

15.0 EQUIPMENT CALIBRATION

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Section 11 lists the major instruments to be used for sampling and analysis. In addition, brief descriptions of calibration procedures for major field and laboratory instruments follow.

15.1 Photovac/MiniRae Photoionization Detector (PID)

Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. Field calibration will be performed on a daily basis. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers. All calibration procedures will follow the manufacturer recommendations.

15.2 Conductance, Temperature, and pH Tester

Temperature and conductance instruments are factory calibrated. Temperature accuracy can be checked against an NBS certified thermometer prior to field use if necessary. Conductance accuracy may be checked with a solution of known conductance and recalibration can be instituted, if necessary.

15.3 O_2/Explosimeter

The specific meter used at the time of work shall be calibrated in accordance with manufacturer recommendations. The model 260 O_2/ Explosimeter is described below.

The primary maintenance item of the Model 260 is the rechargeable 2.4 volt (V) nickel cadmium battery. The battery is recharged by removing the screw cap covering receptacle and connecting one end of the charging cable to the instrument and the other end to an 115V AC outlet.

The battery can also be recharged using a 12V DC source. An accessory battery charging cable is available, one end of which plugs into the Model 260 while the other end is fitted with an automobile cigarette lighter plug.

Recommended charging time is 16 hours.

Before the calibration of the combustible gas indicator can be checked, the Model 260 must be in operating condition. Calibration check-adjustment is made as follows:

1. Attach the flow control to the recommended calibration gas tank.
2. Connect the adapter-hose to the flow control.
3. Open flow control valve.
4. Connect the adapter-hose fitting to the inlet of the instrument; after about 15 seconds the LEL meter pointer should be stable and within the range specified on the calibration sheet accompanying the calibration equipment. If the meter pointer is not in the correct

range, stop the flow; remove the right hand side cover. Turn on the flow and adjust the "S" control with a small screwdriver to obtain a reading as specified on the calibration sheet.

5. Disconnect the adapter-hose fitting from the instrument.
6. Close the flow control valve.
7. Remove the adapter-hose from the flow control.
8. Remove the flow control from the calibration gas tank.
9. Replace the side cover on the Model 260.

CAUTION: Calibration gas tank contents are under pressure. Use no oil, grease, or flammable solvents on the flow control or the calibration gas tank. Do not store calibration gas tank near heat or fire or in rooms used for habitation. Do not throw in fire, incinerate, or puncture. Keep out of reach of children. It is illegal and hazardous to refill this tank. Do not attach the calibration gas tank to any other apparatus than described above. Do not attach any gas tank other than MSA calibration tanks to the regulator.

15.4 Nephelometer (Turbidity Meter)

LaMotte 2020WE Turbidity Meter is calibrated before each use. The default units are set to NTU and the default calibration curve is created. A 0 NTU Standard (Code 1480) is included with the meter. To calibrate, rinse a clean tube three times with the blank. Fill the tube to the fill line with the blank. Insert the tube into the chamber, close the lid, and select “scan blank”.

TABLE 15.4
List of Major Instruments
for Sampling and Analysis

- MSA 360 0_2 /Explosimeter
- Geotech Geopump II AC/DC Peristaltic Pump
- QED MP50 Controller and QED Sample Pro MicroPurge Bladder Pimp
- Horiba U-53 Multi-Parameter Water Quality Meter
- LaMotte 2020WE Turbidity Meter
- EM-31 Geomics Electromagnetic Induction Device
- Mini Rae Photoionization Detectors (3,000, ppbRAE, etc.)

16.0 INTERNAL QUALITY CONTROL CHECKS

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of field equipment. Field-based QC will comprise at least 10% of each data set generated and will consist of standards, replicates, spikes, and blanks. Field duplicates and field blanks will be analyzed by the laboratory as samples and will not necessarily be identified to the laboratory as duplicates or blanks. For each matrix, field duplicates will be provided at a rate of one per 10 samples collected or one per shipment, whichever is greater. Field blanks which may consist of trip, routine field, and/or rinsate blanks will be provided at a rate of one per 20 samples collected for each media, or one per shipment, whichever is greater. Frequency of QC data may vary from project to project; refer to the project-specific work plan for QC requirements.

Calculations will be performed for recoveries and standard deviations along with review of retention times, response factors, chromatograms, calibration, tuning, and all other QC information generated. All QC data, including split samples, will be documented in the site logbook and/or appropriate field logs. QC records will be retained and results reported with sample data.

16.1 Field Blanks

Various types of blanks are used to check the cleanliness of field handling methods. The following types of blanks may be used: the trip blank, the routine field blank, and the field equipment blank. They are analyzed in the laboratory as samples, and their purpose is to assess the sampling and transport procedures as possible sources of sample contamination. Field staff may add blanks if field circumstances are such that they consider normal procedures are not sufficient to prevent or control sample contamination, or at the direction of the project manager. Rigorous documentation of all blanks in the site logbooks is mandatory.

- **Routine Field Blanks** or bottle blanks are blank samples prepared in the field to access ambient field conditions. They will be prepared by filling empty sample containers with deionized water and any necessary preservatives. They will be handled like a sample and shipped to the laboratory for analysis.
- **Trip Blanks** are similar to routine field blanks with the exception that they are **not** exposed to field conditions. Their analytical results give the overall level of contamination from everything except ambient field conditions. For the RI/FS, one trip blank will be collected with every shipment of water samples for VOC analysis. Each trip blank will be prepared by filling a 40-ml vial with deionized water prior to the sampling trip, transported to the site, handled like a sample, and returned to the laboratory for analysis without being opened in the field. Trip blanks may be provided by the laboratory, shipped with the bottleware, and kept with the sampling containers until analysis.
- **Field Equipment Blanks** are blank samples (sometimes called transfer blanks or rinsate blanks) designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use, and that cleaning procedures between samples are sufficient to minimize cross contamination. If a sampling team is familiar with a particular site, they may be able to predict which areas or samples are likely to have the highest concentration of contaminants. Unless other constraints apply, these samples should be taken last to avoid excessive contamination of sampling equipment.

16.2 Duplicates

Duplicate samples are collected to check the consistency of sampling and analysis procedures. The following types of duplicates may be collected.

- **Blind duplicate** samples consist of a set of two samples collected independently at a sampling location during a single sampling event. Blind duplicates are designed to assess the consistency of the overall sampling and analytical system. Blind duplicate samples should not be distinguishable by the person performing the analysis.
- **Matrix Spike and Matrix Spike Duplicates (MS/MSDs)** consist of a set of three samples collected independently at a sampling location during a single sampling event. These samples are for laboratory quality control checks.