Interim Remedial Measures Work Plan
NYSDEC Site #828196

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
30 Church Street, Room 300B
Rochester, New York 14614

LaBella Project No. 2182888

September 2019
Revised December 2019

LaBella
Powered by partnership.

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

Table of Contents

CERTIFICATION

I, Ann Aquilina certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measures 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).

100521	12/17/19	
NYS Professional Engineer #	Date	Signature

1.0 INTRODUCTION

LaBella Associates, D.P.C. ("LaBella") has developed this Interim Remedial Measures Work Plan (IRMWP) for the property located at 68-92 Genesee Street, Monroe County, City of Rochester, New York, hereinafter referred to as "the Site". The City of Rochester (City) entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) on May 1, 2019 (Site #828196). This Work Plan has been developed in accordance with the Order on Consent and NYSDEC Division of Environmental Remediation (DER)-10 *Technical Guidance for Site Investigation and Remediation* Issued May 3, 2010.

A Phase I Environmental Site Assessment (ESA) conducted in 2013 identified environmental concerns associated with historical operations including dry cleaning and automotive repair. Subsequently, a Phase II ESA conducted in 2016 identified the presence of tetrachloroethylene (PCE), a dry cleaning solvent, and other chlorinated volatile organic compounds (CVOCs) in the subsurface. Although the primary contaminants of concern are CVOCs, urban fill containing elevated concentrations of select heavy metals and polyaromatic hydrocarbons (PAHs) as well as two (2) isolated areas of petroleum-contaminated soil were also identified. A Site Investigation Work Plan (SIWP) dated August 2019 was submitted to the NYSDEC for review and comment.

This IRMWP includes four (4) separate IRMs. The purpose of this IRMWP is to remediate discrete areas of petroleum and metals impacted soils and install a sub-slab depressurization system (SSDS) to mitigate CVOCs in the Site building ("Southern Building").

2.0 STIE DESCRIPTION AND HISTORY

2.1 Site Description

The Site comprises approximately 0.76-acres of land located on the northeastern corner of the intersection of Genesee Street and Clifton Street, in a predominately urban area (refer to Figure 2). The Site is currently occupied by one (1) approximately 2,500 sq. ft. structure ("Southern Building") constructed in 1975 which operates as a coin-operated laundromat. The former 25,000-square foot (sq. ft.) United Cleaners building ("Former Northern Building") located in the northern portion of the Site, formerly utilized for dry cleaning operations, was demolished in the spring of 2016 (refer to Figure 2). The eastern portion of the Former Northern Building floor slab was left in place (refer to Figure 3). The City acquired the property through a public foreclosure auction held on July 23, 2019. The deed was recorded with the Monroe County Clerk's office on July 23, 2019 in Liber 12213 of Deeds, page 525.

2.2 Adjacent Properties

Adjacent properties include Bulls Head Plaza (which the City of Rochester acquired in October 2018 and is mostly vacant), to the north and east, a pawn shop and residential properties to the south beyond Clifton Street, and St. Mary's Hospital to the west beyond Genesee Street.

LaBella recently conducted a Phase I ESA and Phase II ESA at the northern adjacent Bulls Head Plaza addressed as 835-855 West Main Street and identified CVOCs and urban fill material. The Phase II ESA completed at the adjacent Bulls Head Plaza property included installation of numerous investigation points in close proximity to the north and east of the Site. A SSDS was installed in occupied portions of the Bulls Head Plaza that warranted mitigation. Additional relevant information regarding the Phase II ESA at this adjacent property is summarized in Section 2.4

2.3 Site History

LaBella reviewed a Phase I ESA conducted by Bergmann Associates for the City dated December 6, 2013. The following summarizes the Site history based on a review of the Phase I ESA (refer to Section 2.4 for additional information regarding the 2013 Phase I ESA).

The Site was occupied by residential structures from at least 1892 until at least 1950. Ronda Place, a dead-end street, was previously located across the center of the Site from at least 1912 until at least 1950. The Former Northern Building was constructed in at least 1938 and utilized for automotive sales and services by Schoen Brothers Automobiles until at least 1950. From at least 1960 until at least 1965, the Former Northern Building was occupied by Dorschel, Inc. and utilized for automotive sales and services. The Former Northern Building appears to have been occupied by United Cleaners from at least 1968 until at least 2008 and utilized for dry cleaning. The Site is listed on the 1977 Monroe County Department of Health Dry Cleaning Database as using 2,200 gallons of perchlorotheylene (also known as tetrachloroethylene, PERC or PCE) annually, which is the second highest volume listed on the database.

A gasoline filling station occupied the southern portion of the Site from approximately the 1920's until the 1960's. The 1938 Sanborn Fire Insurance Map depicts three (3) USTs in the vicinity of the former gasoline filling station. The existing Southern Building was constructed in at least 1975 and has been utilized as a coin-operated laundromat from at least 1975 until present.

One (1) 10,000-gallon UST containing #2 Fuel Oil was reportedly removed from the Site in December 1999. During the Phase I ESA Site visit, two (2) aboveground storage tanks (ASTs) were observed in the basement of the former Northern Building. One (1) tank appeared to be approximately 250-gallons in capacity and the second tank appeared to be approximately 1,000-gallons in capacity. These two (2) tanks were removed during the 2016 building demolition.

The Former Northern Building was demolished in 2016. The eastern portion of the concrete floor slab was in poor condition and was left in place to avoid exposure to the subsurface and prevent the potential further migration of contaminants beneath the slab. Utilities formerly servicing the building were abandoned and the basement was filled in place.

2.4 Summary of Previous Environmental Studies

The following environmental reports have been developed for the Site and adjacent properties:

- Phase I ESA, Bergmann Associates, December 6, 2013
- Tank Closure Report, LaBella, October 20, 2016
- Phase II ESA, LaBella, December 20, 2016
- Phase II ESA, Bulls Head Plaza (adjacent property) LaBella, April 2018
- Soil Vapor Intrusion Assessment, Bulls Head Plaza (adjacent property), LaBella, August 2018

These reports are summarized below.

Phase I ESA, Bergmann Associates, December 6, 2013

A Phase I ESA completed by Bergmann Associates (Bergmann) for the City dated December 6, 2013 identified several Recognized Environmental Conditions (RECs) at the Site generally associated with historical operations completed at the Site, surrounding properties, and conditions observed by Bergmann at the time of the Site visits (note this Phase I ESA was conducted prior to demolition of the Former Northern Building). Specifically, RECs were identified associated with the following items. Note that the following summary of RECs includes information from LaBella's review of historical resources such as Sanborn Fire Insurance Mapping and City of Rochester Building Department Permits.

- *Former Hazardous Waste Handler*: The portion of the Site addressed as 68 Genesee Street (i.e., Former Northern Building) is listed as a hazardous waste handler and violations associated with this listing were issued in 1986 and 1987. It should be noted that the Former Northern Building was utilized for dry cleaning operations at that time. Additional information associated with this listing and associated violations were not identified by the Phase I ESA.
- *Former Dry Cleaning Operations*: The Former Northern Building was occupied by United Cleaners for dry cleaning purposes from the late 1960's to approximately 2007. Dry cleaning facilities commonly utilize chlorinated solvents such as PCE in operations.
- *Former Gasoline Filling Station*: A gasoline filling station was identified associated with 94 Genesee Street (previously the southwestern corner of the Site) from the 1920's to the 1960's. Sanborn Fire Insurance mapping depicts the presence of three (3) gasoline tanks on the southwestern portion of the Site in 1938. In addition, the Former Northern Building appears to have been utilized as an automotive sales and service center from at least the 1930's to at least the 1950's (prior to operation as a dry cleaning facility). The 1938 and 1950 Sanborn Fire Insurance Maps depict one (1) gasoline tank within the footprint of the former Northern Building.
- *Potential Underground Storage Tanks*: Records obtained from the City of Rochester identified the following listings associated with tanks:
    - Installation of two (2) pumps on a fuel island in 1947;
    - Installation of three (3) 2,000-gallon gasoline tanks and associated pumps in 1949;
    - Installation of one (1) gasoline tank of unspecified capacity in 1951;
    - Installation of one (1) fuel oil tank of unspecified capacity associated with the dry cleaning facility (i.e., the Northern Building) in 1968; and,
    - Removal of one (1) 8,000-gallon fuel oil UST in 1999.

  The fuel oil tank installed in 1968 appears to be the tank listed as removed in 1999 as the 1968 listing indicates this tank was associated with the dry cleaning facility and mapping included in the permit file for the 1999 fuel oil tank removal shows that the removed tank was located adjacent to the south of the dry cleaning facility's boiler room. In addition, the mapping in the permit file for the 1999 tank removal is originally dated March 7, 1968 and thus may be associated with the installation of the fuel oil tank in 1968.
  Note: The tank pit presumably associated with the fuel oil UST was encountered during advancement of a soil boring during the 2016 Phase II ESA. Two (2) tanks, one (1) 250-gallon and one (1) 1,000-gallon, were removed during building demolition. Two (2) 1,000-gallon USTs were removed in 2016 by LaBella.
- *Hazardous Material Storage*: Numerous containers of hazardous and potentially hazardous containers were identified during Bergmann's site visits. It should be noted that operations within the Northern Building ceased several years prior to Bergmann's site visits and these containers appear to have been abandoned in the building following closure of the United Cleaners facility.

- *Current Underground Storage Tanks*: A small basement (approximately 275-sf) was present in the former Northern Building. Bergmann identified two (2) ASTs with capacities of approximately 250-gallons and 1,000-gallons in the basement during a 2013 site visit. The basement was flooded with approximately 2-feet (ft.) of water at the time and consequently the contents of those tanks could not be evaluated at that time.
- *Note: These tanks were removed as part of demolition activities and the basement was filled in.*
- *Vapor Intrusion*: Based on the potential for volatile organic compounds (VOCs) to be present in the Site subsurface associated with the historical uses of the Site and/or surrounding properties, the potential for soil vapor intrusion was identified at the Site.
- *Biological Agents*: Bergmann identified the presence of mold and bird droppings throughout the Northern Building during their 2013 site visits. Bulk samples of mold collected as part of the Phase I ESA reported identified at least five (5) types of toxic mold in the former Northern Building. LaBella understands that this issue was resolved as part of the building demolition.
- *Former Automobile Station on Adjoining Property*: An automobile garage was reportedly present adjacent to the north of the Site (i.e., 62 Genesee Street) in at least 1930. Subsurface conditions in the vicinity of this former automobile garage are unknown.

In addition to the RECs identified by the December 2013 Phase I ESA, LaBella identified the following additional potential causes of subsurface impacts at the Site:

- *Long-Term Use of a Hydraulic Elevator in the Northern Building*: Elevator equipment can sometimes release hydraulic fluid (potentially containing polychlorinated biphenyls) into the surrounding subsurface.
- *Former Adjacent Machine Shop*: A machine shop is depicted adjacent to the northeastern corner of the Northern Building in the 1912 Sanborn Fire Insurance Map. Machine shops in this era commonly utilized petroleum products and potentially hazardous substances in their operations.
- *Former Adjacent Underground Storage Tank*: A gasoline UST is depicted on the northern adjacent property in the 1912 Sanborn Fire Insurance Map. The UST is depicted approximately 35-ft. to the north of the Site's northern property line.
- *Preferential Pathways*: Utility mapping depicts the presence of numerous underground utilities entering the Site from Genesee Street, although the extent of these utilities once they enter the Site subsurface is unknown. Underground utilities at the Site may represent conduits for subsurface impacts to be transported. In addition, bedding surrounding underground utilities may act as a preferential pathway to transport impacted groundwater.
  Note: The 2016 Phase II ESA included scoping accessible sewer lines.
- *Unknown Fill Material*: Historical mapping shows the former presence of several residential dwellings and a small street (Ronda Place) in the central and southern portions of the Site from the 1800's until at least 1950. Based on the review of historical mapping, it is unknown if one or more of the prior Site structures had basements and/or other subsurface features. Based on LaBella's experience, basements and other subsurface features were commonly historically filled with readily available material that sometimes included material which is currently considered regulated solid waste by the NYSDEC (e.g., cinders, ash, slag, etc).

Tank Closure Report, LaBella, October 20, 2016

Test pitting activities conducted during the 2016 Phase II ESA (see below) identified two (2) 1,000-gallon underground storage tanks (USTs) within the footprint of the Former Northern Building, presumed to be associated with the former automotive repair facility. One (1) UST contained apparent waste oil and water and one (1) contained unknown petroleum product. The USTs were set approximately 3-ft into bedrock. The USTs were registered with the NYSDEC and removed during an

Interim Remedial Measure (IRM) in 2016. Sidewall soil samples collected indicate that VOCs and SVOCs are present in soil at concentrations that exceed NYSDEC Commissioner Policy (CP)-51 Soil Cleanup Levels. Samples were not collected from the bottom of the UST excavations as the USTs were set into bedrock.

Phase II ESA, LaBella, December 20, 2016

LaBella conducted a Phase II ESA which consisted of:

- evaluation of the Former Northern Building's remaining floor slab;
- evaluation of drains and piping in the Former Northern Building's remaining floor slab;
- geophysical survey;
- advancement of fifty-six (56) overburden soil borings;
- advancement of seven (7) test pits;
- installation of three (3) overburden monitoring wells;
- installation of five (5) bedrock monitoring wells;
- analysis of soil, groundwater, and bedrock samples;
- hydraulic conductivity testing; and
- soil vapor intrusion (SVI) testing at the Southern Building.

The Phase II ESA identified PCE in groundwater at concentrations up to 36 milligrams per liter (mg/L) and in soil at concentrations up to 35,000 micrograms per kilogram (ug/kg) proximate the former dry cleaning operations within the Former Northern Building. Based on the conceptual Site model developed during the Phase II ESA, PCE impacts in groundwater above NYSDEC criteria appear to be present Site-wide. Based on the elevated levels of PCE identified in soil, NYSDEC Spill #1603662 was opened in July 2016 and is currently active.

An EM-61 geophysical survey and associated test pits identified the presence of two (2) USTs that were removed as an IRM as documented in the 2016 Tank Closure Report.

SVI testing conducted in the Southern Building detected PCE at concentrations that warrant mitigation in accordance with the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates ("NYSDOH Guidance Document"). In addition, mercury, lead, petroleum compounds, and polycyclic aromatic hydrocarbons (PAHs) were identified in soil above applicable NYSDEC criteria.

The following Site Conceptual Model was developed during the Phase II ESA (refer to Figure 3):

> Chlorinated Volatile Organic Compounds (CVOCs): Based on the Phase II ESA, CVOCs appear to be the primary contaminant of concern at the Site. Worst-case impacts appear to be focused in the central-eastern portion of the remaining floor slab in the northeastern quadrant of the Site with lower level impacts identified in groundwater to the southwest of this area. Groundwater flow modeling has identified shallow bedrock groundwater flow to be to the west-southwest, generally towards Genesee Street. This is indicative of the migration of higher level impacts in the northeastern portion of the Site to the southwestern portion of the Site and could explain the lower level impacts on the southwestern portion of the Site.
>
> Impacts to soil in the northeastern portion of the Site appear to be present from just below the floor slab to the top of bedrock, which is located between approximately 3.5-ft and 4-ft bgs in this location. Dry cleaning equipment including an apparent still appears to have been used in this general location. Elevated concentrations of PCE have been identified in the

concrete floor slab in the immediate vicinity of the former dry cleaning equipment, indicating releases of dry cleaning solvents containing PCE to the floor surface during historical operations. In addition, worst-case PID readings as well as PCE concentrations in soil and groundwater were identified within or in the immediate vicinity of the crock located approximately 15-ft to the north of the former dry cleaning equipment. A hard bottom was not identified in the crock and thus this structure could have provided a conduit for liquids directly to the subsurface. Based on the close proximity of the crock to the former dry cleaning equipment, dry cleaning solvent and/or wastewater containing solvents which was released to the floor surface in the vicinity of the equipment may have been directed or washed into the crock and consequently into the underlying soil and bedrock. This could explain the elevated levels of CVOCs identified in this area of the Site.

Petroleum Compounds: Apparent petroleum-impacted soil has been identified in the following two (2) areas of the Site:

Northwestern Quadrant – The geophysical survey and test pitting completed identified two (2) approximately 1,000-gallon USTs which appeared to contain residual petroleum product. At least one (1) of these tanks may be the tank depicted on historical mapping under the footprint of this building. The test pitting and soil boring studies did not identify widespread impacts in the vicinity of these tanks; however, during the removal of these USTs, petroleum impacts were identified in in confirmatory soil samples. These impacts appear to be residual material from the UST(s) and appear to be limited.

Southwestern Quadrant – Evidence of petroleum impairment (i.e., suspect odors, elevated PID readings) were observed in soil borings SB-45 and SB-52. Maximum PID readings recorded in borings SB-45 and SB-52 were 344 ppm and 48 ppm, respectively. These borings were advanced in the vicinity of the former gasoline filling station on the southwestern portion of the Site, surrounding the footprint of the current Southern Building. Several petroleum-related compounds were identified above Unrestricted Use and Protection of Groundwater SCOs but below Commercial Use SCOs in soil samples collected from these borings. SVI samples collected from within the Southern Building did identify the presence of petroleum compounds in sub-slab vapor and indoor air; however, there are no NYSDOH guidance values for these compounds. An additional ten (10) soil borings and four (4) test pits were advanced in this area of the Site; petroleum impacts were not identified in these additional investigation locations.

Based on the apparent lack of widespread impacts and the relatively low-level concentrations identified in soil samples (i.e., not above Commercial Use SCOs), the petroleum impacts observed on the southwestern portion of the Site may be attributed to residual impacts from the former gasoline filling station. However, soil borings and test pits were not advanced within the footprint of the current Southern Building and as such, the potential exists for isolated, higher concentration impacts to be present beneath the building.

Urban Fill: Urban fill including ash and cinders was identified in several locations in the northern portion of the Site, within the footprint of the Former Northern Building. Depths of this fill material generally ranged from 0 to 3-ft bgs. An elevated concentration of mercury was identified in a sample of this material from test pit TP-03 and an elevated concentration of lead was identified in a sample from boring SB-04. The concentrations detected were

above Unrestricted Use and Protection of Groundwater SCOs but below Commercial Use SCOs.

In addition, concentrations of several PAHs were identified above Commercial Use SCOs in samples from borings SB-17 and SB-46. Although ash and cinders were not specifically noted in these locations, PAHs are typically associated with partially combusted petroleum products (e.g, cinders, coal, asphalt, etc.) and may be indicative of additional urban fill material in these areas of the Site. Boring SB-17 was advanced through the crock in the northeastern portion of the Site and thus the PAH impacts could be associated with the washing of waste material containing PAHs into the crock. SB-46 was advanced to the north of the parking lot in the area in which several residential dwellings were previously noted. There is the potential that fill material was generated as part of the demolition of these structures which lead to the presence of elevated concentrations of PAHs in this area of the Site.

The presence of the ash and cinders is likely due to the historical use of this material as fill at the Site, which was common in urban environments in the early and mid-1900's. Compounds commonly found at elevated levels in this material (i.e., heavy metals and PAHs) typically adhere to the soil matrix and are not readily soluble in groundwater. In addition, heavy metals and PAHs typically associated with urban fill were not identified at elevated concentrations in groundwater samples collected at the Site. As such, the migration of impacts within the urban fill material is unlikely via groundwater. In addition, the heavy metal and PAH impacts have been identified in locations that are either currently capped by impervious surfaces (i.e., asphalt pavement) or are located at least 1-ft bgs. As such, active remediation of these impacts does not appear warranted. However, low-level impacts have been identified in the fill and this material is considered a regulated solid waste by the NYSDEC and thus should be managed through an Environmental Management Plan (or similar).

Phase II ESA, Bulls Head Plaza (adjacent property), LaBella, April 2018
LaBella conducted a Phase II ESA at the northern/eastern adjacent property known as the Bulls Head Plaza in 2018. This report was previously shared with the NYSDEC under separate cover. The assessment consisted of advancement of seven (7) test pits, thirty-three (33) overburden soil borings, six (6) overburden monitoring wells and nine (9) bedrock wells. CVOCs, primarily PCE were detected in soil and groundwater. Potential sources of PCE impacts include a former dry cleaning facility located in the northern portion of the Bulls Head Plaza and the former dry cleaning operations at 68-92 Genesee Street. Fill material was also encountered.

Soil Vapor Intrusion Assessment, Bulls Head Plaza (adjacent property), LaBella, August 2018
A SVI assessment was conducted in occupied areas of the Bulls Head Plaza in 2017 which included three (3) tenant spaces as documented in a letter dated August 6, 2018. Based on the results of the SVI assessment, the southernmost occupied tenant space warranted mitigation. This tenant space is located approximately 50-ft north of the 68-92 Genesee Street Site. A SSDS was installed within this tenant space in 2018 and it is currently operating.

2.5 Geology & Hydrogeology

Fifty-six (56) soil borings, five (5) bedrock borings, and seven (7) test pits were advanced at the Site during the 2016 Phase II ESA. Soil borings extended to depths ranging from 1.0 to 12.0-ft. bgs. Bedrock was encountered in a majority of soil borings at depths generally ranging from 2.6-6.1-ft.

bgs. Equipment refusal in the northern portion of the Site was generally encountered at depths less than 4-ft. bgs and in the southern portion of the Site was generally encountered at depths greater than 4-ft. SB-42 extended to 12.0-ft. bgs and SB-46 extended to 7.8-ft. bgs which appeared to extend into bedrock. SB-42 was advanced in an apparent former 8,000-gallon UST pit and is assumed to extend to the depth that rock was removed to install the former UST.

Soils encountered generally consisted of fine to coarse gravel, coarse sand and silty sand. Urban fill material consisting of ash and cinders was encountered in several testing locations (SB-08, SB-09, SB-12, SB-13, SB-14, SB-15, SB-22, SB-25, and TP-03) generally located in the northern portion of the Site. Depths of fill material ranged from 0 to 3-ft. bgs.

Bedrock was cored in four (4) locations (BW-01, BW-02, BW-03, and BW-04); however, due to the highly fractured nature of the rock, coring was not completed in BW-05 (note only 3.5-ft. of bedrock was recovered in BW-03 and 0.5-ft. of bedrock was recovered in BW-04). The top of bedrock was encountered during the bedrock drilling at depths ranging from 2.8 to 6.2-ft. bgs with bedrock encountered at shallower depths in the northeastern portion of the Site and deeper in the southwestern portion of the Site. Although recovery was limited due to highly weathered rock, based on known regional geology and observations made at the Site, Decew Dolostone appears to have been encountered immediately below overburden soils in wells BW-01 through BW-04. Several pin to dime-sized vugs and mineralization (apparent calcite) were observed in the dolostone layer observed at the Site. The dolostone appeared gray and sandy in composition. According to the United States Geological Survey (USGS), Decew Dolostone was formed in the Early Silurian Period. Apparent Rochester Shale was encountered in BW-02 beneath the dolostone at a depth of approximately 12-ft bgs. The shale appeared dark gray and silty in composition. USGS indicates that Rochester Shale was also formed in the Early Silurian Period and conformably underlies the Decew Dolostone formation in the Rochester, New York region.

Bedrock wells extended to depths ranging from 14 to 16-ft. bgs. Rock Quality Designation (RQD) values ranged from 0% to 50% which corresponds with the higher weathered and fractured nature of the rock observed during drilling.

Groundwater was encountered at the Site from depths ranging from 8.62 to 10.29-ft. bgs below top of PVC casing (measured on August 10, 2016). Bedrock wells were surveyed by a licensed surveyor, and groundwater elevations were calculated from the August 10, 2016 static water levels ranging from 533.67 to 535.58 feet above mean sea level (fmsl). Groundwater flow direction was mapped and groundwater at the Site appears to flow towards the west-southwest, with a gradient of approximately 1.7-ft. from BW-05 to BW-01. The deepest sewer invert elevation (532.19 fmsl) in the area was identified in the intersection of Genesee Street and Clifton Street, to the southwest of the Site. The sewer line and surrounding relatively porous bedding may at least partially account for the groundwater flow direction to the west-southwest at the Site.

Hydraulic conductivity testing was completed on August 10, 2016 for the five (5) bedrock wells (BW-01 through BW-05). Hydraulic conductivity values were relatively high, and ranged from approximately 6.72E-04 centimeters per second (cm/sec) or 58 cm/day to approximately 2.48E-03 cm/sec or 214 cm/day.

3.0 STANDARDS, CRITERIA & GUIDANCE

This section identifies the Standards, Criteria and Guidance (SCGs) for the Site. The SCGs identified are used in order to quantify the extent of contamination at the Site that may require remedial work based on the cleanup goal.

Soil SCGs:

- New York Codes, Rules, and Regulations (NYCRR) Subpart 375-6.8(b) Soil Cleanup Objectives (SCOs) for Protection of Public Health/Restricted Residential Use;
- NYCRR Subpart 375-6.8(b) SCOs for the Protection of Groundwater; and
- NYSDEC Commissioner Policy 51 (CP-51) Soil Cleanup Levels (SCLs).

Groundwater SCGs:

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

Sub-Slab Vapor and Indoor Air SCGs:

- NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent amendments are utilized for the SCG for soil vapor and indoor air.

4.0 OBJECTIVE

This IRMWP includes four (4) IRMs and the objectives are as follows:

- **IRM #1 – Mercury Impacted Soil Removal** – Remove mercury impacted soil in the area of TP-03 to meet 6 NYCRR Part 375-6.8(b) Restricted Residential Use SCOs.
- **IRM #2 – Lead Impacted Soil Removal** - Remove lead impacted soil in the area of SB-04 to meet 6 NYCRR Part 375-6.8(b) Restricted Residential Use SCOs.
- **IRM #3 – Residual Petroleum Impacted Soil Removal** - Remove petroleum impacted soil in the area of former UST-002 to meet NYSDEC CP-51 SCLs.
- **IRM #4 – SSDS Installation** – Mitigate potential soil vapor intrusion (SVI) of CVOCs into the Southern Building.

IRM #1 and IRM #2 will be conducted following completion of delineation soil borings included as part of the Site Investigation and detailed in the Site Investigation Work Plan. Locations of planned delineation soil borings are shown on Figure 4. If based on the results of the delineation soil borings the area of excavation needs to be changed, the NYSDEC will be notified. This IRMWP is not intended to address all Site-related contaminants. Subsequent Work Plans will be developed as necessary following the Site Investigation.

5.0 INTERIM REMEDIAL MEASURES

5.1 IRM #1 Mercury Impacted Soil Removal

This IRM will include excavation and off-Site disposal of mercury-impacted soil identified during the Phase II ESA within TP-03. Mercury was detected in TP-03 at 0.86 mg/kg which exceeds the Restricted Residential Use SCO of 0.81 mg/kg.

LaBella Environmental LLC will remove mercury-impacted soil using an excavator. Soils will be live-loaded into 6 NYCRR Part 360 permitted trucks or temporarily staged on a minimum 6-mil poly sheeting prior to being loaded in to trucks for transportation and disposal at a 6 NYCRR Part 360 permitted landfill. Refer to Section 5.5 for details regarding stockpiling and storage of material.

In accordance with the Site Investigation Work Plan, four (4) delineation soil borings will be advanced to pre-characterize soil and determine the extent of mercury impacts (refer to Figure 4). Soil borings will be advanced to equipment refusal (anticipated to be approximately 4-5-ft. bgs). Soils from the borings will be retrieved in 4 or 5-ft. macrocore liners and will be continuously assessed for evidence of impairment. Soils will be continuously screened with a photoionization detector (PID) ppbRAE and x-ray fluorescence (XRF) meter. Soils will be logged by a LaBella representative. A soil sample will be collected from each soil boring and analyzed for the following:

- Three (3) for Resource Conservation and Recovery Act (RCRA) metals via USEPA Method 6010/7471.
- One (1) for full-suite parameters including:
    - USEPA Target Compound List (TCL) VOCs including tentatively identified compounds (TICs) using USEPA Method 8260 using collection method 5035;
    - USEPA TCL SVOCs including TICs using USEPA Method 8270;
    - Target Analyte List (TAL) metals using USEPA Methods 6010/7470/7471;
    - Cyanide using USEPA Method 9012;
    - PCBs using USEPA Method 8082;
    - Pesticides using USEPA Method 8081;
    - 1,4-dioxane using USEPA Method 8260C SIM; and
    - per- and polyfluoroalkyl substances (PFAS) using USEPA modified method 537.

In addition, for waste characterization purposes, one soil sample will be collected for the following:

- Toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs and metals via methods 1311/8260/8270/6010/7471;
- Ignitability via method 1030; and
- pH via method 1010.

If delineation soil borings do not exceed Restricted Residential Use SCOs for metals, confirmatory soil samples will not be collected and the IRM excavation will be extend to those delineation soil borings. If delineation soil borings do exceed Restricted Residential SCOs for metals, the excavation will extend slightly past the soil boring locations, and confirmatory soil samples will be collected for RCRA metals in the locations that previously exceeded Restricted Residential Use SCOs. The excavation will continue until each of the four (4) sidewalls meet Restricted Residential Use SCOs for metals.

The IRM excavation will extend to bedrock which is anticipated to be approximately 4-5-ft. bgs. It is anticipated soils within an approximate 10-ft. by 10-ft area will be excavated. The excavation will extend to bedrock; as such, bottom confirmatory samples will not be collected. The excavation will be backfilled with crushed stone from a quarry or mine. Requests to import material will be provided to NYSDEC and material will be approved by NYSDEC prior to import. An estimated 27 tons of mercury-impacted soil will be excavated and disposed of.

5.2 IRM #2 Lead Impacted Soil Removal

This IRM will include excavation and off-Site disposal of lead-impacted soil identified during the Phase II ESA within SB-04. Mercury was detected in SB-04 at 683 mg/kg which exceeds the Restricted Residential Use SCO of 400 mg/kg.

LaBella Environmental LLC will remove lead-impacted soil using an excavator. Soils will be live-loaded into 6 NYCRR Part 360 permitted trucks or temporarily staged on a minimum 6-mil poly sheeting prior to being loaded in to trucks for transportation and disposal at a 6 NYCRR Part 360 permitted landfill. Refer to Section 5.5 for details regarding stockpiling and storage of material.

In accordance with the Site Investigation Work Plan, four (4) delineation soil borings will be advanced to pre-characterize soil and determine the extent of lead impacts (refer to Figure 4). Soil borings will be advanced to equipment refusal (anticipated to be approximately 4-5-ft. bgs). Soils from the borings will be retrieved in 4 or 5-ft. macrocore liners and will be continuously assessed for evidence of impairment. Soils will be continuously screened with a PID ppbRAE and XRF meter. Soils will be logged by a LaBella representative. A soil sample will be collected from each soil boring and analyzed for the following:

- Three (3) for RCRA metals via USEPA Method 6010/7471.
- One (1) for full-suite parameters including:
    - USEPA TCL VOCs including TICs using USEPA Method 8260 using collection method 5035;
    - USEPA TCL SVOCs including TICs using USEPA Method 8270;
    - TAL metals using USEPA Methods 6010/7470/7471;
    - Cyanide using USEPA Method 9012;
    - PCBs using USEPA Method 8082;
    - Pesticides using USEPA Method 8081;
    - 1,4-dioxane using USEPA Method 8260C SIM; and
    - PFAS using USEPA modified method 537.

In addition, for waste characterization purposes, one soil sample will be collected for the following:

- TCLP VOCs, SVOCs and metals via methods 1311/8260/8270/6010/7471;
- Ignitability via method 1030; and
- pH via method 1010.

If delineation soil borings do not exceed Restricted Residential Use SCOs for metals, confirmatory soil samples will not be collected and the IRM excavation will be extend to those delineation soil borings. If delineation soil borings do exceed Restricted Residential SCOs for metals, the excavation will extend slightly past the soil boring locations, and confirmatory soil samples will be collected for RCRA metals in the locations that previously exceeded Restricted Residential Use SCOs. The excavation will continue until each of the four (4) sidewalls meet Restricted Residential Use SCOs for metals.

The IRM excavation will extend to bedrock which is anticipated to be approximately 4-5-ft. bgs. It is anticipated soils within an approximate 10-ft. by 10-ft area will be excavated. The excavation will extend to bedrock; as such, bottom confirmatory samples will not be collected. The excavation will be backfilled with crushed stone from a quarry or mine. Requests to import material will be provided to

NYSDEC and material will be approved by NYSDEC prior to import. An estimated 27 tons of lead-impacted soil will be excavated and disposed of.

5.3 IRM #3 Residual Petroleum Impacted Soil Removal

This IRM will include excavation and off-Site disposal of petroleum-impacted soil identified during the removal of two (2) USTs from the northwestern portion of the Site in August 2016. Several petroleum compounds were identified in confirmatory soil samples collected during the UST removals at concentrations above NYSDEC Commissioner Policy 51 (CP-51) Soil Cleanup Levels (SCLs). The objective of the IRM will be to remove soils from this area containing petroleum-related compounds at concentrations above NYSDEC CP-51 SCLs.

LaBella Environmental LLC will remove petroleum-impacted soil using an excavator. Soils will be live-loaded into 6 NYCRR Part 360 permitted trucks or temporarily staged on a minimum 6-mil poly sheeting prior to being loaded in to trucks for transportation and disposal at a 6 NYCRR Part 360 permitted landfill. Refer to Section 5.5 for details regarding stockpiling and storage of material.

For waste characterization purposes, a soil boring will be advanced in the planned IRM area and one soil sample will be collected for the following:

- Toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs and metals via methods 1311/8260/8270/6010/7471;
- Ignitability via method 1030; and
- pH via method 1010.

The tank pit appears to extend approximately 4-ft into bedrock, to a total depth of approximately 8-ft bgs. The excavation extent will be determined based on visual and olfactory evidence of impairment and screening with a PID. Although the final excavation will be based upon field screening, the IRM excavation is currently anticipated to extend to the bottom of the tank pit (8-ft bgs). Soil from 0-4-ft bgs will be staged on poly sheeting and covered with poly sheeting. A sample will be collected from the stockpile for full suite parameters. If material meets Restricted Residential Use SCOs, a request to reuse soil will be submitted to NYSDEC for reuse of the material as backfill in the same excavation. If the material does not meet Restricted Residential Use SCOs, it will be disposed of off-Site at a permitted facility. Soil from approximately 4-ft bgs to 8-ft bgs (i.e., that with previously observed petroleum impacts) is anticipated to be disposed of off-site. The proposed IRM assumes an excavation area of approximately 130-square feet (refer to Figure 4). Confirmatory sidewall samples will be collected from each sidewall of the excavation for analysis of the following:

- Three (3) for NYSDEC CP-51 List VOCs via USEPA Method 8260.
- One (1) for full-suite parameters including:
    - USEPA TCL VOCs including TICs using USEPA Method 8260 using collection method 5035;
    - USEPA TCL SVOCs including TICs using USEPA Method 8270;
    - TAL metals using USEPA Methods 6010/7470/7471;
    - Cyanide using USEPA Method 9012;
    - PCBs using USEPA Method 8082;
    - Pesticides using USEPA Method 8081;
    - 1,4-dioxane using USEPA Method 8260C SIM; and
    - PFAS using USEPA modified method 537.

It is anticipated the bottom of the excavation will extend to bedrock; as such, bottom confirmatory soil samples are not anticipated to be collected. The excavation will continue until each of the four (4) sidewalls meet CP-51 SCLs. The excavation will be backfilled with excavated material from 0-4-feet (pending analytical data that meets Restricted Residential SCOs) and crushed stone from a quarry or mine. Requests to import/reuse material will be provided to NYSDEC and material will be approved by NYSDEC prior to import/ reuse. An estimated 30 tons of petroleum-impacted soil is anticipated to be excavated and disposed of.

5.4 IRM #4 SSDS Installation

This IRM will include installation of a SSDS in the Southern Building to mitigate potential SVI of CVOCs. SVI sampling conducted during the Phase II ESA at the Southern Building indicated mitigation is warranted due to concentrations of PCE in the sub-slab and indoor air. LaBella will retain Mitigation Tech of Brockport, New York to install a retro-fitted SSDS within the Southern Building. The SSDS will be installed in accordance with the NYSDOH Guidance Document.

5.4.1 Pilot Test

A pilot test will be conducted in order to complete a detailed design and size the fan. The following will be completed as part of the pilot test:

- Examine the floor surfaces for material defects and potential leaks.
- Drill several vacuum holes (4 to 5-inch diameter) into the lowest level concrete slab at anticipated permanent suction point locations. All larger diameter coreholes will be temporarily sealed with polycarbonate sheeting and urethane caulk when not being utilized as part of the pilot test. These vacuum holes may be used as permanent suction points.
- Drill several small diameter (approximately ½ in.) holes to be utilized for vacuum monitoring points (pressure field extension test points). All small diameter coreholes will be temporarily sealed with closed cell backer rod and urethane caulk when not being utilized as part of the diagnostic testing.
- The exact number and location of vacuum/suction holes and monitoring points is not specified herein. Rather, the number and location of such holes will be based on sub-slab characteristics of the building determined during the pilot test. The necessary number of holes and monitoring points will be based on the air flow beneath the slab; however, it is assumed one (1) or two (2) vacuum holes will be drilled for the purpose of the pilot test.
- The points will be tested by applying a known vacuum and measuring differential pressure measurement (using a digital manometer) via vacuum monitoring points. The pressure readings will be utilized to estimate the expected radius of influence for typical suction points.
- Volumetric air flow analysis will also be completed to determine the number of suction points that can be supported by particular blower types, and calculate required pipe sizes.
- Assessment of electrical connection options, practicability of piping routes and penetrations will be assessed.

The pilot test results will be used to develop a SSDS design for installation. The design will include a proposed SSDS layout and installation procedures in accordance with the NYSDOH Guidance Document. The design will include location and size of suction points, vacuum fans, piping and other key components, and a description of procedures and techniques to be employed during installation. The design will be submitted to NYSDEC and NYSDOH for review and comment.

5.4.2 Post-Mitigation Testing

Pressure field extension (PFE) testing will be completed to evaluate performance of the system following system startup. Sub-slab pressure contour lines will be developed to ensure a minimum pressure differential of -0.004 inches of water column ("wc) is achieved across the entire Southern Building.

Following PFE testing to confirm influence of the SSDS, post-mitigation indoor air testing will be completed to ensure system effectiveness. Indoor air samples will be collected from the same locations as the Phase II ESA sampling, IAQ-01 and IAQ-02. An outdoor air sample will also be collected as a control. Samples will be collected in accordance with the NYSDOH Guidance Document using Summa® canisters certified clean by the laboratory and set to 8-hours. A NYSDOH Building Inventory form will be completed. Samples will be analyzed by an ELAP-certified laboratory for VOCs via USEPA Method TO-15.

5.5 Soil Stockpiling, Transportation and Disposal

Excavated soils will be live loaded into 6 NYCRR Part 360 permitted trucks or temporarily staged prior to being loaded in to trucks for transportation and disposal at a 6 NYCRR Part 360 permitted landfill. Staged soil will be stockpiled on minimum 6-mil poly sheeting and covered with a minimum 6-mil poly sheeting pending receipt of analytical results, transportation and disposal. Based on the investigations completed to date, the overburden is unsaturated. However, if excess water is observed in soils, additional actions such as use of truck liners and/or soil dewatering will be completed. Temporary locked fencing will be installed surrounding staged soils and excavation areas until the soils are disposed of and excavations are backfilled.

Due to the known PCE impacts and historical dry cleaning operations at the Site, a contained-in determination will be completed for disposal of material as non-hazardous. Pending approval of the contained-in determination request, non-hazardous soil will be transported to Mill Seat Landfill in Bergen, NY for disposal and hazardous soil will be transported to Horizon Environment Inc. in Quebec Canada, or other appropriately permitted facilities.

6.0 HEALTH AND SAFETY

LaBella's Health and Safety Plan (HASP) for this project is included in Appendix 1.

7.0 COMMUNITY AIR MONITORING PLAN

The NYSDOH Generic Community Air Monitoring Plan (CAMP) and Fugitive Dust and Particulate Monitoring will be utilized for these IRMs and is included in Appendix 2. The Special Requirements CAMP is included in Appendix 2 and will be utilized for any ground intrusive or soil handling activities occurring within 20 feet of an occupied structure or receptor.

8.0 EQUIPMENT DECONTAMINATION

Excavation equipment will be decontaminated before entering and exiting the Site. Trucks entering the exclusion zone will be visually inspected and decontaminated before leaving the site. Additional information regarding the exclusion zone is included in the HASP in Appendix 1.

9.0 QUALITY CONTROL

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 3. Quality assurance/ quality control (QA/QC) sampling will include analysis of one matrix spike/ matrix spike duplicate (MS/MSD) and one (1) blind duplicate sample for each matrix type (i.e., soil and air) at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater. QA/QC sampling will not be conducted for waste characterization samples.

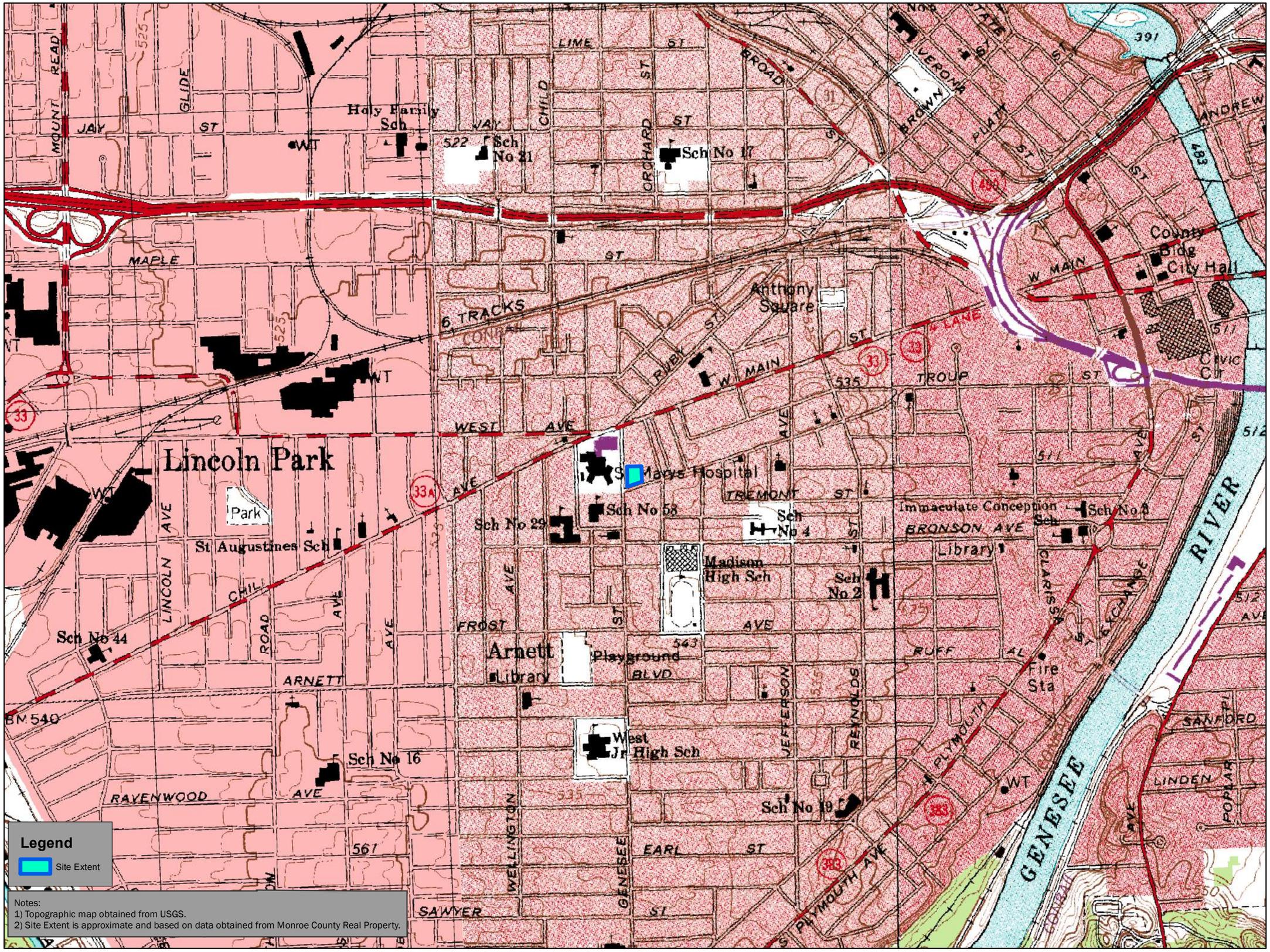
All samples will be delivered under Chain of Custody procedures to a NYSDOH ELAP-certified laboratory. The laboratory will provide NYSDEC ASP Category B Deliverables and NYSDEC EQUIS Electronic Data Deliverables (EDDs) for all samples except waste characterization samples. A data usability summary report (DUSR) will be completed for all ASP Category B format laboratory data packages per DER-10.

10.0 SCHEDULE AND DELIVERABLES

At the conclusion of the investigation a Construction Completion Report (CCR) will be developed detailing the completion of the IRMs. The CCR will include as-built drawings for the IRMs and an Operation and Maintenance Plan for the SSDS.

Work is anticipated to begin within 60 days of Work Plan approval from NYSDEC. The scope of work included herein is anticipated to take approximately 4-6 months to complete. A CCR is anticipated to be complete approximately 60 days following receipt of all validated data.

FIGURES



Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\IRM Work Plan\Figure 1 - Site Location.mxd

LaBella
Powered by partnership.

N
W E
S

0 500 1,000
Feet
1 inch = 1,000 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

CITY OF ROCHESTER

PROJECT:
INTERIM REMEDIAL MEASURES
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

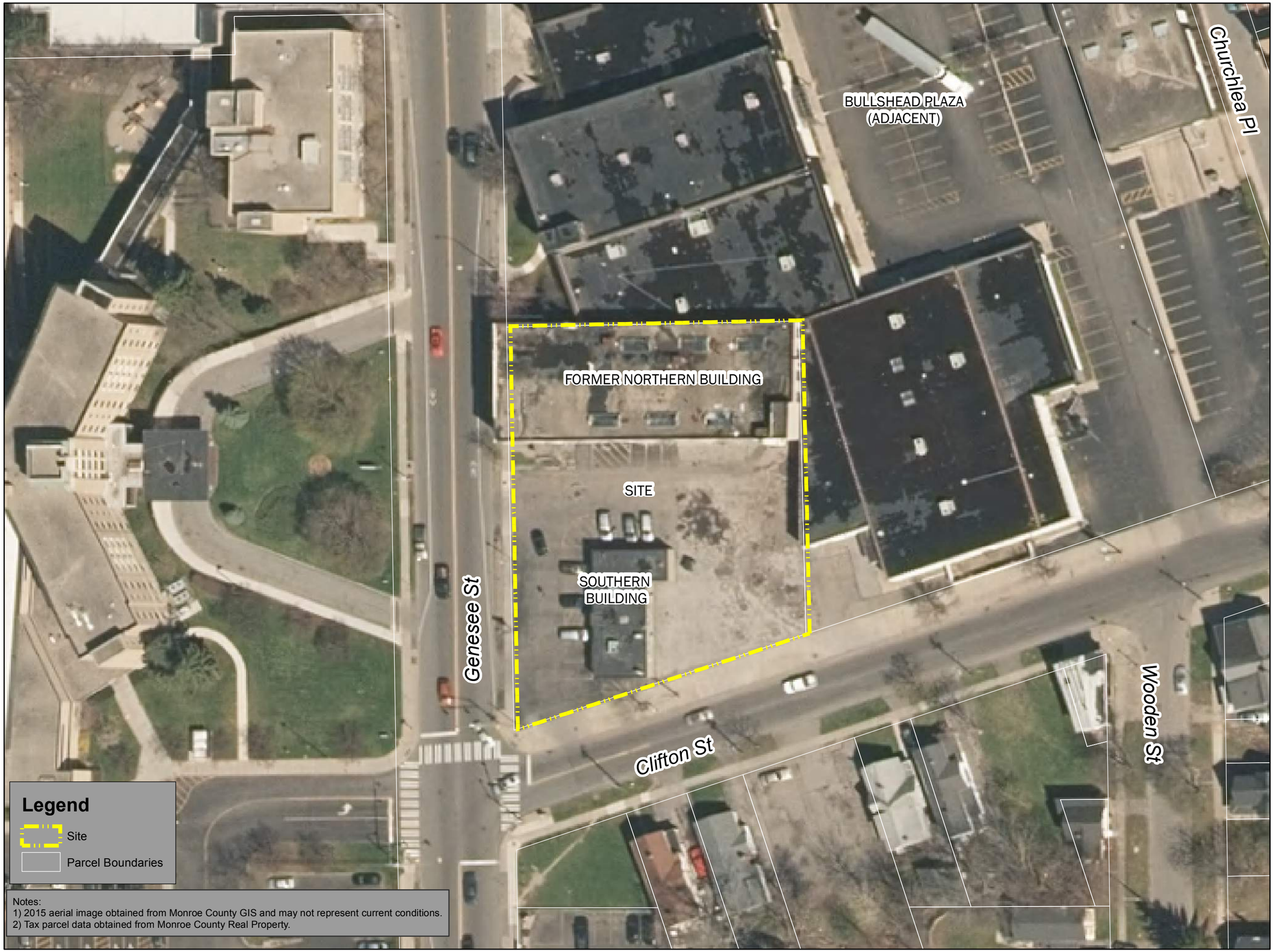
SITE LOCATION MAP

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 1

9/10/2019



Path: \\Projects2\Projects NZ-2\Rochester. City\2182888 - 68-92 Genesee St Site Inv\Drawings\IRM Work Plan\Figure 2- Site and surrounding area.mxd

LaBella
Powered by partnership.

N
W E
S

0 25 50
Feet
1 inch = 50 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

CITY OF ROCHESTER

PROJECT:

INTERIM REMEDIAL MEASURES
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

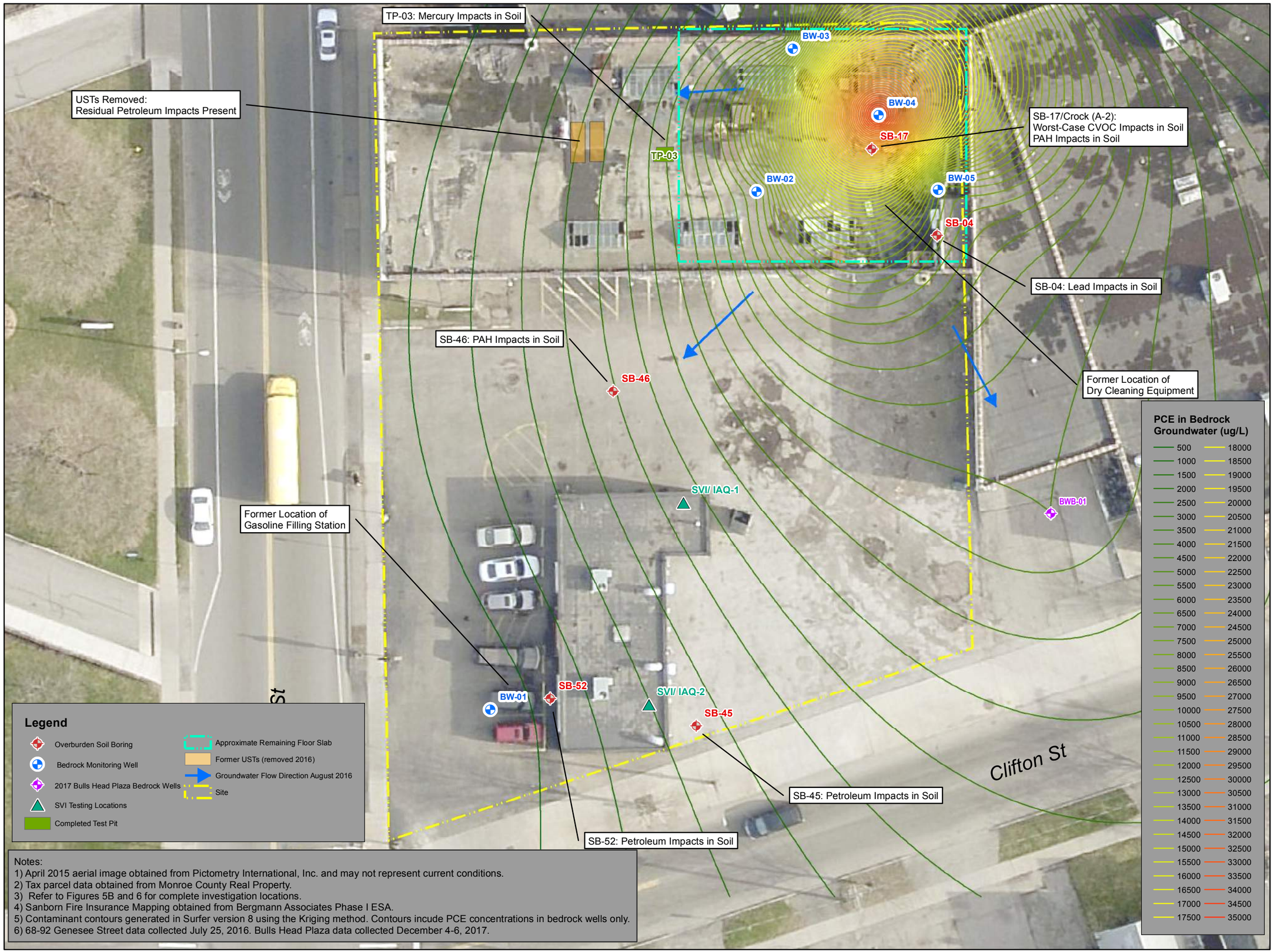
SITE AND
SURROUNDING AREA

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 2

9/12/2019



Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel data obtained from Monroe County Real Property.
3) Refer to Figures 5B and 6 for complete investigation locations.
4) Sanborn Fire Insurance Mapping obtained from Bergmann Associates Phase I ESA.
5) Contaminant contours generated in Surfer version 8 using the Kriging method. Contours incude PCE concentrations in bedrock wells only.
6) 68-92 Genesee Street data collected July 25, 2016. Bulls Head Plaza data collected December 4-6, 2017.

LaBella
Powered by partnership.

N
W E
S

0 25
Feet
1 inch = 25 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

CITY OF ROCHESTER

PROJECT:

INTERIM REMEDIAL MEASURES
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

FINDINGS OF PREVIOUS INVESTIGATIONS

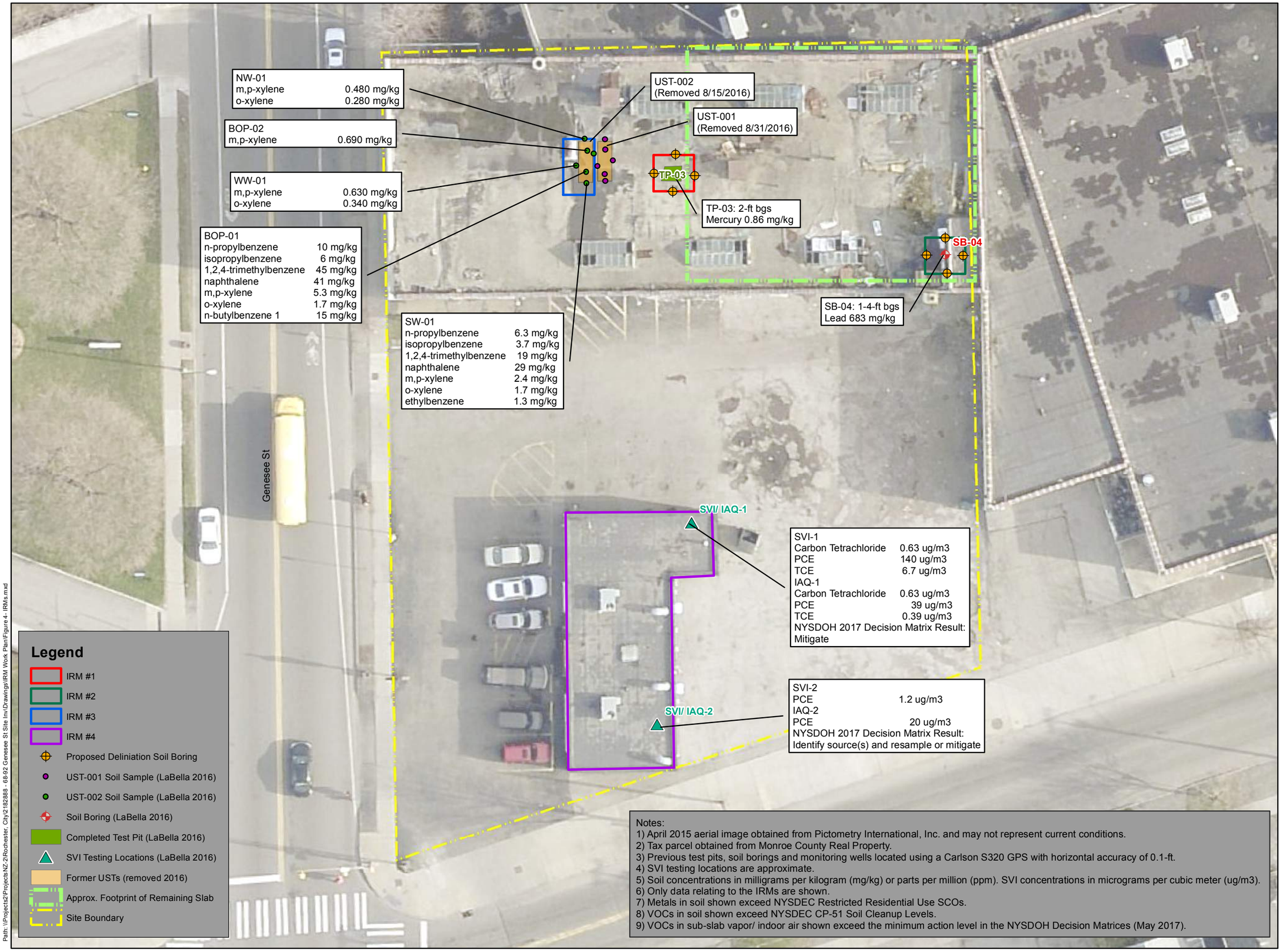
PROJECT #/DRAWING #/ DATE

2182888

FIGURE 3

9/12/2019

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\IRM Work Plan\Figure 3 - Previous investigations.mxd



Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel obtained from Monroe County Real Property.
3) Previous test pits, soil borings and monitoring wells located using a Carlson S320 GPS with horizontal accuracy of 0.1-ft.
4) SVI testing locations are approximate.
5) Soil concentrations in milligrams per kilogram (mg/kg) or parts per million (ppm). SVI concentrations in micrograms per cubic meter (ug/m3).
6) Only data relating to the IRMs are shown.
7) Metals in soil shown exceed NYSDEC Restricted Residential Use SCOs.
8) VOCs in soil shown exceed NYSDEC CP-51 Soil Cleanup Levels.
9) VOCs in sub-slab vapor/ indoor air shown exceed the minimum action level in the NYSDOH Decision Matrices (May 2017).

N
W E
S

0 25
Feet
1 inch = 25 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

CITY OF ROCHESTER

PROJECT:

INTERIM REMEDIAL MEASURES
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

INTERIM REMEDIAL MEASURES

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 4

9/17/2019

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\IRM Work Plan\Figure 4- IRMs.mxd

APPENDIX 1

Health and Safety Plan

Site Health and Safety Plan

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Proposal No. 2182888

June 2019

Table of Contents

SITE HEALTH AND SAFETY PLAN

Project Title:	68-92 Genesee Street
Project Number:	2182888
Project Location (Site):	68-92 Genesee Street, Rochester, NY
Environmental Director:	Gregory Senecal, CHMM
Site Safety Manager:	David Engert, CHMM
Site Control Provided By:	LaBella Associates, D.P.C.
Project Manager:	Jennifer Gillen, PG
Plan Review Date:	TBD
Plan Approval Date:	TBD

Site Conditions:	0.76-acre commercial land
Site Environmental Information Provided By:	• Phase I ESA by Bergmann Associates dated December 2013 • Tank Closure Report by LaBella October 2016 • Phase II ESA by LaBella December 2016
Air Monitoring Provided By:	LaBella Associates, D.P.C.
Site Control Provided By:	Contractor(s) TBD

EMERGENCY CONTACTS

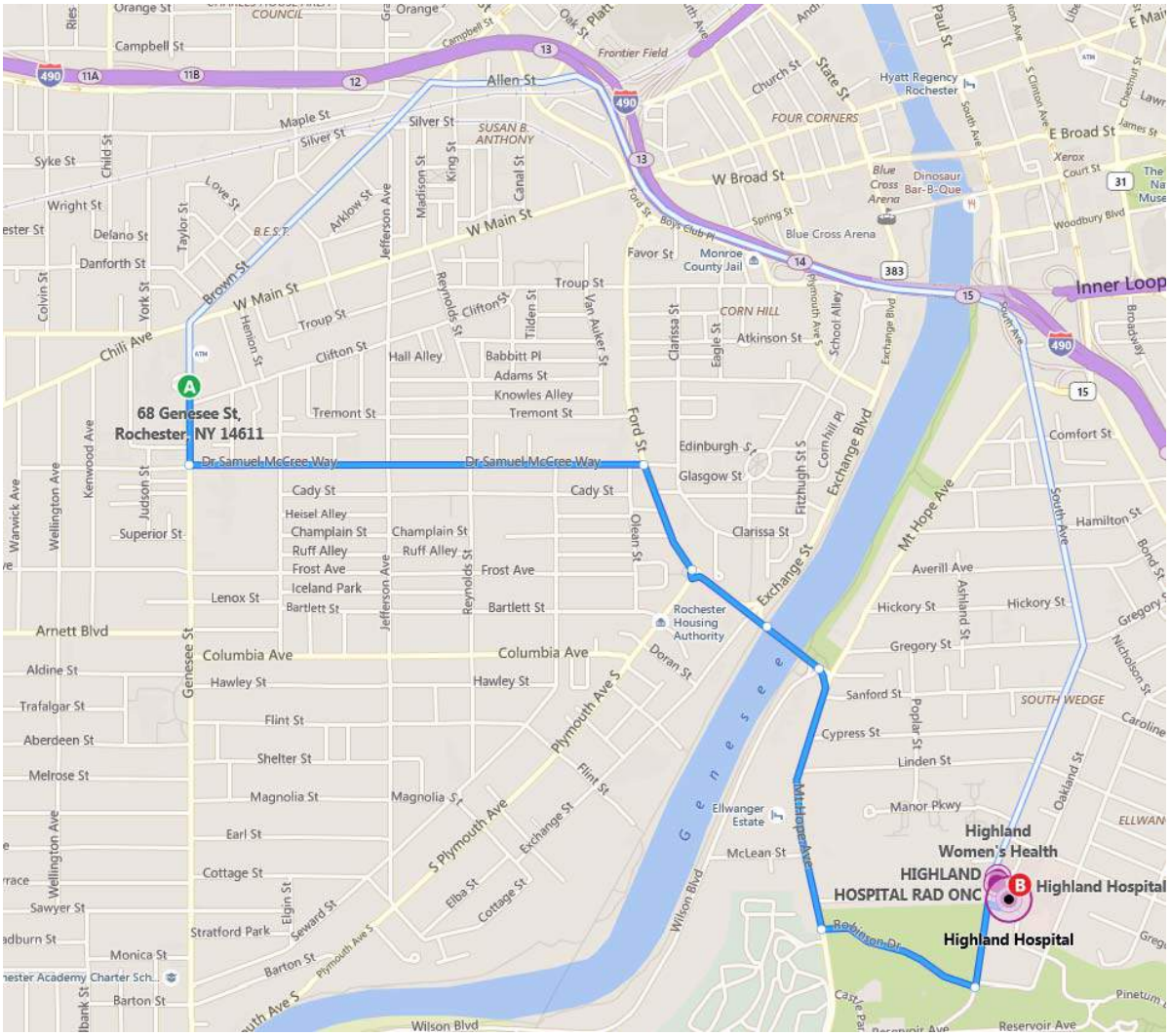
	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Highland Hospital	585-473-2200
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Rochester Police Department	911
Fire Department:	Rochester Fire Department	911
Site Contact:	Jane Forbes, City of Rochester DEQ	585-428-7892
Project Manager	Jennifer Gillen, PG	585-295-6648
Site Safety Manager:	David Engert, CHMM	585-295-6630

MAP AND DIRECTIONS TO THE MEDICAL FACILITY
HIGHLAND HOSPITAL

Address: 1000 South Ave, Rochester, NY

1. Exit the Site heading south on Genesee Street
2. Turn left on Dr. Samuel McCree Way
3. Turn right onto Ford Street
4. At roundabout, take 2nd exit onto Ford Street
5. Turn right onto Mt. Hope Avenue
6. Turn left onto Robinson Drive
7. Turn left onto South Avenue
8. Turn right onto Bellevue Drive
9. Arrive at hospital

Total travel distance: 2.5 miles
Approximate travel time: 10 minutes



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 field activities relating to the implementation of Interim Remedial Measures at the property addressed as 68-92 Genesee Street, Monroe County, City of Rochester, New York (the Site). 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. 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
- 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.

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 personnel 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. Tasks 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, and may require additional training. Subsequently, approved personnel are to receive authorization for entry from the Site personnel. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped, shored or otherwise protected. 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.

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:
Serious injuries are to be reported immediately to the Project Manager. The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager.

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.

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 Procedures

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 Protective Equipment

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 will consist at a minimum of the procedures described below. Site perimeter and community air monitoring and appropriate response actions will be implemented as described in the New York State Department of Health (NYSDOH) Generic Community Air Monitoring guidance.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Air monitoring of the work areas and EZ, if established, will be performed at least every 60 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone in the work area or EZ, work should be temporarily ceased and personnel are to leave the work area until satisfactory readings are obtained, the source of vapors identified and addressed through corrective actions 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 50 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 personnel.

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 investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL (ppm)(b)	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	.2	.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
Ethyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100	100	NA	1.0	6.7	2,000	Ether	2.3	8.76
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol	400	200	500	2.0	12.7	2,000	Rubbing alcohol	3	10.10
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphoric Acid	1	1	3	NA	NA	10,000	NA	NA	NA
Polychlorinated Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium Hydroxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56
Metals									
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	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.
(d) Metal compounds in mg/m3
(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 2

Community Air Monitoring Plan

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

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 volatile organic compounds (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 NYSDEC/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. 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.

- 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.

- 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.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) 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.

- 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.

- 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.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

ATTACHMENT 1: SPECIAL REQUIREMENTS CAMP

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative- pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3 (micrograms per cubic meter), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX 3

Quality Control Plan

Quality Control Program (QCP)

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Proposal No. 2182888

June 2019

Table of Contents

1.0 Introduction

LaBella's Quality Control Program (QCP) 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. This QCP should be followed during implementation of environmental investigation and remediation projects and should serve as a basis for quality control methods to be implemented during field programs. Project-specific requirements may apply.

The QC program contains procedures which allow for the proper collection and evaluation of data and documents that QC procedures have been followed during field investigations. The QC program presents 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 procedures.

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

This QC program includes the following:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling and Logging Techniques
- Sample Handling, Packaging, and Shipping
- Laboratory Requirements and Deliverables

It should be noted that project-specific work plans (e.g., Remedial Investigation Work Plans) may have project specific details that will differ from the procedures in this QC program. In such cases, the project-specific work plan should be followed (subsequent to regulatory approval).

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.

1.1 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.

1.2 Precision

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

1.3 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.

1.4 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.

1.5 Comparability

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

2.0 Measurement of Data Quality

2.1 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 gas chromatography (GC) or GC/MS (mass spectrometry) analyses, solutions of surrogate compounds are used. These solutions can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination.

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.

2.2 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 typically not known to the laboratory. 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, field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

2.3 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.

2.4 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.

2.5 Comparability

Comparability of laboratory tests is ensured by utilizing only New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)- certified laboratories. This certification is the basis for demonstrating proficiency in testing requirements. Using ELAP certified laboratories will result in consistency amongst analytical data within a specific project and across projects.

3.0 Quality Control 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.

4.0 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.

4.1 Drilling Equipment and Techniques

<u>Direct Push Geoprobe Advanced Borings:</u>

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.

4.1.1 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).

4.1.2 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.

4.1.3 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.

4.1.4 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.

4.2 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.

4.3 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.

5.0 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

6.0 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.

7.0 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.

8.0 Field Documentation

8.1 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.

8.2 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.

9.0 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.

10.0 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 location using an alconox solution. Consumables including gloves, tubing, bailers, string, etc. will be dedicated to one sample location and will not be reused.

11.0 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 11-1
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-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 11-2
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 11-3
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.

12.0 Sample Custody and Shipment

12.1 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)

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.

12.2 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 a 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.

12.3 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.

12.4 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.

12.5 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.

12.6 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.

12.7 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.

13.0 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.

14.0 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.

14.1 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.

14.2 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.

14.3 0_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 a 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.

14.4 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 formazin. 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 14-4
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.)

15.0 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.

15.1 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.

15.2 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.