Remedial Investigation/ Remedial Alternatives Analysis

DRAFT

Interim Remedial Measures Work Plan

300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144

USEPA ID #BF-97207900-0

Prepared For: City of Rochester
Division of Environmental Quality
30 Church Street, Room 300B
Rochester, New York, 14614-1278

Prepared By: Lu Engineers
175 Sully's Trail, Suite 202
Pittsford, New York 14534

and

Day Environmental, Inc.
1563 Lyell Avenue
Rochester, New York 14606

Date: July 18, 2012

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

Nathan E. Simon, P.E.
Task Leader (NYS P.E. License #087172)
Day Environmental, Inc.

___________________________	___________________________
Jeffrey A. Danzinger	Gregory Andrus, CHMM
Project Manager	Project Manager
Day Environmental, Inc.	Lu Engineers

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1.0 Introduction

The City of Rochester (City) Division of Environmental Quality (DEQ) received an Environmental Restoration Program (ERP) grant from the New York State Department of Environmental Conservation (NYSDEC) to perform a Remedial Investigation/Remedial Alternatives Analysis (RI/RAA) project for the Andrews Street Site #E828144 (the 'Site'). The City has also been awarded an Environmental Protection Agency (EPA) Brownfields Cleanup Grant that will be used to partially fund interim remedial measures (IRMs) to address contamination at the Site and other environmental conditions to facilitate future re-use.

Lu Engineers, P.C. (LU) and Day Environmental, Inc. (DAY) have formed a teaming arrangement to complete this project for the City. DAY is the prime consultant and LU has been retained by DAY as the sub-consultant.

This work plan is presented to provide a scope of work for the completion of interim remedial measures (IRMs) during the Remedial Investigation (RI) of the Site, which is currently underway. The IRMs are part of the State Assistance Contract, and this IRM Work Plan has been developed in accordance with NYSDEC Department of Environmental Restoration (DER)-10 "Technical Guidance for Site Investigation and Remediation" and the general requirements of the NYSDEC Brownfield Cleanup Program.

As defined within DER-10, an IRM is an action taken to mitigate environmental or human exposures before the completion of the remedial investigation and remedial alternative selection. IRMs may include the removal of wastes and contaminated materials, including environmental media. The use of a non-emergency IRM is encouraged when a source of contamination or exposure pathway can be effectively addressed prior to completion of the investigation and remedy selection process.

The goal of the IRM will be to remove areas of contamination and environmental conditions that are considered to have the greatest potential for human exposure and migration. Planned IRM activities for the Site generally include:

- Excavation and disposal of tetrachloroethylene (PCE) impacted soils at the 304-308 and 320 Andrews Street parcel and in the Evans Street right-of-way;
- Excavation and removal of a combined sewer in the Evans Street right-of-way, north of the PCE source area, that appears to be acting as a preferential migration pathway of the contamination;
- Removal of two (2) abandoned underground storage tanks (USTs) at 25 Evans Street;
- Removal of a small area of surface and near-surface polychlorinated biphenyl (PCB)-impacted soils near the PCE source area;

- Removal of impacted soil associated with a former trench drain and bedding materials at 25 Evans Street; and

1.1 Site Description

The Site is located at 300, 304-308, and 320 Andrews Street and 25 Evans Street in the City of Rochester, New York (Figure 1). The Site has a combined area of 1.527 acres and is located at the intersection of Andrews Street and Evans Street. The Inner Loop ramp, and associated infrastructure, borders the Site to the north. Vacant buildings occupied the Site and were demolished by the City in 2010 and 2011, prior to the RI activities. The Site is surrounded by commercial properties.

1.2 Previous Investigations

Phase I Environmental Site Assessments - 2006

Phase I Environmental Site Assessments (Phase I ESAs) were completed for the Site in 2006, by Leader Professional Services (Leader) on behalf of the City, that identified recognized environmental conditions (RECs) associated with former uses of the Site including: a commercial bus depot and bus garage; a gasoline station; chemical sales/distribution; a dry cleaning equipment distributor; and a fuel oil contractor. In addition, the Phase I ESA report identified two (2) closed in place 5,000-gallon USTs and one out-of-service 3,000-gallon above ground storage tank (AST) at 25 Evans Street, and two (2) 275-gallon ASTs were noted at 304-308 Andrews Street. The ASTs were removed by the City prior to the demolition and implementation of RI activities. In addition, a floor trench drain system and below grade service pit were noted at 25 Evans Street, and a floor drain was noted at 308 Andrews Street.

Phase II Environmental Site Assessment - 2006

A Phase II Environmental Site Assessment (Phase II ESA) conducted in 2006 by Leader consisted of test borings, installation of three (3) overburden groundwater monitoring wells, and preliminary evaluation of the select floor drains and discharge points. The findings of the Phase II ESA included shallow soil, subsurface soil, and groundwater impacted by volatile organic compounds (VOCs), in particular PCE and petroleum fuel related VOCs.

At-Grade and Sub-Grade Demolition Phase Study - 2010-2011

Demolition of the Site structures was initiated in the fall of 2010 and completed in the spring of 2011. In order to preclude disturbance of the PCE source area and the closed in-place UST area, slabs and foundations overlying, or in proximity to, these areas were not removed during the demolition. During at-grade and sub-grade demolition work, DAY screened the structures for evidence of environmental impact. In addition, 21 soil/fill samples were submitted for analytical laboratory testing. Analytical laboratory summary results from the At-Grade and Sub-Grade Demolition Phase study are summarized below:

- Two soil samples tested contained target compound list (TCL) VOCs exceeding one or more NYSDEC soil cleanup objectives (SCOs).
- Soil samples collected from a generally black fill material observed on the 300, 304-308 and 25 Evans Street properties, and impacted soil/fill associated with the 25 Evans Street trench drain, contained semi-volatile organic compounds (SVOCs) and target analyte list (TAL) metals at concentrations exceeding one or more Restricted-Residential Use SCOs and/or Protection of Groundwater SCO.
- PCBs were only detected at a concentration above its Restricted-Residential Use SCO in sample S-48 collected beneath a former concrete paved area on the west side of the 320 Andrews Street parcel.
- Pesticides were tested for, but not detected at concentrations exceeding Restricted-Residential SCOs or Protection of Groundwater SCOs.
- A water sample collected from the eastern portion of the 304-308 Andrews Street basement excavation contained a PCE concentration of 4.08 ug/l or ppb.

The Site was backfilled with imported New York State Department of Transportation (NYSDOT) CR-2 and #3 washed stone from an off-site NYSDEC-approved source, and the backfill was compacted and graded in accordance with the City's specifications, to the extent practicable.

2.0 Summary of Environmental Conditions

The following sections summarize the findings of the RI activities conducted to date and provide a detailed analysis of the nature and extent of contaminated media requiring remediation.

2.1 Remedial Investigation Summary and Findings

In 2011 and 2012, under the NYSDEC ERP, the majority of RI field work and analytical laboratory testing was completed. The work completed to date included the following elements:

- a geophysical survey across the Site to identify magnetic anomalies that may represent potential presence of buried tanks and other metallic objects;
- a utility assessment, including research, mapping and videotaping underground utilities on and around the Site. During this assessment work, a sample of tar-like material from inside a portion of the Evans Street storm sewer located in the area with highest PCE concentrations, was collected and submitted for analytical laboratory testing. In addition, some cracks were observed in this same section of sewer pipe during the videotaping.
- excavation of seven test pits to evaluate magnetic anomalies, buried structures, and/or subsurface conditions of interest.

- photoionization detector (PID), halogen specific detector (XSD) and conductivity Down-hole testing at twenty-six (26) direct-push test boring locations using Membrane Interface Probe (MIP) technology.
- Collection of soil samples for analytical laboratory testing at seventeen (17) test borings advanced with direct-push drilling equipment, and three deep test borings and five shallow test borings advanced with rotary drilling equipment.
- Advancement, collection of soil samples, and installation of monitoring wells at twenty rotary drilled locations. Eleven (11) of these wells were installed in the overburden, and nine (9) of these wells were installed as open-hole bedrock wells cored approximately 10 feet through permanent casings seated into the top two feet of bedrock to preclude communication with the overburden.
- Collection and analysis of one round of groundwater samples from three (3) existing overburden monitoring wells, eleven (11) new overburden monitoring wells, and nine (9) new bedrock monitoring wells.

The remaining RI work will continue in conjunction with implementation of this IRM Work Plan. The subsurface investigations conducted to date have identified PCE as the primary VOC at the Site. PCE has been the predominant VOC detected in shallow soil samples, subsurface soil samples, and groundwater samples. RI sample locations are shown on Figure 2. A second round of groundwater sampling and analysis was performed in June 2012, and the results will be available in the near future.

The City does not have generator knowledge that PCE was a spent solvent or unused commercial chemical product when it was released to the environment; therefore, the wastes being generated by these IRMs do not meet the definition of F-listed wastes as defined by 40 CFR Part 261.31. PCE-contaminated soil, sediment, and other non-aqueous media will be generated as part of the IRMs. As a result, waste streams suspected of containing PCE will be sampled to determine if wastes exhibit the properties of a characteristic hazardous waste as defined in 40 CFR Part 201, Subpart C.

PCE concentrations in soil samples collected within the PCE source zone exceed the NYSDEC Part 375 Protection of Groundwater SCO for PCE of 1.3 mg/kg, or parts per million (ppm). PCE in the vadose zone has been confirmed to have migrated vertically and leached into the upper water bearing zone present at approximately 10.5 feet (ft.) below ground surface (bgs), resulting in concentrations of PCE that exceed groundwater standards in overburden groundwater monitoring wells installed within, and hydraulically downgradient of, the PCE source zone.

The following sections summarize the findings of the remedial investigation to date.

<u>PCE Source Area and Evans Street Sewer</u>

PCE is the predominant contaminant detected in soil and groundwater at the Site. The source of the PCE may be associated with the former dry cleaning equipment and supply company that was located on the 304-308 Andrews Street parcel between 1978 and 1988.

Based on the work completed to date, there appears to be two source areas of the PCE that are relatively close to each other (one outside the former building in proximity to a garage bay door, and one inside the former building in proximity to a floor drain). The contaminants from these two areas then appear to have impacted the sewer (pipe and bedding material) that is located in the adjoining right-of-way of Evans Street as evidenced by the 51,000 mg/kg (5.1 %) of PCE detected in the tar-like sample collected from the interior wall of the sewer piping in this area. The buried sewer system may have acted as a preferential migration pathway for the PCE within the saturated zone.

The highest concentrations of PCE in soil were detected at locations B-17(1'), B-17A(1') and TB-MIP-10(11') at concentrations of 3,560 mg/kg, 270 mg/kg and 450 mg/kg, respectively. The highest concentration of PCE detected in an overburden well during the January 2012 Round 1 groundwater sampling event was at well MW-1 (48,000 ug/l) located north of the PCE source areas and in close proximity to the Evans Street Right-of-way and the northern property boundary of the Site. The highest concentration of PCE detected in a bedrock well during the January 2012 Round 1 groundwater sampling event was at well MW-4R (46 ug/l) located northwest of the PCE source areas.

Soil PCE data and MIP XSD data were used with Geographical Information System (GIS) Spatial Analyst to three-dimensionally model the extent of PCE impact in soil at concentrations greater than 1.3 mg/kg, which is the Protection of Groundwater SCO for PCE (refer to Section 2.2 for further detail). Based on this modeling, it is estimated that approximately 703 cubic yards (CY) (1,160 tons) of PCE-contaminated soil above 1.3 mg/kg is located in the approximate 3,500 square-foot source area to depths ranging between 10 and 12 feet, primarily above the upper groundwater table or capillary fringe. Figure 3 provides details on Site features and buried utilities of interest, the PCE source areas, and the GIS-modeled extent of PCE detected in soil at concentrations greater than 1.3 ppm. In addition, it is calculated that a total of 61 CY (101 tons) of PCE-contaminated soils, including sewer contents and bedding, is located within the Evans Street right-of-way beneath and north of the primary PCE source area.

<u>UST Area</u>

The two closed in-place 5,000-gallon capacity USTs, presumed to have stored gasoline and diesel oil, on the eastern portion of the 25 Evans Street parcel have been identified as a potential source area for petroleum contamination. In 1984, the tanks were pumped and filled with K-Crete as a method of closing them in-place. Some petroleum-type VOCs were detected in nearby soil samples during the 2006 Phase II ESA. As part of this project to benefit redevelopment of the Site, the two closed in-place USTs will be removed in accordance with applicable regulations. Based on findings at test locations in proximity to the two USTs, it is estimated that approximately 24 CY (40 tons) or less of petroleum contaminated soil requiring remediation will be removed during the UST removal work. The location of the two USTs is shown of Figure 3.

PCB-Impacted Area

A small area (i.e., 225 square feet or less) of PCB-impacted soil above soil cleanup objectives was documented in the area of demolition phase test location S-48 (PCB = 1.8 mg/kg). Analytical laboratory testing of soil samples from RI borings SB-01 through SB-05 show that the extent of PCB impact is limited (i.e., 15 ft. by 15 ft. by 4 ft. deep or less), and it is estimated that approximately 33 CY (55 tons) or less of PCB-contaminated soil above 1 mg/kg is located in this area. The location of this area is shown on Figure 3.

Trench Drain Area

An approximately 130-foot long by 1-foot wide trench drain was located on the 25 Evans Street parcel. A portion of the trench drain structure was removed and disposed during the demolition phase work. Impacts were documented in underlying soil in proximity to the trench drain. Contaminants exceeding SCOs included various polycyclic aromatic hydrocarbon (PAH) SVOCs and metals. Based on a projected 130 ft. long by 4 ft. wide by 4 ft. deep excavation, it is estimated that approximately 77 CY (125 tons) of SVOC and/or metal-contaminated soil above SCOs is located in proximity to the trench drain. The location of this area is shown on Figure 3.

Piping Area

An area of buried piping is located on the 320 Andrews Street Parcel. A section of this piping was encountered during excavation of test pit TP-07. A sample of the solid contents from inside this piping contained 0.58 mg/kg of PCE. A soil sample collected from test pit TP-07 only contained 0.012 mg/kg of PCE. Based on the EM-61 geophysical survey on this area of the Site, it is estimated that approximately 205 linear feet of piping exists in this area that may have similar solid contents containing PCE. Based on a projected 205 ft. long by 3 ft. wide by 3 ft. deep excavation, it is estimated that approximately 68 CY (113 tons) or less of PCE-contaminated piping contents and surrounding soils could be present in this this area, and it is possible that contents of some sections of this piping or surrounding soils may contain concentrations of PCE greater than its Protection of Groundwater SCO of 1.3 mg/kg. The location of this area is shown on Figure 3.

Historical Fill Material

Heterogeneous historic urban fill material is present across most of the Site. The fill material generally consists of reworked soils, with lesser amounts of coal, cinders, glass, brick, gravel, rock, concrete and asphalt. Samples of the fill material, and also some samples of soil, contain concentrations of PAH SVOCs and/or metals that exceed SCOs. Based on an average fill thickness of 3.12 feet multiplied by the area of the Site (65,340 square feet (SF)), less the area of former basements backfilled with select clean geotechnical fill (5,776 SF), it is conservatively estimated that approximately 6,900 CY (11,400 tons) of fill material and/or adjoining site soils potentially containing PAH

SVOCs and/or metals exceeding SCOs are present at the Site. [Note: No IRM work is currently planned with respect to historic fill materials at the Site. However, it is anticipated that this material will be addressed by Institutional Controls (ICs) and Engineering Controls (ECs) as part of the final Site remedy].

Miscellaneous Areas with VOCs

Low levels of PCE (in relation to that detected in the PCE source area described above) and other VOCs (acetone, benzene, trimethylbenzenes, trichloroethene, etc.) were detected in soil/fill samples on portions of the 25 Evans Street parcel, the 320 Andrews Street parcel, and the Franklin Square right-of-way. The samples were collected from depths ranging between 1.5 feet and 4.0 feet bgs, and the presence of PCE in these areas appears associated with its use in these areas and/or transfer within fill material across the Site that contained these VOCs. Concentrations of PCE detected in these soil/fill samples ranged between 0.0532 mg/kg and 1.12 mg/kg, which are below the Part 375 Protection of Groundwater SCO for PCE. [Note: No IRMs are currently planned with respect to miscellaneous areas containing VOCs at the Site. However, it is anticipated that this material will be addressed by ICs and ECs as part of the final Site remedy].

2.2 Analysis and Modeling of Data Associated with PCE-Impacted Areas

The cumulative analytical results for soil samples generated to date, and the XSD data collected during the advancement of the MIP test borings, were input into ESRI's ArcMap GIS version 10.0. Using ESRI's Spatial Analyst extension program, an interpolation model was utilized to estimate the approximate areal extent, vertical extent and volume of PCE-contaminated soil exceeding the NYSDEC Part 375 SCO for PCE of 1.3 ug/kg requiring it to be excavated and disposed off-site as an IRM.

A sufficient number of MIP test borings, test pits, soil test borings, and monitoring wells have been advanced within, and immediately adjacent to, the PCE source area. The spatial distribution of these test locations within the source area appeared conducive for interpolation modeling. The MIP equipped with the XSD sensor provides continuous vertical profile for VOC concentrations in soil, resulting in a vertically dense data set, conducive for interpolation modeling.

The average depth to groundwater as measured in three overburden monitoring wells located within the PCE source area (i.e., MW-1, MW-2 and MW-3) was approximately 10.5 ft. bgs. In general the MIP test borings were advanced to depths of 10 ft. or more. Thus, MIP XSD data was satisfactorily collected from the vadose zone within the PCE source area.

A review of MIP data logs indicated that elevated MIP XSD readings from test borings advanced in the PCE source area correlated well with elevated concentrations of PCE detected in soil samples analyzed by the laboratory, indicating that interpolation modeling based on XSD sensor readings was appropriate.

Data Sets Used in IRM Soil Excavation Model

As part of the RI, twenty-six (26) MIP test borings were advanced at the Site to equipment refusal, which occurred at depths ranging between approximately 8 ft. and 18 ft. bgs, with the majority of refusals occurring between 12 ft. and 14 ft. bgs. The MIP consists of several components housed in a downhole assembly probe mounted just behind the cone penetrometer tip. As the probe membrane was advanced through the soil, the MIP continuously sampled for VOCs using XSD and PID sensors. Lithology was also evaluated using the soil conductivity sensor as the probe was advanced.

The two-foot interval average and peak XSD concentrations measured in microvolts for each MIP test boring location were used in conjunction with the Site's analytical laboratory PCE concentrations measured in soil samples to estimate the volume of soil to be removed during the IRM. Specifically, the PCE soil sample concentrations measured by analytical laboratories utilized during the Site's Phase II ESA, building demolition phase (i.e., soil samples collected from the sidewalls and bottoms of excavations following removal of below-grade and slab-on-grade structures) and during the RI (i.e., samples from test pits and test borings) were used in the IRM soil excavation model.

Model Development and Methodology

The highest analytical laboratory PCE concentration in a soil sample measured at each test location (in the event more than one soil sample was collected from a location) was input into the ArcGIS Spatial Analyst program and interpolated using the natural neighbor interpolation method. According to ESRI, the natural neighbor interpolation model finds the closest subset of input samples to a query point and applies weights to them based on proportionate areas in order to interpolate a value. Its basic properties are that it's local, using only a subset of samples that surround a query point, and that interpolated heights are within the range of the samples used. This method does not infer trends and will not produce peaks, pits, ridges or valleys that are not already represented by the input samples.

The model output was a peak PCE in soil interpolated area, which is shown on Figure 4. Independently, the peak XSD values from each MIP test boring were input into a second model using the natural neighbor interpolation method to generate a peak XSD interpolated area for soil, which is shown on Figure 5. The 1.3 parts ppm contour (based on the NYSDEC Part 375 Protection of Groundwater SCO value for PCE) from the peak PCE interpolated area for soil was then superimposed on the peak XSD interpolated area for soil. [Note: The peak PCE and XSD interpolated areas used identical scales.] The corresponding XSD values for eighteen equidistant points on the 1.3 ppm PCE soil contour superimposed on the interpolated peak XSD area were averaged to determine the average XSD value that corresponds to an approximate PCE concentration in soil of 1.3 ppm, (refer to Figure 5). For the Site, an XSD value of 2.73×10^6 microvolts was determined to correspond to an approximate soil PCE concentration of 1.3 ppm.

The area requiring excavation based on the peak XSD interpolated area in soil was divided into discrete 2-ft. intervals from the ground surface to 12 ft. bgs (the extent of sufficient XSD data). For each MIP test boring, an average XSD value for each 2-foot interval (i.e., 0-2 ft. bgs, 2-4 ft. bgs, 4-6 ft. bgs, 6-8 ft. bgs, 8-10 ft. bgs and 10-12 ft. bgs) was calculated, and the average XSD values for each discrete 2-foot interval were interpolated using the natural neighbor interpolation method. The XSD contour of 2.73×10^6 microvolts was then identified as a contour line to represent the minimum excavation limits for each two foot interval. Refer to Figure 7 illustrating the aerial limits of excavation for each discrete 2-foot interval. As a contingency and practical measure, it was assumed that the thick red line presented on Figure 3 and Figure 7 will be the actual IRM excavation limits. This additional area/volume accounts for soil cave-in, sloping and equipment limitations.

Model Limitations

Due to the limitations of the MIP/XSD technology, the model did not predict soil removal in the 0-2 ft. interval. However, based on field screening and analytical results for soil samples from previous studies, it is known that this interval contains PCE at concentrations greater than 1.3 ppm in the same area as output by the model for the 2-4 ft. interval. As such, the modeled excavation limit contour line for the 2-4 ft. interval has been assumed for the 0-2 ft. interval.

The model did not include a small area of soil (i.e., approximately 166 SF) in the 2-4 ft. depth interval in proximity to monitoring well MW-3 and test boring B-17F within the removal area, however analytical laboratory results from soil samples collected in the 2-4 ft. depth interval at these locations contained PCE at concentrations that exceeded 1.3 ppm. The excavation limits in the 2-4 ft. depth interval in proximity to monitoring well MW-3 and test boring B-17F were modified to include these locations of known contamination that exceed the 1.3 ppm NYSDEC SCO for PCE.

Concentrations of PCE were measured above 1.3 ppm in soil samples collected below 12 ft. bgs, however, the XSD data below 12 ft. was deemed insufficient for modeling. Static water levels in the wells closest to the PCE source area indicate the groundwater table on this portion of the Site is about 10.5 feet bgs. To the extent practicable under the IRM, contamination below 12 ft. will be removed based on field observations during the soil excavation work and/or will be addressed in the final remedy for the Site.

2.3 Definition of IRM Areas of Concern

Based on the investigation work completed to date as well as detailed description and analysis of the nature and extent of Site contamination presented in Section 2, the Site IRM effort has been segregated into six (6) distinct areas of concern referred to as IRM - 01 through IRM-06 in this work plan as follows (see Figure 3 for respective locations of each IRM location).

IRM-01 PCE Source Area

The area of the Site with the highest concentration of PCE was found in the vicinity of the "barn" or garage structure formerly located at 304-308 Andrews Street, the Evans Street right-of-way, and the westernmost portion of 320 Andrews Street. PCE was also detected in the groundwater monitoring well on the northwest portion of 320 Andrews Street. It is estimated that this IRM will require removal and disposal of approximately 703 CY (1,160 tons) of PCE-contaminated soil above 1.3 mg/kg located in the approximate 3,500 square-foot source area, primarily above the uppermost groundwater bearing soil or capillary fringe.

IRM-02 Buried Sewer System in Evans Street Right-of-Way

This IRM involves removal of a buried sewer and PCE contaminated materials from the Evans Street right-of-way near where the highest concentrations of PCE have been identified on-site. The sewer, sewer contents, sewer bedding, and surrounding soils will be removed during this IRM. The remaining sewer leading off-site will be capped in accordance with Monroe County Pure Waters (MCPW) criteria. A total of approximately 61 CY (101 tons) of PCE contaminated soil will be removed as part of this IRM.

IRM-03 UST Removal Area

Two closed in-place USTs are identified as a potential source area for petroleum contamination. These USTs will be removed from the Site, and it is estimated that approximately 24 CY (40 tons) or less of petroleum contaminated soil requiring remediation is present in this area, which will be removed as part of this IRM.

IRM-04 PCB-Impacted Area

A small area of PCB impact (i.e., 15 ft. by 15 ft. by 4 ft. deep or less) above soil cleanup objectives was documented at the Site. It is estimated that approximately 33 CY (55 tons) or less of PCB-contaminated soil above 1 mg/kg is located in this area, which will be removed as part of this IRM.

IRM-05 Trench Drain Area

Soil contaminated with PAH SVOCs and metals at concentrations exceeding SCOs is present in the area of a former trench drain system. Based on a projected 130 ft. long by 4 ft. wide by 4 ft. deep excavation, it is estimated that approximately 77 CY (125 tons) of SVOC and/or metal-contaminated soil above SCOs is located in proximity to the former trench drain system, which will be removed and disposed as part of IRM-05.

IRM-06 320 Andrews St. Piping Network Area

Solid contents in buried piping on the 320 Andrews Street parcel contained elevated concentrations of PCE. Based on a projected 205 ft. long by 3 ft. wide by 3 ft. deep excavation, it is estimated that approximately 68 CY (113 tons) or less of PCE-contaminated piping contents and surrounding soils could be present in this area, and that contents of this piping or surrounding soils may contain concentrations of PCE greater than the applicable SCO. The piping, its contents, and surrounding contaminated soils (if present) will be removed as part of this IRM.

Figure 3 identifies the location of each of the IRM areas with respect to utilities, wells, and other Site features.

2.4 Standards, Criteria, and Guidance

Standards, criteria, and guidance (SCG) values to be employed during the IRMs include Restricted-Residential Use SCOs and Protection of Groundwater SCOs referenced in the NYSDEC document titled "*6 NYCRR Part 375, Environmental Remediation Programs*" dated December 14, 2006. Table 1 provides a list of the SCOs that are specific to the target contaminants addressed by each IRM.

Table 1 - Site SCOs

IRM	Contaminant(s)	NYSDEC SCO	SCO Concentration
IRM-01 PCE Removal Area	PCE	Protection of Groundwater	1.3 ppm
IRM-02 Buried Sewer System in Evans St. Right-of-Way	PCE	Protection of Groundwater	1.3 ppm
IRM-03 UST Removal Area	Petroleum-related VOCs & SVOCs (anticipated)	Restricted-Residential	SCOs in NYCRR Part 375-6.8(b) will be used for specific VOC & SVOCs detected
IRM-04 PCB-Impacted Area	PCBs	Restricted-Residential	1 ppm
IRM-05 Trench Drain	benzo(a)pyrene & other PAHs	Restricted Residential	1 ppm, (ideno(1,2,3-cd)pyrene: 0.5ppm)
	Arsenic	Restricted Residential	16 ppm
	Barium	Restricted Residential	400 ppm
	Lead	Restricted Residential	400 ppm
	Cadmium	Restricted Residential	4.3 ppm
	Mercury	Restricted Residential	0.5 ppm
IRM-06 320 Andrews St. Piping Network Area	PCE	Protection of Groundwater	1.3 ppm

3.0 Alternatives Analysis Summary

Remedial goals, objectives, and consideration factors were developed in order to prepare remedial alternatives for consideration. A complete, detailed discussion of remedial alternatives, methods, procedures and associated project costs has been prepared as the Analysis of Brownfield Cleanup Alternatives (ABCA) completed in June 2012 for this project by DAY. Evaluation criteria have been developed in order to compare the remedial alternatives. The alternatives considered for this Site are intended to address contamination in soil, fill and groundwater, and are presented below. The alternatives evaluated for this project are based on the assumption that the Site will be used for multi-family residential (townhouse) purposes, or mixed use (e.g., commercial first floor with residential above).

1. No Action:

   A no action alternative is a NYSDEC ERP procedural requirement and provides a baseline to evaluate other alternatives. Under this alternative, remedial and monitoring activities, as well as placement of ICs or ECs, at the Site are not implemented. Environmental conditions at the Site would essentially remain as they are, and future use of the Site would not be limited. This alternative would not allow for the City's planned mixed commercial-residential reuse.

2. IRM Removals; In-Situ Groundwater Remediation; Institutional Controls; Engineering Controls; and Groundwater Monitoring:

   Remediation would consist of an IRM involving removal and off-site disposal of areas of highest impacted soil above soil cleanup criteria for the Site. This IRM includes removal of contaminated soil primarily above the groundwater table in the PCE source area. It is anticipated that some PCE contaminated soil would remain in-place subsequent to the IRM. In addition, a section of buried public sewer that appears to be acting as a preferential migration pathway, some remaining impacted on-site piping and trench drain structure, and two previously closed in-place USTs would be removed and disposed off-site as part of the IRM. In-situ groundwater remediation would be conducted to assist in remediation of residual VOC concentrations in the groundwater above cleanup criteria in the overburden. The remaining contaminants in soil, fill and groundwater (e.g., SVOCs, metals, residual VOCs) would be addressed via institutional controls (e.g., Environmental Easement and Site Management Plan, etc.) and engineering controls (e.g., soil vapor mitigation system, cover system). A groundwater monitoring program would be implemented to evaluate the effectiveness of the remedy. This alternative is considered a Track 4 cleanup to allow for restricted residential and restricted commercial use of the Site.

3. Full Removal of Impacted Fill Material, Soil and USTs, Groundwater Remediation; and Groundwater Monitoring:

   Excavation and off-site disposal would be implemented to completely remediate soil contamination and fill material that exceeds NYSDEC Track 1 SCOs and allows for unrestricted use of the Site. A section of buried public sewer that appears to be acting as a preferential migration pathway, some remaining impacted on-site piping and trench drain structure, and two previously closed in-place USTs would be removed and disposed off-site. Contaminated groundwater that exceeds Track 1 SCOs would be addressed by dewatering excavations, pre-treating the removed water, if necessary, and discharging the water to a publicly owned treatment works (POTW); and/or contaminated areas in overburden and bedrock that are not affected by the excavation dewatering would be addressed by in-situ remediation. Groundwater monitoring wouldbe implemented to evaluate the effectiveness of the remedy. This alternative is considered a Track 1 cleanup to allow for unrestricted use of the Site.

The proposed recommended remedial alternative is based on the results of the Remedial Investigation and the evaluation of alternatives presented herein. A detailed evaluation of the three remedial alternatives was performed, and implementation of Alternative #2 (IRM Removals; In-Situ Groundwater Remediation; Institutional Controls; Engineering Controls; and Groundwater Monitoring) is recommended for the Site. Alternative #2 will achieve the remediation goals for the Site by: removing contaminated soil/fill; removing two closed in-placed petroleum USTs; removing impacted sewer piping; treating contaminated groundwater; controlling exposure to residual contamination through the use of institutional controls and engineering controls; creating conditions that restore groundwater quality to the extent practicable; and monitoring of groundwater to evaluate the effectiveness of the remedy. Alternative #2 satisfies the threshold criteria and provides the best balance of the primary balancing criteria identified in the ABCA. Alternative #2 is an acceptable alternative, can be implemented easily in relation to future use of the Site, and costs less than Alternative #3.

4.0 Scope of Work

The primary goal of the IRM is to address areas of contamination and environmental conditions that are considered to have the greatest potential for human exposure and migration. The IRM will include: removal of soils primarily in the unsaturated zone that are impacted with PCE, PCBs, petroleum, PAH SVOCs, and metals at specific source areas; as well as two (2) closed in-place 5,000-gallon USTs; remaining concrete building slabs, foundations, footers and asphalt over source areas; and buried piping that is contaminated or potentially acting as a preferential migration pathway. IRM actions will be completed in six (6) distinct areas of concern, as follows.

- IRM-01: PCE Source Area
- IRM-02: Buried Sewer System in Evans Street Right-of-Way
- IRM-03: UST Removal Area
- IRM-04: PCB-Impacted Area
- IRM-05: Trench Drain Area
- IRM-06: 320 Andrews Street Piping Network Area

4.1 Site Preparation and Control

IRM work will be performed by subcontractors to be selected through a competitive bid process in accordance with NYSDEC ERP procurement requirements. The IRM activities will be observed by Lu Engineers and Day Environmental. The subcontractor will be responsible for identification and clearance of Site utilities prior to commencement of the work.

Planned IRM work will require Site controls to ensure the safety of Site workers and the public. The Site is currently secured with perimeter fencing and three locked gates. Access to the Site will be limited to staff, workers, and pertinent agencies involved with the project only. The public will not be permitted to enter within the fenced area. Contractors will be responsible for maintaining the integrity of the perimeter fence to ensure proper Site security.

Support facilities, including a POD and a portable toilet, will be located on the northeast portion of the Site (see Figure 6). The POD will be used for storage of equipment and as a field office. Parking areas will be designated as shown on Figure 6.

IRM activities are to be contained within the Site boundaries. Figure 3 indicates the location of each IRM area and other significant existing Site features. Figure 6 identifies the anticipated layout of the Site during IRM activities. Planned staging, transportation and support areas are located such that movement of heavily contaminated waste materials across the Site will be limited to the extent necessary to allow excavation and safe and efficient access to each work area.

GPS will be used to locate IRMs and IRM-related features. The extent of each IRM area will be marked using marking paint and other methods prior to initiation of IRM activities. Likewise, areas of the Site to be used for staging, parking, decontamination and related activities will be marked using aerosol marking paint. The perimeter of IRM-01 will also be marked using high visibility rebound driveway markers (or similar material). The markers will serve as excavation perimeter reference points to allow precise determinations to be made as to depth and location of the excavation while work is in progress. These points will be driven into the ground at regular intervals 5 feet outside the excavation perimeter. Using these reference points, it is anticipated that excavations will be completed within a 5-foot tolerance of the mapped limits and corresponding depths. Figure 7 indicates the planned location of excavation perimeter reference points with respect to IRM-01.

Material Staging Areas

Soil removal areas at IRM-03, IRM-04, IRM-05 and IRM-06 will be excavated, staged and backfilled prior to the excavation of areas IRM-01 and IRM-02. Staging area locations are described below and illustrated on Figure 6.

- IRM-01 and IRM-02: Uncontaminated soil is anticipated to be staged in 100 CY piles at the IRM-06 area, subsequent to removal work in the IRM-06 area. Concrete building footers, foundations, and/or slab on grade materials will be staged in the Staged Material Exclusion Zone. Uncontaminated crushed stone will be staged west of this area.

- IRM-01 and IRM-02: Contaminated soil types will be staged in 100 CY piles located east of Evans Street on the southern portion of the Site.

- IRM-03: Petroleum-contaminated soils will be staged adjacent to the east side of Evans Street at the north end of the Site.

- IRM-04: PCB-contaminated soils will be staged east of Evans Street at the north end of the Site.

- IRM-05: Contaminated soils from the trench drain area will be staged south of the trench drain excavation in the northwest portion of the Site.

- IRM-06: Contaminated soils and piping removed from the piping network area will be staged immediately north of the excavation.

- Dewatering Staging Area: It is anticipated that two (2) 20,000-gallon frac tanks will be staged along the northern Site boundary, east of Evans Street.

Clean Stone/Soil Staging Areas

No poly sheeting will be required to be placed beneath the piles where clean materials are to be staged.

Contaminated Soil Staging Areas

The ground surface at the majority of the staging areas is currently covered in angular crushed stone. Excavated materials will likely include angular stone and fill materials capable of tearing single-layer poly sheeting, therefore a double 10-mil poly sheeting area will be constructed for each staging area as described below:

> For all areas where contaminated soils are to be staged, a layer of 10-mil poly sheeting of sufficient size to contain soil to be staged in that area will be laid on the ground surface. An approximate 2-3 inch layer of NYSDOT-approved clean

sand (or equivalent) will be placed on the poly sheeting, covering the entire surface of the poly. A second layer of 10-mil poly sheeting of equal size will then be placed on top of the sand such that it will contain the soil placed on it. This will prevent the likelihood of cross-contamination occurring if a single layer of poly sheeting was torn during placement of the impacted soil.

The staged soil piles will be covered with 6-mil poly sheeting and secured with sand bags until disposal occurs. Staging areas will be bermed to mitigate the possibility of run-off and run-on. It is noted that during excavation, staging and disposal activities, the Contractor will be directed to provide the provisions necessary to implement dust and vapor suppression controls as described in the Health and Safety Plan (HASP) in Section 7.0 of this Work Plan.

Miscellaneous Site Controls

The tree illustrated on Figure 6 along the west side of Evans Street may require removal if deemed necessary to facilitate heavy equipment and truck access through this portion of the Site. City approval to remove the tree must first be obtained. The root ball would remain in-place and may provide sidewall support during the adjacent IRM excavation work.

Concrete bollards currently staged on the northeast portion of the property will be used during the IRM activities to demarcate and protect the existing monitoring wells across the Site with the exception of the two wells to be decommissioned (MW-03 and the corrugated standpipe located on the 320 Andrews Street parcel).

Bollards and construction cones will also be used to establish the truck route through the Site, as necessary. Use of the bollards across the Site will allow the space necessary to establish the “Staged Material Exclusion Zone”, as illustrated on Figure 6.

Sedimentation Control – Temporary Strawbale Dike

Bales shall be placed with the cut ends vertical around Site storm water drainage structures to prevent sedimentation. In areas where drainage structures are surrounded by soil, each bale shall be embedded into the soil a minimum of 4 inches, and be securely anchored. Hardwood stakes or rebar shall be installed a minimum of 12 inches into the ground below the bale. The first stake in each bale shall be driven at an angle toward the previously laid bale to force the bales together.

Decontamination Procedures

As part of the subcontractor’s mobilization activities, a decontamination (decon) area for trucks, equipment, and personnel will be constructed on the Site to prevent tracking of contaminated residuals from the Site. It is anticipated that the decon area will be located in the southwest portion of the Site, as illustrated on Figure 6.

To further eliminate tracking of chlorinated VOC and petroleum-contaminated soils, the drivers will follow designated truck routes to contain traffic within a limited area (Figure 6). Efforts will be made to minimize any accumulation of impacted materials outside the excavation and staging areas, and these areas will be addressed to the satisfaction of the Field Team Leader.

During truck loading activities, polyethylene sheeting or tarps may be used to prevent unnecessary tracking of wastes through the Site and during transport.

Decontamination will be performed in accordance with NYSDEC-approved procedures. Sampling methods and equipment have been chosen to minimize decontamination requirements and prevent the possibility of cross-contamination.

Prior to exiting the Site, transport vehicles will be decontaminated via washing, as deemed necessary. This washing activity will take place on the decontamination pad (decon pad) located in the southwest portion of the Site, as illustrated on Figure 6. Heavy equipment may be dry decontaminated, if possible. It should be noted that, if possible, clean areas/corridors that either eliminate or minimize any decontamination washing will be utilized. Efforts will be made to unload, use and load transport equipment in a manner that prevents contact of the vehicles with impacted materials. Adherence to these procedures will help to ensure that decontamination will not be necessary.

Decon Pad Design

A decon pad will be constructed to decontaminate equipment and vehicles exiting the Site, such as excavators, or support trucks that may have come into contact with contaminated soil. At a minimum, equipment and/or vehicles that contact potentially contaminated soil will be washed down (or dry decontaminated) prior to exiting the Site. A typical decon pad design is as follows:

- The decon pad dimensions will be approximately 25 feet (length) by 15 feet (width);
- The pad will slope toward a low point sump to allow for collection of decontamination water;
- The pad will be constructed of 60 mil high density polyethylene (HDPE) liner material overlain by a geotextile, and a minimum of 12 inches of clean sub-angular stone will be back filled over the HDPE liner and geotextile;
- A 12-inch high containment berm constructed of clean sub-angular stone will be placed around the perimeter of the decon pad.

Decon water will be drummed for possible transfer to the frac tanks described in Section 4.7. Staging area liner materials will be loaded out with their respective waste streams.

Groundwater Monitoring Well Decommissioning

As previously mentioned, wells MW-3 and the Modified Sump "well" (locations shown on Figure 4) will be decommissioned prior to beginning intrusive Site work. These two wells will be decommissioned in accordance with protocols outlined in the NYSDEC document titled "CP-43: Groundwater Monitoring Well Decommissioning Policy" dated November 3, 2009. If other wells need to be removed as a result of the IRM activities, they will also be decommissioned in accordance with CP-43 protocols.

The remaining existing wells will be maintained until such time that their decommissioning is formally requested, and only after the NYSDEC formally concurs that they can be decommissioned.

It is anticipated that new monitoring wells will be installed to replace decommissioned monitoring wells after the IRM removal and backfilling work is completed.

Utility Decommissioning

One or two existing water mains located in the Evans Street right-of-way will be disconnected/decommissioned prior to the start of excavation work.

4.2 IRM Implementation and Sequencing

As described in Section 3.0, the selected alternative, Alternative 2, includes excavation and disposal of contaminated soils, underground storage tanks and piping, and limited remediation of contaminated groundwater by in-situ methods. Alternative 2 consists of various technical and administrative actions that are intended to perform remediation of the highest concentrations of contaminants at the Site, reduce exposure to Site contaminants, and provide long-term monitoring of groundwater to document the effectiveness of the remediation completed and to ensure that the contamination is not migrating off-site.

The Site preparation and control measures described in Section 4.1 will be implemented prior to completing IRM excavations.

The IRM-related components of Alternative 2 are shown on Figure 3. This alternative is intended to assist in remediating IRM Areas to meet Restricted-Residential Use SCOs, Protection of Groundwater SCOs, and also Restricted Commercial Use SCOs. The following sections define the specific remedial work associated with each IRM Area.

The initial excavation effort will be focused on IRM-03, IRM-04, IRM-05 and IRM-06. Completion of these IRMs will allow for the maximization of available Site area for completion of IRM-01 and IRM-02, which will generate the bulk of the materials requiring excavation, staging, disposal and/or re-use. To the extent practicable, the wastes generated during completion of IRM-03 through IRM-06 will be removed from the Site prior to initiating the IRM-01 and IRM-02 excavations and related Site preparations. This will further maximize the use of available space on-site, and will also help to avoid comingling of waste materials and unnecessarily long distance movement and associated potential tracking of wastes through the work area.

4.2.1 IRM-01: PCE Source Area

The source area of PCE-contaminated soil will be removed, characterized during on-site staging, and subsequently disposed off-site. Using the modeled extent of soil exceeding 1.3 ppm of PCE as a guide, it is estimated that approximately 703 CY (1,160 tons) of PCE contaminated soil primarily above the water table or capillary fringe will be removed. Based on the modeling, it is also estimated that approximately 673 CY (1,109 tons) of clean re-usable soil will need to be excavated and staged on-site in order to remove the extent of PCE contaminated soil projected for off-site disposal. The clean soil will later be re-used to partially backfill the excavation. It is assumed that dewatering will be required to advance the excavation to the required depth. A total of approximately 700 CY of imported crushed stone will also be required to return the excavation area to grade.

Section 4.7 describes the measures required for pumping, staging and disposal of contaminated groundwater. It is assumed that up to 40,000 gallons of contaminated water may be handled and disposed of as part of IRM-01 and IRM-02.

4.2.1.1 Soil Excavation and Staging

Based on previous studies conducted at the Site, a poor correlation between PID measurements (ambient and headspace) and analytical laboratory test results exists for this Site. Conversely, the XSD data generated during the MIP test boring program showed a more reliable correlation with the Site's analytical laboratory data and conceptual model. As such, the IRM-01 excavation limits were derived using GIS by interpolating the cumulative analytical PCE results for soil samples generated to date (i.e., Leader Phase II ESA, Demolition Phase Study, RI) and the XSD data collected during the MIP test boring program as described in Section 2.2. Using the perimeter reference point system installed prior to IRM-01 and IRM-02 excavation work, in conjunction with GIS mapping and on-site Global Positioning System (GPS), in-situ locational data will be used to determine the limits of excavation for each depth interval.

Soils excavated during IRM-01 and IRM-02 will be segregated into three categories based on the modeled XSD results and their associated level of PCE contamination derived by the model, as follows:

- Type A: no impact or below 1.3 ppm PCE and intended to be used for backfilling of IRM-01 and IRM-02 excavations.
- Type B: low level contaminated soil. Depending on analytical laboratory test results, this soil may be disposed of off-site or re-used on-site as IRM-01 and IRM-02 excavation backfill.
- Type C: grossly contaminated soil for off-site disposal.

During IRM-01 and IRM-02 excavation work, soils modeled with XSD responses less than $2.7x10^6$ microvolts will be characterized as Type A soils; soils modeled with XSD responses greater than $2.7x10^6$ microvolts but less than or equal to $3.9x10^6$ microvolts will be characterized as Type B soils; and soils modeled with XSD responses greater than $3.9x10^6$ will be characterized as Type C soils. In the event field evidence of gross contamination is identified (i.e., staining, evidence of dense non-aqueous phase liquids (DNAPL), PID readings above 5000 ppm) during IRM-01 or IRM-02 excavation work, the impacted soil will be categorized as Type C soil regardless of the GIS XSD model output. The IRM-01 and IRM-02 soils will be staged on Site in approximate 100 CY piles in the corresponding areas labeled as "Soil Staging Areas Type A, Type B and Type C" on Figure 6.

The modeled extent of soils within IRM-01 for each 2-foot depth interval is presented on Figure 7. [Note: Due to model limitations, the 0-2 ft. and 2-4 ft. interval excavation footprints were assumed to be the same. As such, one panel on Figure 7 (i.e., 0-4 ft. interval) is presented for both depth intervals.] The modeled contours represent the target excavation boundaries for the various types of soils (i.e., Type A, Type B and Type C) for each depth interval associated with IRM-01.

During excavation activities, Type A and Type B soils will be stockpiled on polyethylene sheeting and securely covered to prevent run-off, prior to testing the pile for TCL VOCs to determine it's viability as IRM-01 and/or IRM-02 backfill. In the event the TCL VOC test results indicate that the soil cannot be used as a backfill material, additional waste characterization testing will be conducted. Type C soils will be staged on polyethylene sheeting and securely covered to prevent run-off, prior to waste characterization and off-site disposal.

In the event field evidence of gross contamination, warranting removal as part of the IRM, is found to have migrated beyond the modeled excavation limits, additional soil removal from the identified interval may be conducted. The soil above the impacted interval would be placed in it's own 100 CY or less piles in the Type B Soil Staging Area. The grossly contaminated soil and an approximate 1-ft. over excavation buffer zone surrounding the grossly contaminated soil will be placed in 100 CY piles within the Type C Soil Staging Area. These soils will be tested in accordance with the procedure established for each soil type. Due to budget limitations, if additional Type B and/or Type C soils beyond what is described herein are removed for off-site disposal, a comparable volume of lesser-impacted soils modeled to be removed will be left in-place for future treatment. The soils left behind will be documented and included in the selected remedial alternative in the RI/RAA report.

It is anticipated that soils will be excavated and transferred directly into a front-end loader for appropriate staging. It is assumed that the front end loader will be loaded with 3-4 loads of excavated soils at a time prior to staging. Alternatively, materials may be temporarily staged within or adjacent to (on plastic sheeting) removal areas to be subsequently placed in the designated staging areas. Efforts will be made to avoid cross-contamination between loads by excavating like materials continuously to the extent possible based on access and other considerations. Spillage of soils from the front end loader onto uncontaminated areas of the Site will not be allowed. The contractor will be directed to prevent spillage of soils or liquids during transfer efforts to the extent possible.

Each soil staging area will be constructed as described in Section 4.1 using crushed stone with two layers of 10-mil polyethylene sheeting separated by finer material to avoid damage to the liner during the staging process to the extent possible. Once a pile has accumulated approximately 100 CY of material, analytical laboratory samples will be collected to determine the pile's viability for use as backfill material and/or off-site disposal requirements in accordance with the analytical laboratory testing program established for each soil type.

Prior to excavation of affected soils, remaining surface concrete, building foundations/footers and asphalt will be excavated from the IRM-01 footprint and the immediate surrounding area. This concrete and asphalt will be evaluated for the potential presence of VOC contamination and will be sampled in accordance with the QAPP to determine proper handling and disposal requirements. The concrete and asphalt will be placed in the "Staged Material Exclusion Zone", presented on Figure 6.

Care will be taken to assess and geo-locate drainage features observed during the excavation of IRM-01 and IRM-02. Observations will be logged, and photographs will be taken as deemed appropriate.

4.2.1.2 Post-Excavation Sampling

Once soils removal has taken place, the bottom and side walls of the excavated area will be sampled. Figure 8 indicates the location of each anticipated sample location based on guidance in DER-10. It is understood that additional RI soil samples may be obtained for analysis by the City in order to more precisely define the limits and concentrations of contamination left in-place after completion of IRM-01. The RI soil samples will also assist the City in evaluating future remedial alternatives and remedial design. Actual sample locations will be selected at the discretion of LU and DAY with concurrence from representatives of the City and NYSDEC. The Quality Assurance Project Plan (QAPP) (Appendix A) provides detailed descriptions of the applicable sampling protocols and planned analytical requirements. Analytical results will be evaluated with respect to 6NYCRR Part 375 SCOs.

Limited over excavation may be conducted to the maximum attainable depths in IRM-01 and IRM-02 to evaluate soil conditions as thoroughly as possible. Soils disturbed during this process will be returned to the excavation once the evaluation process is complete. Evaluation of subsurface soils in this area will include geotechnical logging based on the Burmister Soil Classification System. As described in the HASP (Appendix B), vapor screening with a PID will be conducted continuously during excavation and handling of contaminated soil for protection of on-site workers and the nearby community.

A handheld GPS unit will be used during and after excavation activities to the extent possible in order to locate the sample points, the limits of IRM excavation, and other significant features of interest. The location, depth and concentrations of residual contamination will be documented and incorporated into the existing City of Rochester Site-specific GIS database and in the IRM Construction Completion Report.

4.2.1.3 Backfill and Remedial Component Installation

Backfill with low total organic content will be preferentially used for Site backfilling where additional material is required. Imported materials will be from approved sources that meet requirements set forth in DER-10. The IRM-01 and IRM-02 excavations will be backfilled using screened crushed stone (dolomite) with a maximum allowable size of 2-inches. To the extent practicable, this material will be installed and compacted to attain 95% compaction using vibratory rolling or equivalent compaction equipment in 1-foot lifts. Prior to the installation of backfill, 10-inch diameter corrugated steel piping will be installed in selected locations within the IRM-01/IRM-02 footprint to facilitate future delivery of in-situ remedial products to treat residual contamination or groundwater extraction and treatment, if such action is deemed necessary.

The lower portion of these pipe sections, set in the saturated zone (i.e., approximately 10.5 ft. bgs), will be perforated and wrapped with steel screen to prevent the infiltration of excessive amounts of fine grained material. It is assumed that up to six (6) of these vertical pipes ("wells") will be installed during this process. Vertical pipes will be equipped with a 10-inch diameter 2-foot sump. These wells will be capped at the surface using lockable steel covers fitted over the outside of each well casing. The wells will be completed in such a way as to extend approximately 3 feet above the ground surface. These wells will be located with GPS upon completion. A Schematic Backfill Well Detail is provided as Figure 9.

Materials segregated during excavation, characterized for VOCs via analytical laboratory testing and determined to be clean backfill will be used to fill the excavations above the anticipated high overburden groundwater elevation, assumed to be approximately nine (9) feet below grade. To the extent possible, 95% compaction will also be required (Contractor to verify) for the Site-derived backfill materials. Excavations will be returned to grade and covered with a minimum six (6) inches of existing crushed stone that will also be compacted to 95% (if possible) to match the existing ground surface.

4.2.2 IRM-02: Buried Sewer System in Evans Street Right-of-Way

Closely related to the planned excavation and related work associated with IRM-01, removal of PCE-contaminated materials within IRM-02 will generally be limited to the 12 to 14-foot depth interval except in the southern portion of IRM-02, which lies beneath IRM-01. Concrete will be removed from the surface within the northern half of IRM-02. This material is considered to be uncontaminated, but will be staged in the "Staged Material Exclusion Zone" (shown on Figure 6), characterized, and then crushed to the extent deemed necessary for off-site disposal.

An approximate 96-foot long length of sewer system piping and associated manholes located within and north of the PCE source areas will be removed and disposed off-site. Based on dimensions of 96 ft. long by 8 ft. wide by 2 ft. thick, and accounting for some sloughing, it is anticipated that approximately 61 CY (101 tons) of PCE contaminated soil, sewer material and contents will also be removed and disposed off-site. Vapor and particulate monitoring will be conducted continuously during work at IRM-02 as described in the HASP (Appendix B). Post-excavation sampling will be conducted as indicated on Figure 8 and as specified in the QAPP (Appendix A). Analytical results will be evaluated with respect to 6 NYCRR Part 375 SCOs.

Once removal of the approximate 96 linear feet of 1.25-foot diameter vitrified clay tile (VCT) sewer line is complete, the portion of pipe that will remain in place will be plugged and filled as deemed necessary by, and under the protocol of, MCPW (refer to Section 4.2.2.1 below). The blocking of the sewer is intended to prevent potential residual contaminant migration through the remaining pipe and/or pipe bedding material.

The deep and narrow configuration of IRM-02 will require the use of a trench box or equivalent shoring methods in the northern 50 feet of its footprint. The southern 46 feet of this excavation will be exposed and sidewalls sloped back as part of the excavation of IRM-01. Shoring will be evaluated in this area based on the condition of the excavation at that time. It is not anticipated that workers will be allowed to enter this excavation.

Backfilling of the IRM-02 excavation will be done concurrently with the backfilling of IRM-01 as described in Section 4.2.1.3. It is assumed that two to three backfill wells will be installed in this area during the backfill process, as described in Section 4.2.1.3.

Section 4.8 defines the measures required for pumping, staging and disposal of contaminated groundwater. It is assumed that up to 40,000 gallons of contaminated water will be handled and disposed of as part of IRM-01 and IRM-02.

4.2.2.1 Sewer Line Closure

It is understood that the City has obtained verbal approval from MCPW to allow closure of the on-Site portion of the Evans Street sewer. It is also understood that the City has submitted an official Map Amendment to abandon the Evans Street Right-of-Way.

It is assumed that the point of termination of the sewer pipe in the IRM-02 excavation will occur at a VCT pipe joint near the fence line. Approximately two feet of bedding material will be removed from beneath the exposed pipe end to allow for proper closure. Per MCPW specifications, the pipe will be plugged at each point of termination (on Site at the northern limit of the IRM-02 excavation and within the sewer manhole drainage structure located north of the fence line in the on-ramp embankment). Each plug will consist of a water-tight masonry bulkhead constructed of brick and cement mortar, as illustrated on Figure 11.

Construction of the bulkhead at the sewer pipe termination point in IRM-02 will include the installation of a fill port for proper placement of fill material in the sewer line (Figure 11). During bulkhead construction within the sewer manhole, a temporary air vent line will be installed through the bulkhead to allow air within the sewer to escape as the pipe is filled (Figure 11). Once the sewer is filled, the vertical vent riser will be removed from within the manhole structure and the vent will be capped at the bulkhead. Per MCPW specifications, the sewer will be tremie filled (or equivalent method) with a controlled density flowable fill material.

In an effort to minimize the potential for contaminant migration, sewer line abandonment will be completed by encasing the exposed end of the sewer pipe in a block of 2,500 psi-rated concrete. The concrete will be placed on the excavation floor beneath the pipe and will extend to the limits of the width of the excavation, ending approximately two feet south of and above the exposed pipe end. An earthen berm will be used as necessary to confine the concrete within the northern end of the sewer removal trench. The concrete will be allowed to cure for a period of approximately two (2) hours prior to backfilling. The excavation will be dewatered as necessary to ensure proper curing of the bulkhead and concrete plug, and to facilitate backfilling.

In the event that any lateral sewer or drain lines connected to the main sewer line are uncovered during pipe removal, any exposed lateral will be capped, plugged, or removed. The method of capping or plugging will be dependent on the pipe material. Due to the potential for vapor accumulation to occur within the limits of the excavation, cutting of any pipe will not be allowed.

4.2.3 IRM-03: UST Area

The two abandoned USTs and an estimated 24 CY (40 tons) or less of petroleum contaminated soil will be removed and disposed off-site.

It will be necessary to demolish the concrete slab located at 25 Evans Street to access and remove two (2) 5,000-gallons USTs as well as to investigate the tank pit and surrounding soils. It is anticipated that demolition work will be performed by the subcontractor using necessary equipment.

The 25 Evans Street buildings' remaining concrete slabs and foundations will be excavated by the subcontractor using an excavator capable of breaking up the concrete into manageable units. Lu Engineers will observe and screen soils beneath the slab with a MiniRAE 3000, or equivalent, PID to assess possible chlorinated solvent and petroleum impacts to sub-slab soils, especially around floor drains and other significant features. Concrete pieces will be staged in the "Staged Materials Exclusion Zone", characterized, and disposed off-site.

Sub-slab piping and drainage structures can potentially act as migration pathways for contaminants to follow. If any such piping or drainage structures are encountered, they will be investigated for evidence of suspect contamination and removed during the concrete slab removal.

It is anticipated that petroleum impacted soils exist in the vicinity of the USTs, and that the removal of approximately 40 tons of petroleum contaminated soil from the tank excavation and/or piping trenches will be completed during the IRM. Impacted materials will be screened with a PID and staged in the IRM-03 staging area as indicated on Figure 6.

Lu Engineers will provide detailed descriptions of the elements of the completion of this IRM including field notes, tank closure form, and photographic documentation of the soil, tank and piping conditions for the IRM Construction Completion Report (refer to Section 9.0).

4.2.3.1 Tank and Soil Removal

The two (2) known USTs that were closed in-place with flowable fill (K-Crete) and are located beneath the 25 Evans Street concrete floor will be exposed, emptied of K-Crete, cleaned, and disposed of in accordance with NYSDEC protocols in DER-10 Section 5.5, Petroleum Bulk Storage (PBS) regulations in 6 NYCRR Part 613.9, and other applicable regulations. Any remaining connecting lines will also be disconnected and removed.

A variance request will be made to the City of Rochester Fire Marshall to allow opening of tanks for removal of K-Crete and other materials in-place. The tanks will then be excavated, cleaned and removed from the Site for scrapping and recycling. Decontamination residues and contents will be disposed of in accordance with applicable regulations and protocols.

The City will prepare and submit a NYSDEC PBS application prior to the tank removal. The tank removal and closure will be performed by the subcontractor with oversight by Lu Engineers. Lu Engineers will provide a description in the field notes and photographic documentation of the tank and piping condition for the report.

4.2.3.2 Closure Samples

Once the tanks are removed from the excavation, soil conditions will be evaluated for evidence of suspect contamination and limited over-excavation will be completed to remove grossly contaminated soils (anticipated to be 40 tons or less). Excavated soils will be placed in the IRM-03 staging area as indicated on Figure 6. Dewatering is not anticipated to be necessary to complete IRM-03.

Upon removal of the USTs, associated piping, and contaminated soil to the extent possible, Lu Engineers will examine the tank pit for any physical evidence of contamination and screen the sidewalls and excavation floor along transects no more than 5 feet apart. Closure samples from suspected areas of the greatest contamination will be collected to verify remaining soil conditions, in accordance with NYSDEC DER-10 Section 5.5. To the extent possible under the current budget, soils exhibiting evidence of petroleum contamination will be removed for disposal if headspace PID readings exceed 50 ppm. If groundwater is encountered in the excavation, it will be visually examined and screened with a PID, and per DER-10 an overburden monitoring well will be installed, if warranted. Post-excavation soil samples will then be collected in accordance with NYSDEC protocols in DER-10 Section 5.5(b)(4)(iii)(2)(A). Soil samples will be analyzed (with Category B Deliverables) as specified in the QAPP (Appendix A).

Soils surrounding associated underground piping will be evaluated to identify any evidence of a release. Soil samples will be collected from 0-6 inches below the removed piping, in accordance with DER-10 Section 3.9(a)5. One sample for each 15 feet of piping length and one sample for each additional 20 feet will be collected and analyzed for the parameters listed in the QAPP. Analytical results will be evaluated with respect to 6 NYCRR Part 375 SCOs.

4.2.4 IRM-04: PCB Impacted Area

The area of PCB-contaminated soil with levels of PCB above the 1.0 mg/kg SCO with an estimated volume of 33 cubic yards (55 tons) or less will be removed, staged on the northern portion of the Site, east of Evans Street (refer to Figure 6), and disposed off-site as non-hazardous waste. Confirmatory sampling will not be necessary for completion of this IRM as the perimeter has already been defined by laboratory testing of soil samples collected during the RI (refer to Section 2.1).

4.2.5 IRM-05: Trench Drain Area

Heavy equipment will be used to excavate and crush the remaining concrete trench drain and immediately surrounding concrete slab associated with IRM-05. Soils will be evaluated in the field for indications of contamination and segregated into the IRM-05 staging area as indicated on Figure 6. Uncontaminated soils will be staged in the “Uncontaminated” staging location indicated on Figure 6. Concrete will be reduced (crushed) to the extent deemed necessary, staged, characterized, and disposed off-site in accordance with applicable regulations.

An estimated volume of 77 CY (125 tons) of SVOC and/or metal-contaminated soil above SCOs located in proximity to the former trench drain at 25 Evans Street will be removed and disposed off-site at a permitted landfill.

The excavation will be sampled to confirm that contaminated soils have been removed in accordance with DER-10 and the QAPP (Appendix A) and as indicated on Figure 8. Analytical results will be evaluated with respect to 6 NYCRR Part 375 SCOs. The excavation will be backfilled and compacted to 95% (contractor to verify) to grade with clean soil and imported crushed stone. Imported materials will be from approved sources that meet requirements set forth in DER-10.

4.2.6 IRM-06 Piping Area

The area of shallow, buried PCE-contaminated piping, its contents and surrounding soils on the 320 Andrews Street parcel with an estimated volume of 68 CY (113 tons) or less will be removed and disposed off-site. Piping, piping contents and immediately surrounding soils will be consolidated for disposal as a single waste stream. Vapor monitoring using a PID will be conducted in accordance with the QAPP and HASP, but the limits of the excavation will generally be defined as shown on Figure 3. Excavated materials will be staged in the IRM-06 staging area located immediately north of IRM-06 as indicated on Figure 6. Post excavation sampling will be conducted as specified in DER-10 and the QAPP (Appendix A) and as indicated on Figure 8. Analytical results will be evaluated with respect to 6 NYCRR Part 375 SCOs.

The excavation will be backfilled and compacted to 95% (contractor to verify) to grade with clean soil and imported crushed stone. Imported material will be from approved sources that meet requirements set forth in DER-10.

4.3 On-Site Management of Excavated Soils

Excavated soils will be handled in accordance with applicable protocols and health and safety considerations. Detailed descriptions of the methods planned for segregating and staging soils and other excavated materials are specified in Section 4.2.1.1, Soil Excavation and Staging.

4.4 Characterization, Transportation, Disposal, or Re-Use of Contaminated Soils

Waste characterization samples will be collected from the excavated soils to determine re-use and/or disposal options, in accordance with the QAPP (Appendix A). These samples will be analyzed for one or more of the following parameters:

- TCL VOCs (EPA Method 8260)
- Toxic Characteristic Leaching Procedure (TCLP) VOCs (EPA Methods 1311, 8260)
- TCLP Metals (EPA Methods 1311, 6010/7470)
- TCL SVOCs (EPA Method 8270)

Trucks will be logged, and drivers and their respective time on-site will be documented to ensure compliance with applicable health and safety requirements and prevailing wage considerations.

The excavation contractor will be responsible for loading, transporting, and disposing of non-hazardous and hazardous contaminated soils, concrete, and asphalt generated during the IRM work. Truck beds will be lined if necessary at the discretion of the field team leader and the City and covered with tarps prior to departing the Project Site and during precipitation events. Tarps will also be required if a loaded truck is to remain on-Site overnight.

Appropriate shipping documents will be prepared for each waste shipment, for execution by the City. Copies of disposal documentation will be maintained and will be available for on-site review. Documentation from the disposal facility verifying the weight of each shipment will be obtained by the excavation contractor and provided to LU, DAY, and the City as soon as possible.

4.5 Dust and Vapor Monitoring and Mitigation Procedures

Procedures for dust and vapor monitoring are presented in the HASP included as Appendix B, and the Community Air Monitoring Plan (CAMP) included as Appendix C.

Continuous perimeter and work zone air monitoring will be conducted during contaminated soil removal and handling activities using Thermo Scientific, Inc. Data RAMs and MiniRAE 3000s (or equivalents) to ensure that workers and the public are not exposed to elevated concentrations of dusts and/or VOCs. The air monitoring will be conducted in accordance with a Site-specific CAMP, which is included in Appendix C.

4.6 Decontamination Procedures

As part of the subcontractor's mobilization activities, a decontamination area for trucks, equipment, and personnel will be constructed on the Site to prevent tracking of contaminated residuals from the Site as described in Section 4.1.

To further eliminate the tracking of chlorinated and petroleum-contaminated soils, drivers will follow designated truck routes to contain traffic within a limited area. If materials accumulate outside the excavation and staging areas, they will be addressed to the satisfaction of the field team leader.

Decontamination will be performed in accordance with NYSDEC-approved procedures. Sampling methods and equipment have been chosen to minimize decontamination requirements, prevent the possibility of cross-contamination, and ensure compliance with the QAPP (Appendix A).

4.7 Handling and Disposal of Contaminated Groundwater

If de-watering of the excavation is required, this water will be pumped directly into a 20,000-gallon frac tank for treatment or off-site disposal. For estimating purposes, it is assumed that infiltrating water will be pumped into two frac tanks and that up to 40,000 gallons of water will be collected and disposed of off-site. It is anticipated that excavation dewatering will only be required during removals associated with the PCE Source Area and the buried sewer system in the Evans Street right-of-way (i.e., IRM-01 and IRM-02).

It is anticipated that a sample of the water in the frac tank will be tested for total purgeable organics using EPA Method 624. Depending upon the results, the water will be: (1) discharged to the sanitary sewer under a sewer use permit, (2) pre-treated and then discharged to the sanitary sewer under a sewer use permit after obtaining acceptable effluent results, or (3) disposed off-site as a hazardous or non-hazardous waste.

4.8 Disposal of Other IRM-Derived Wastes

The following IRM-derived wastes are anticipated for this project in addition to the bulk (soil and groundwater) materials discussed elsewhere:

- Building slab, footer, and foundation demolition debris;
- Steel USTs and piping;
- Chlorinated solvent and petroleum impacted debris; and
- Decontamination wastes.

The building's concrete slab, footer, and foundation pieces and broken asphalt will be characterized for VOCs and be disposed off-site in accordance with applicable regulations. K-crete from inside the closed in-place USTs will also be characterized and disposed off-site. The USTs will be transported for off-Site cleaning and recycling as scrap metal. Piping will be also be disposed off-site, with associated soil.

Decontamination water will be containerized and staged on-Site with water removed during excavation activities. Final disposal of decontamination water will be dependent on the results of water analyses and waste characterization samples, as described in Section 4.7 above.

Excavated chlorinated solvent and petroleum impacted soils will be transported to an off-Site disposal facility permitted to accept such wastes. Prior to transport, waste characterization samples will be collected for laboratory analysis in accordance with Section 4.4, and as required by the disposal facility. Waste profiling will be coordinated with the City. Waste manifests or bills of lading will be used for off-site shipments, and such documentation will be included in the subsequent IRM Construction Completion Report.

4.9 Site Restoration

Once chlorinated solvent and petroleum-impacted soils have been excavated and post-excavation sampling has been completed and/or as necessitated by conditions observed during excavation, the excavations will be backfilled with clean soil that was previously removed and staged on-site, and imported sand/gravel/stone from an approved source(s) that meet the requirements set forth in DER-10.

To the extent practicable, backfill will be placed in 1-foot lifts and compacted to attain 95% compaction. Areas impacted by the IRM will be returned to existing conditions with a minimum of 1-foot crushed stone cover material. Existing grade will be matched at each IRM.

4.10 Installation and Development of Additional Monitoring Wells

Using a rotary drill rig, four (4) additional overburden monitoring wells will be installed upon completion of the IRM and Site restoration activities; however, the actual number of wells and locations are subject to change based on field conditions encountered and input from the City and NYSDEC. Each well will be up to 30 feet deep. A well will be installed to replace MW-03, which will be excavated during the IRM-01 source area soil removal. In addition, a new PCE source area well location will be selected to monitor post-excavation groundwater concentrations. Two additional wells will be installed northeast and northwest of the PCE source area to monitor for potential off-site migration of groundwater contaminants. The anticipated location of additional wells is indicated on Figure 6.

The additional monitoring wells will be installed utilizing a two-inch inside diameter, Schedule 40 PVC casing and screen materials. A schematic overburden well construction diagram is shown on Figure 10. A No. 10 slot screen will be attached to a solid PVC riser casing with a PVC cap that will extend from the top of the screened section to approximately two to three feet above ground surface. If DNAPL or high level contamination is encountered, the NYSDEC will be notified of the finding, and the well will be constructed of stainless steel to be chemically compatible with the encountered DNAPL.

The anticipated screen length will be 10 feet with approximately three feet above the observed water table and seven feet below the observed water table. The actual length of the well screen may vary from 10 feet to 25 feet due to the encountered field conditions.

The annulus around the collection sump and well screen will be filled with a washed and graded silica sand pack that will be placed to at least two feet above the top of the screen interval. A minimum two-foot thick bentonite seal will be placed above the sand pack and hydrated with potable water. Following hydration of the bentonite, the remaining annulus will be filled with cement/bentonite grout consisting of approximately 96% Portland type 1 (or similar) cement to 4% granular bentonite mixture and water. The cement/bentonite grout will be tremied into the well annulus to approximately one foot below grade. Wells will be completed with lockable above-grade protective steel covers.

Well Development

Monitoring wells will be developed by utilizing either a new dedicated disposable bailer with dedicated cord, and/or a pump and dedicated disposable tubing depending on the field conditions. Monitoring well development can occur a minimum of 48 hours after installation. No fluids will be added to the wells during development without prior approval of the NYSDEC, and well development equipment will be decontaminated prior to development of each well.

The well development procedure is listed below:

- Obtain pre-development static water level and oil/water interface reading for presence of DNAPL using a Heron Model HO1.L oil/water interface probe or similar instrument;
- Calculate water/sediment volume in the well;
- Obtain initial field water quality measurements (e.g., pH, specific conductivity, turbidity, temperature, and PID readings). The pH, specific conductivity, turbidity and temperature readings will be obtained using Horiba U-22 water quality meter (or similar equipment);
- Select development method and set up equipment depending on method used;
- Alternate water agitation methods (e.g., moving a bailer or pump tubing up and down inside the screened interval) and water removal methods (e.g., pumping or bailing) in order to suspend and remove solids from the well;
- Obtain field water quality measurements for every two to five gallons of water removed. Record water quantities and rates removed;
- Stop development when the following water quality criteria are met and at least 10 well volumes have been removed;
    - Water is clear and free of sediment and turbidity is less than 50 nephelometric turbidity units (NTUs);
    - pH is ±0.1 standard unit between readings;
    - Specific conductivity is ±3% between readings, and;
    - Temperature is ±10% between readings.
- Obtain post-development water level readings; and
- Document development procedures, measurements, quantities, etc.

Pertinent information for each well will be recorded on well development logs.

5.0 Geographical Information System Database

Lu Engineers will update the existing GIS database to identify, track, and document the IRM activities as they progress. The database will also prove to be an efficient vehicle for location of IRM areas and evaluating data from previous investigations. The scope of work will include incorporating the current geodatabase into an updated spatial database with interactive GIS map.

6.0 QA/QC Protocols

LU and DAY are responsible for the project management, coordination and scheduling, subcontracting, and quality assurance/quality control (QA/QC) of IRM activities. General QA/QC procedures, including sample preparation and holding times, are described in the QAPP (Appendix A). The EPA Region II Site-Specific QAPP Template was used in preparing the QAPP for this project.

Samples will be obtained, handled and characterized in accordance with NYSDEC Analytical Services Protocol (ASP) methods. Once obtained, samples will be immediately labeled and stored on ice in a cooler. Analytical work will be performed by an appropriately qualified New York State Department of Health (NYSDOH) Environmental Laboratory Approval Plan (ELAP) Contract Laboratory Protocol (CLP) certified subcontracted laboratory. Analytical methods reflect the requirements of the NYSDEC ASP, Revised June 2000. Chain-of-custody requirements will be strictly adhered to for designated analyses.

A listing of anticipated samples, analytes, methods, and QA/QC samples to be collected during this project is included in the attached QAPP. The QAPP protocols will not be deviated from except to collect additional RI samples, as deemed necessary by City personnel.

7.0 Health and Safety

A site-specific HASP has been prepared for this project and is included as Appendix B. The HASP will be reviewed by LU and DAY employees before starting site work. Other entities can adopt the protocols set forth in the HASP, or can develop their own HASP which must be submitted to the NYSDEC and NYSDOH. Monitoring of the work area and screening of soil and groundwater will be conducted throughout the duration of IRM activities using the following (or equivalent) instrumentation:

- Aerosol particulate meter (Thermo Scientific Data RAM)
- EntryRAE Multi-Gas Monitor (or equivalent)
- Two MiniRAE 2000 or MiniRAE 3000 PIDs equipped with a 10.2 eV or 10.6 eV lamps.

Air monitoring at the Site will be continuous during ground intrusive activities and during the demolition of building slabs and asphalt pavement. Air monitoring will be periodic during non-intrusive activities. Daily recorded perimeter real-time air monitoring readings for VOCs, as required by the CAMP, will be submitted to the NYSDEC, NYSDOH, the City, and DAY via email (as practicable) each day that the monitoring is implemented.

A written CAMP is provided as Appendix C.

LU and DAY employees and the subcontractor on-Site will have completed the Occupational Health and Safety (OSHA) 40-hour Hazardous Waste Operations (HAZWOPER) training with current refresher courses. A copy of the HASP will be available on-site at all times during the IRM activities.

Professional personnel entering the Site will have current OSHA HAZWOPER Certifications. Non-professional personnel will maintain OSHA 10-hour Certifications, at a minimum.

8.0 Project Organization

The personnel for this project are anticipated as follows:

Greg Andrus, CHMM	LU Project Manager
Jeff Danzinger	DAY Project Manager
Joe Biondolillo	City Project Manager
Eric Detweiler/Laura Neubauer	LU Field Team Leader
Nate Simon, P.E.	DAY Field Team Leader/Engineer
Laura Neubauer, CHMM	Quality Assurance Officer
Eric Detweiler	Site Safety Officer
Janet Bissi/Jon Becker	Field Technicians

<u>Subcontractors</u>

To Be Determined	Environmental Remediation Contractor(s)
Chemtech	Analytical Laboratory
EDV, Inc.	Data Validation

9.0 IRM Construction Completion Report

Upon receipt and review of necessary data, an IRM Construction Completion Report will be prepared including:

- A discussion of the IRM work completed;
- A Site Plan with location of the removed UST systems;
- Extents of soil removal;
- Manifests for off-site disposal of waste materials;
- Photographs;
- Tabulated post-excavation soil sampling results, including comparison to appropriate NYSDEC SCOs in 6 NYCRR Part 375; and
- Laboratory analytical reports and chain-of-custody forms.

A draft IRM report will be prepared for review. The report will be prepared in recommended ERP format and identify and list recommended cleanup levels in accordance with SCGs. In addition, the report shall identify applicable Federal and State criteria, advisories and guidances associated with any identified hazardous substances. Hazardous substances to which SCGs have been exceeded or contravened will be identified in the draft IRM report. Upon approval of the draft IRM report by the City, the report will be provided to the NYSDEC.

10.0 Schedule

A project schedule that includes the anticipated fieldwork and report submission, is included as Appendix D.

11.0 Citizen Participation

A Citizen Participation Plan (CPP) has been developed for this project by the City and is available upon request. The components of the CPP will be implemented as they relate to the IRM work.

Figures

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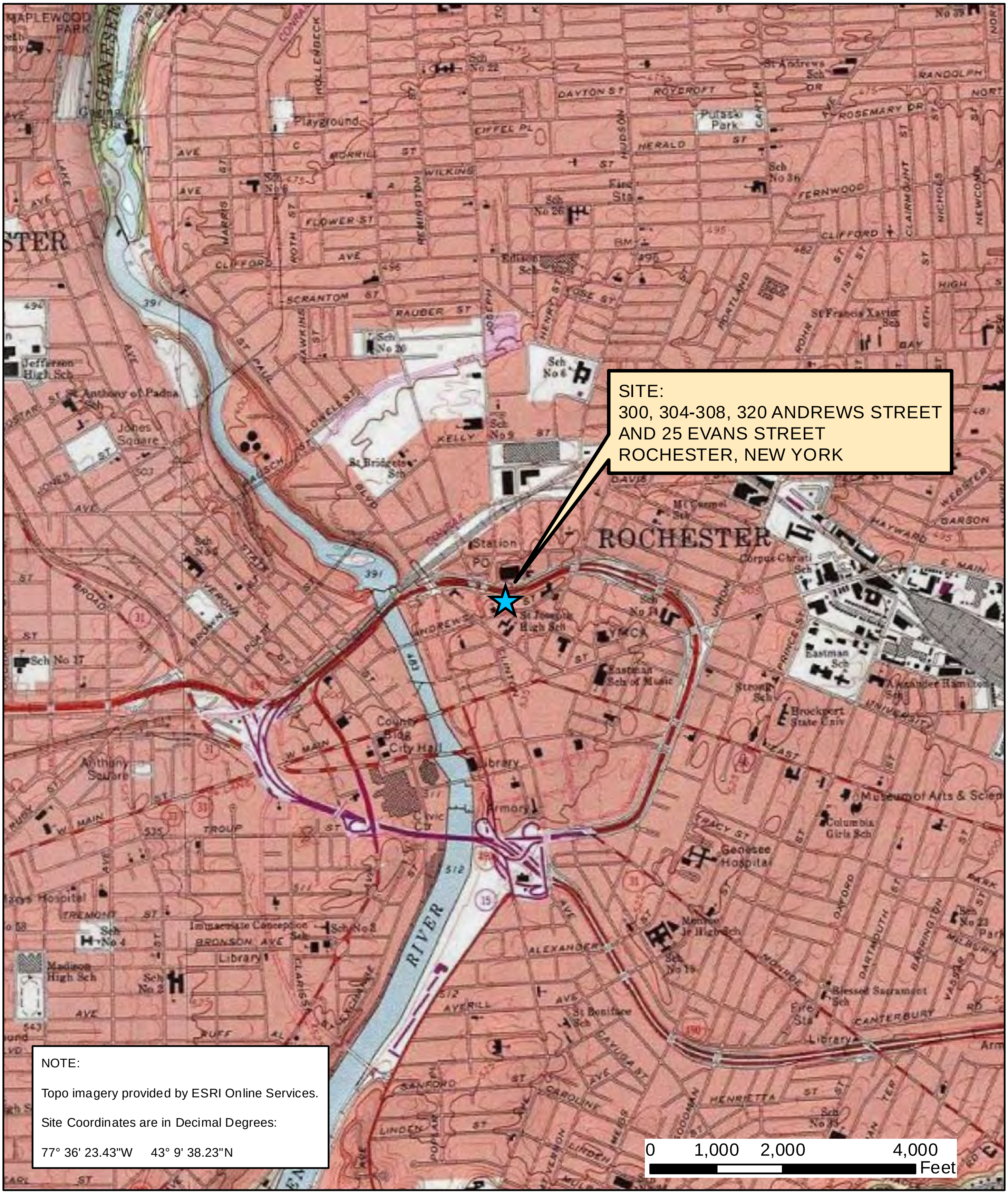

Date 06-06-2012	Lu Engineers ENVIRONMENTAL • TRANSPORTATION • CIVIL **175 Sully's Trail, Suite 202** **Pittsford, NY 14534**	Project Title 300, 304-308, 320 ANDREWS STREET AND 25 EVANS STREET ROCHESTER, NEW YORK (NYSDEC SITE NO.: E828144) ENVIRONMENTAL RESTORATION PROJECT	Project No. FIGURE 1
Drawn By CPS		Drawing Title Project Locus Map	
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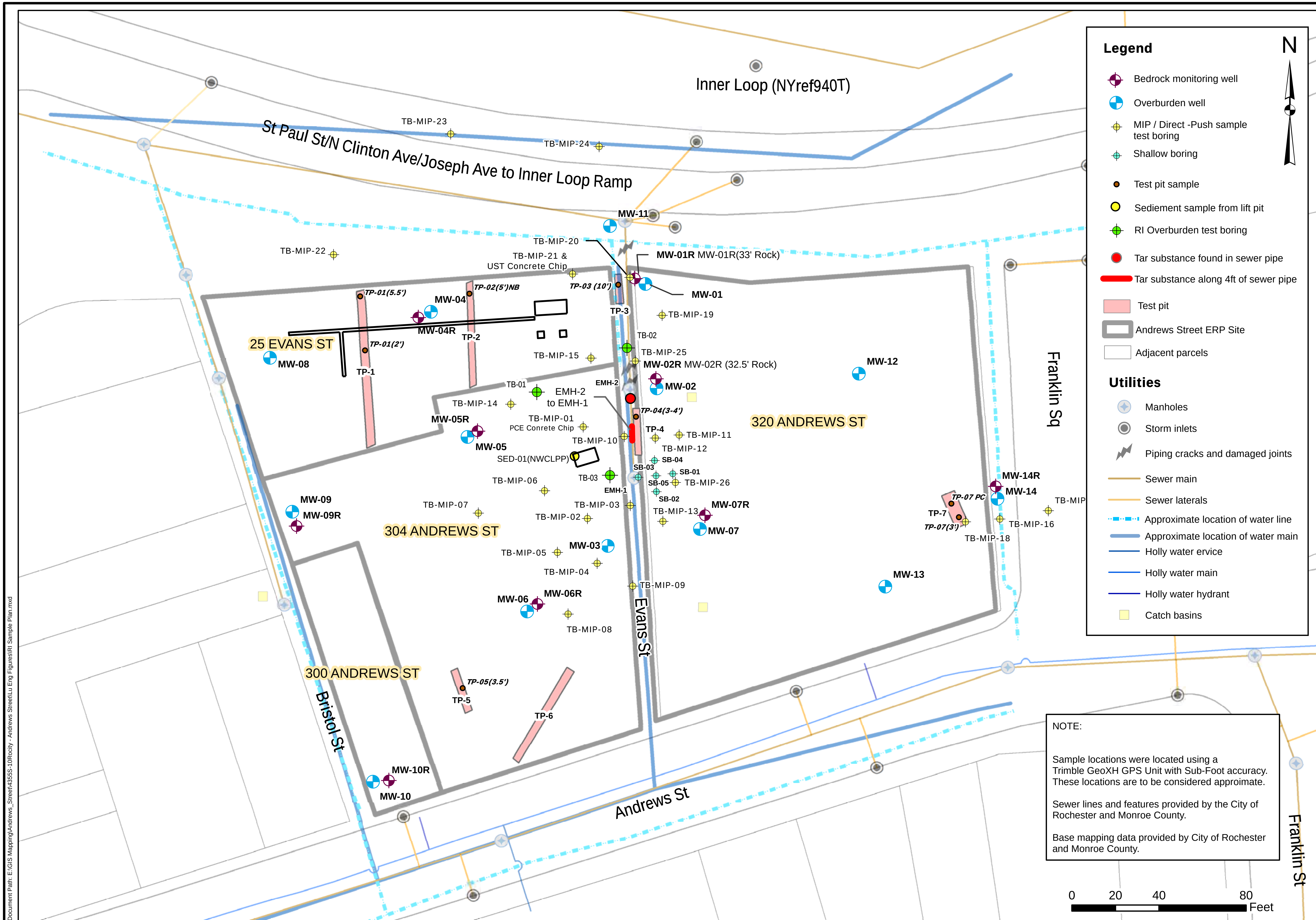

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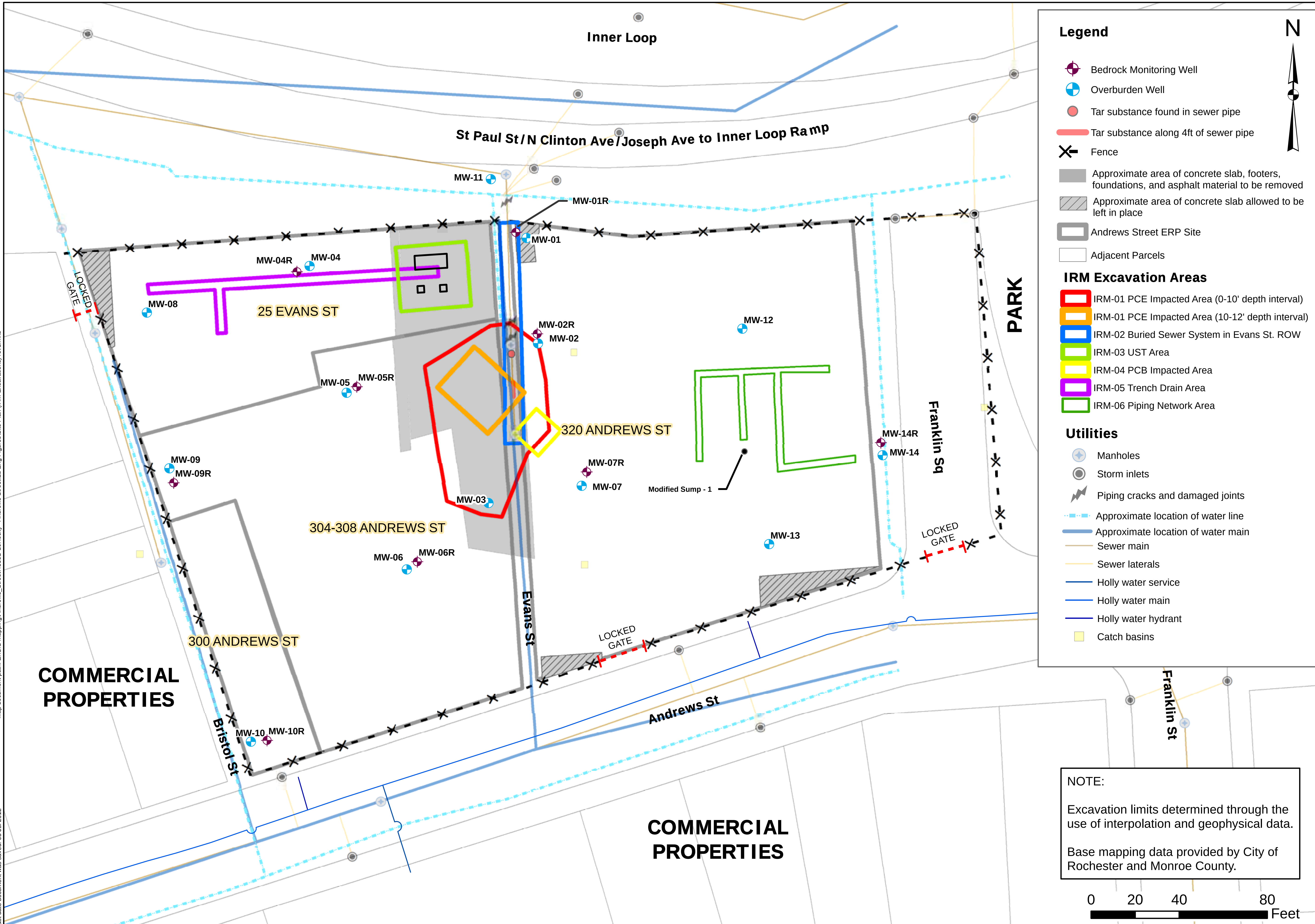
ENVIRONMENTAL RESTORATION PROJECT NYSDEC SITE NO.: E828144

Drawing Title
Site Plan with Cumulative Test Locations from Remedial Investigation

Project No.

FIGURE 2



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Last date document was saved: 05 Jul 2012

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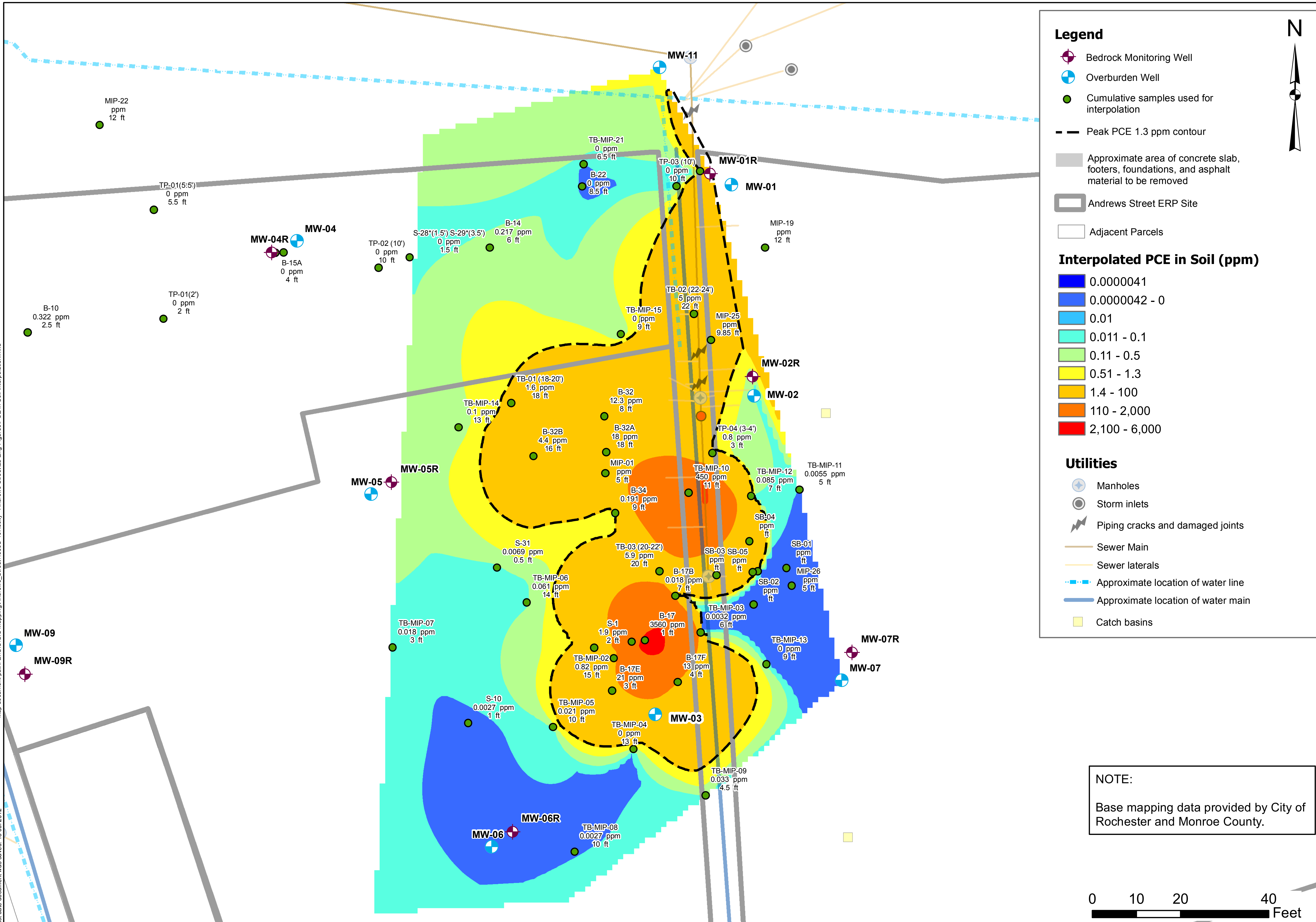
Drawing Title
Overall Site Plan Identifying the Six IRM Areas

Project No.

FIGURE 3



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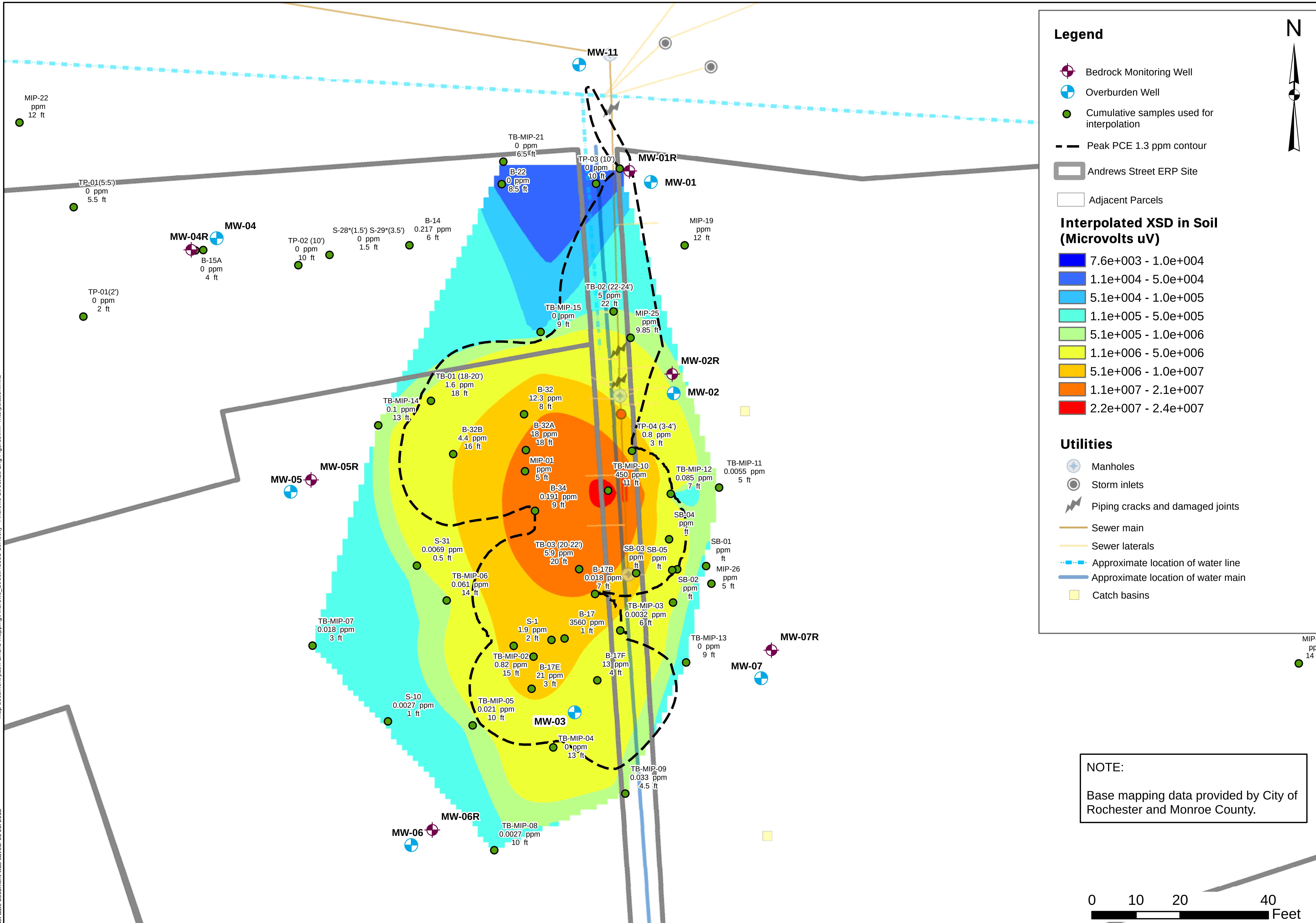
ROCHESTER, NEW YORK

ENVIRONMENTAL RESTORATION PROJECT NYSDEC SITE NO: E828144

Drawing Title
Interpolated Area of Peak PCE in Soil

Project No.

FIGURE 4



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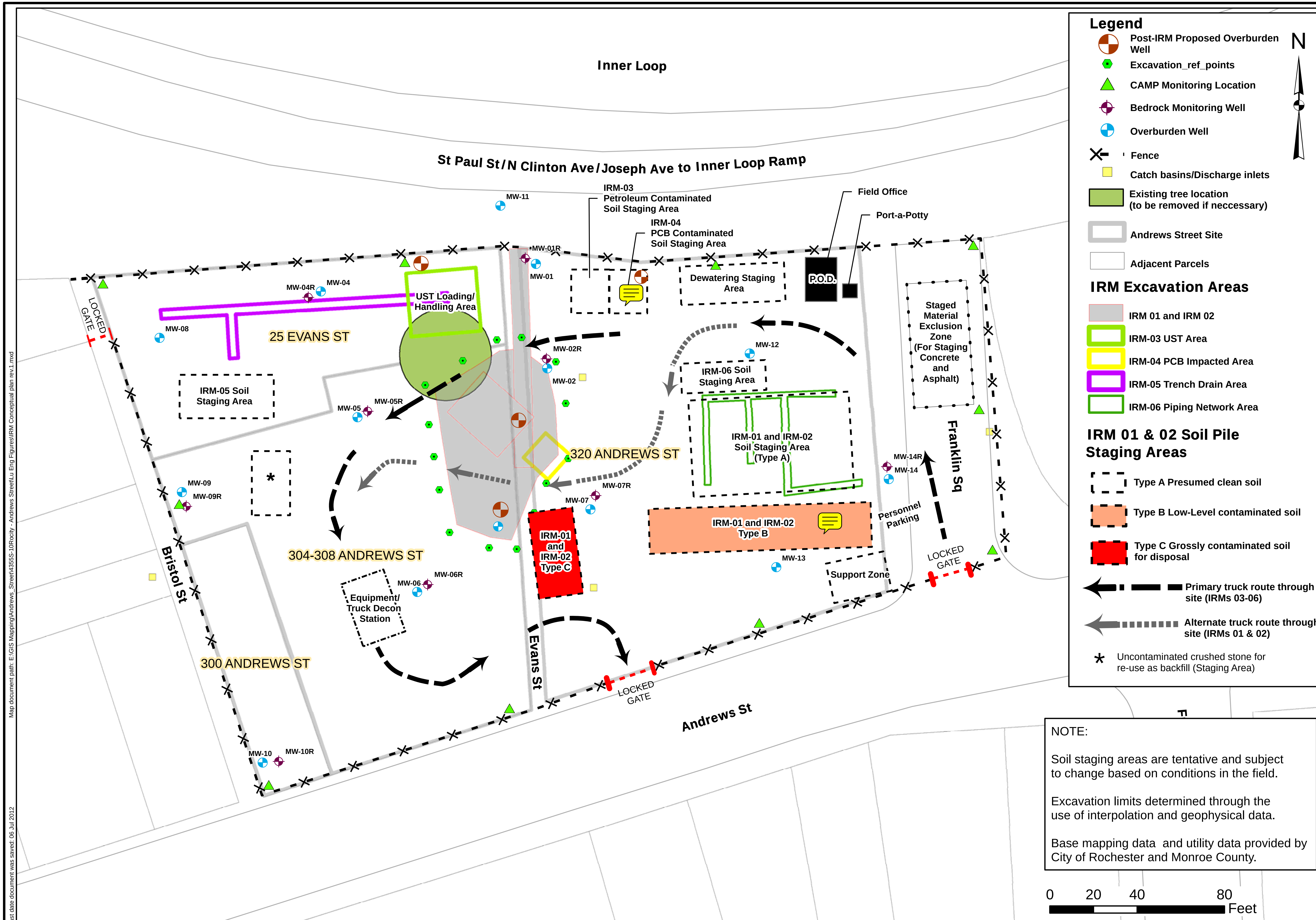
Drawing Title
Interpolated Area of Peak XSD in Soil

Project No.

FIGURE 5



NOTE:

Soil staging areas are tentative and subject to change based on conditions in the field.

Excavation limits determined through the use of interpolation and geophysical data.

Base mapping data and utility data provided by City of Rochester and Monroe County.

DATE 06-2012	DATE DRAWN 06-2012	DATE ISSUED 06-06-2012
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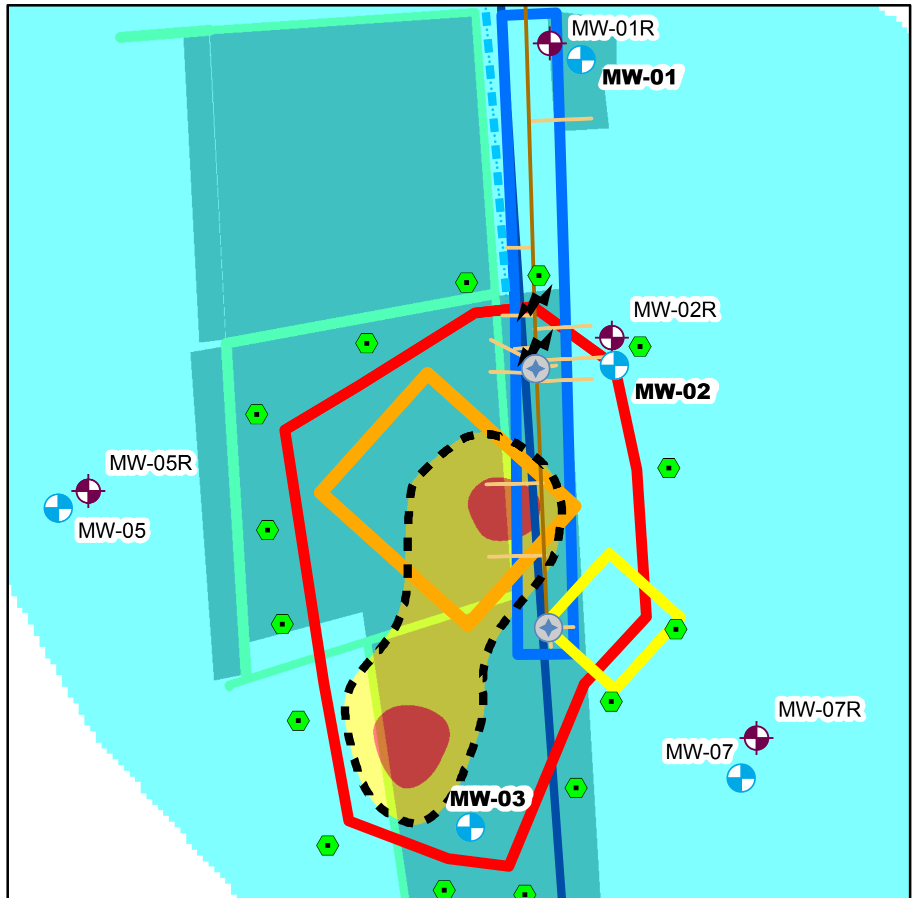
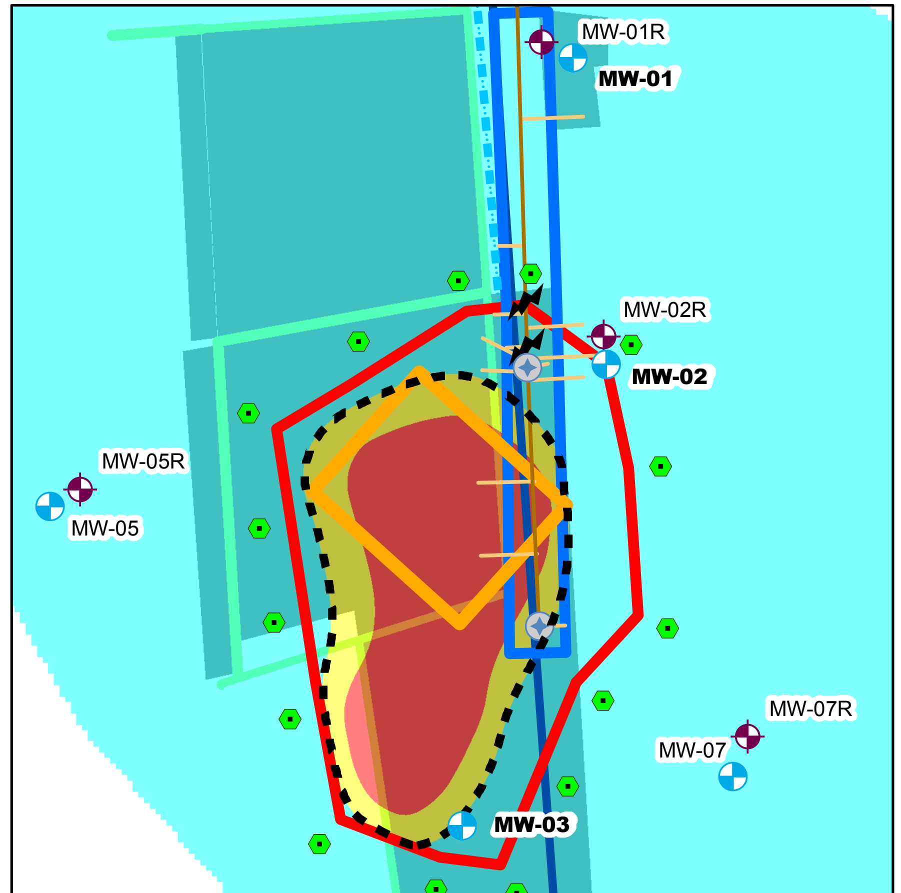
Drawing Title
IRM Conceptual Plan

Project No.

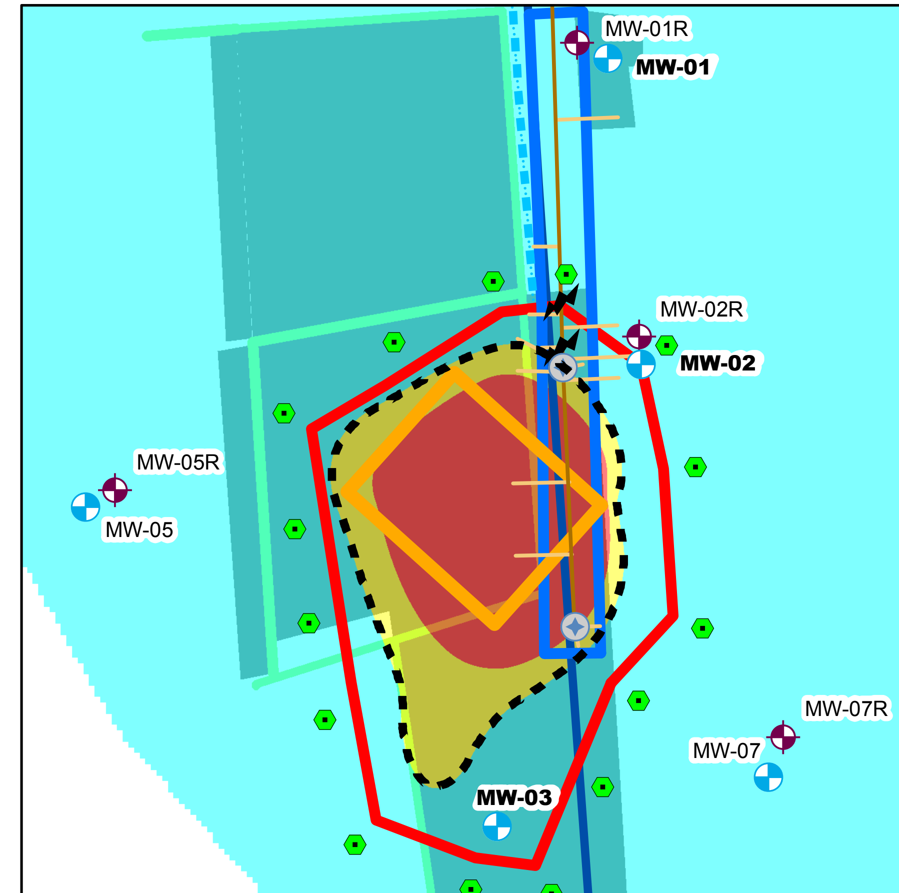
FIGURE 6



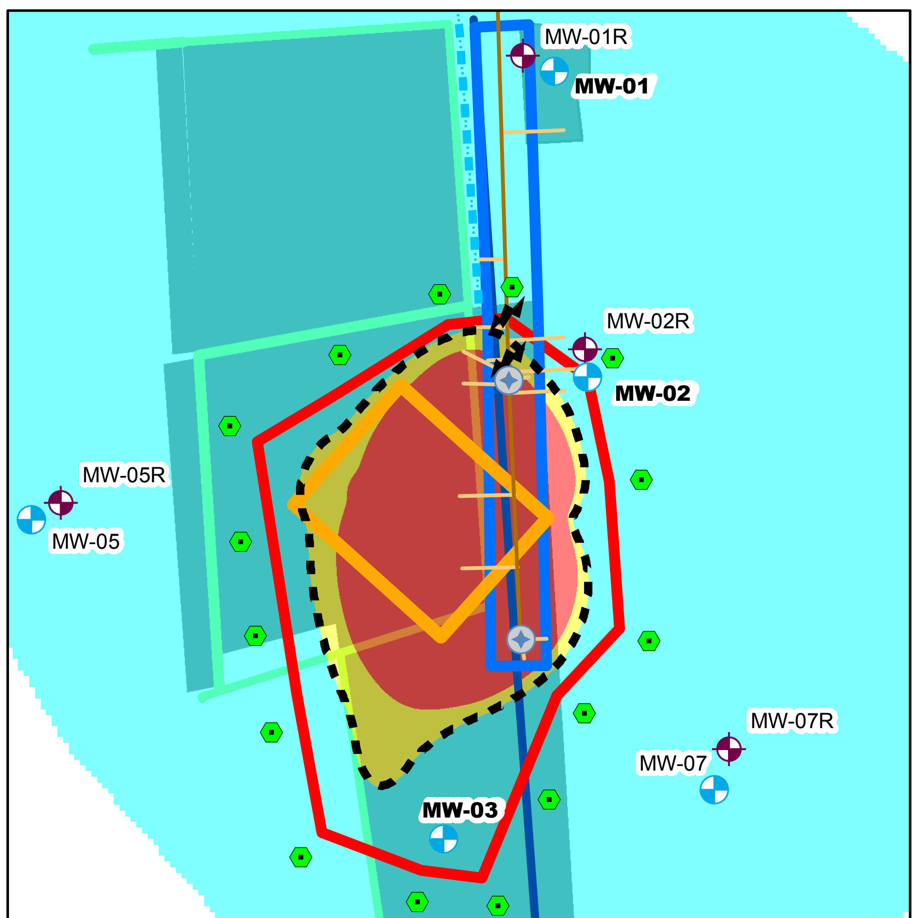
Interpolated PCE Contamination at 0-4 feet



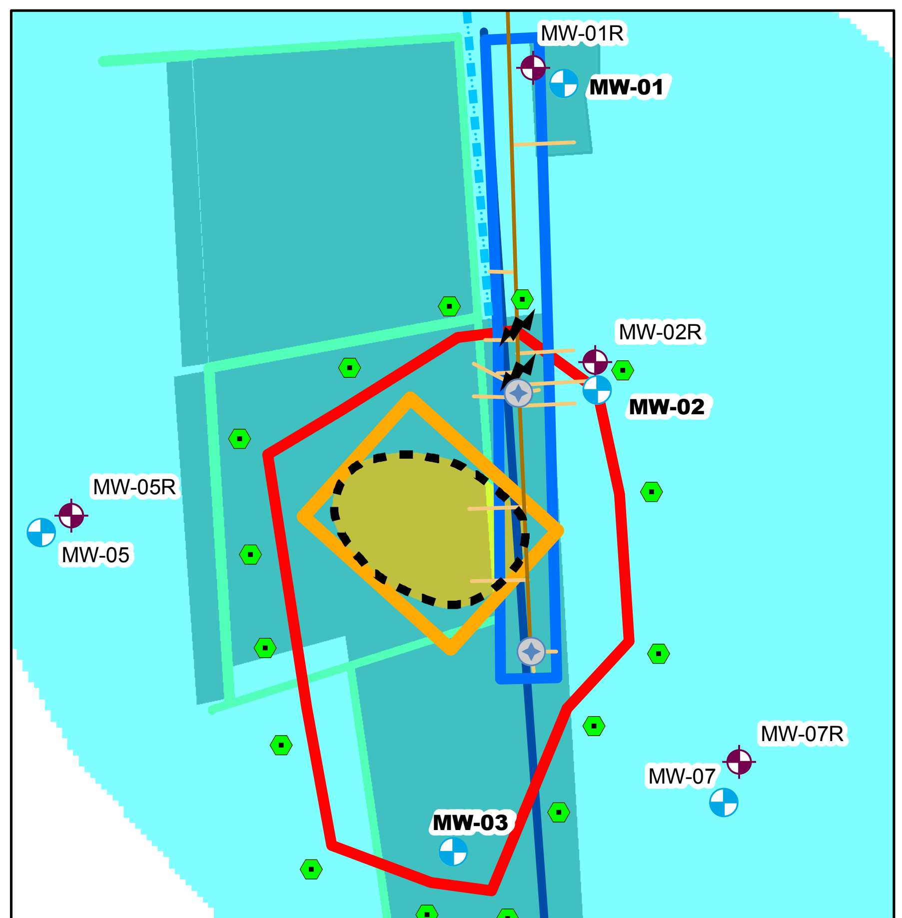
Interpolated PCE Contamination at 4-6 feet



Interpolated PCE Contamination at 6-8 feet



Interpolated PCE Contamination at 8-10 feet



Interpolated PCE Contamination at 10-12 feet

Legend

- Excavation perimeter reference point
- Overburden well
- Bedrock Monitoring Well
- IRM excavation PCE in soil contour > 1.3 ppm
- Manholes
- Piping cracks and damaged joints
- Sewer main
- Laterals
- Approximate location of water line
- Approximate location of water main
- Footers left in place after building demolition. Footers within excavation areas are to be removed
- IRM-01 PCE Impacted Area (0-10' depth interval)
- IRM-01 PCE Impacted Area (10-12' depth interval)
- IRM-02 Buried Sewer System in Evans St. ROW
- IRM-04 PCB Impacted Area
- Approximate IRM Area hard material to be removed

Interpolated XSD results representing PCE contamination

- 7.7e+003 - 2.7e+006 (Type A)
- 2.8e+006 - 3.9e+006 (Type B)
- 4.0e+006 - 2.4e+007 (Type C)

N

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Drawing Title
Interpolated PCE Source Area by Depth Interval

Project No.

FIGURE 7

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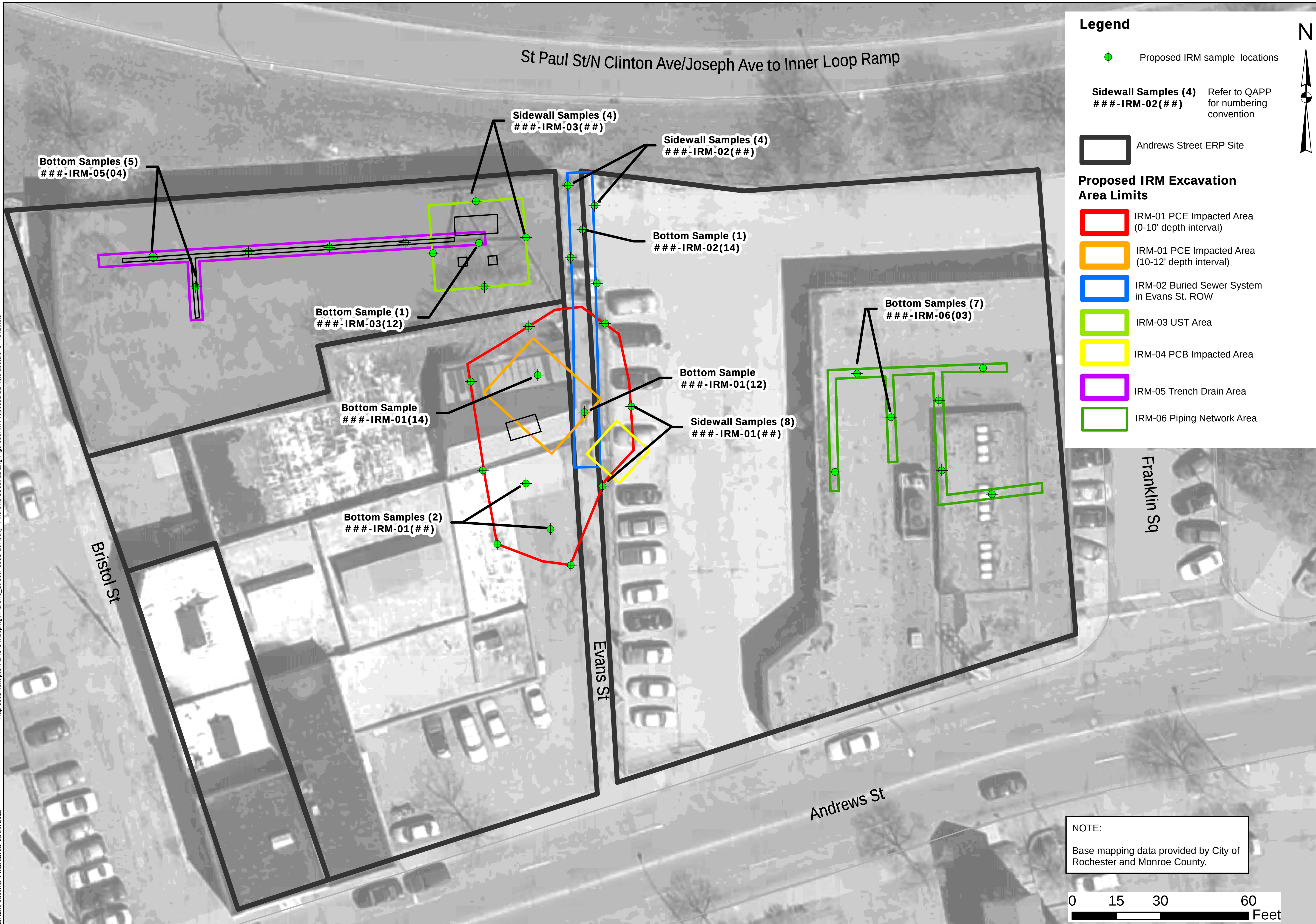

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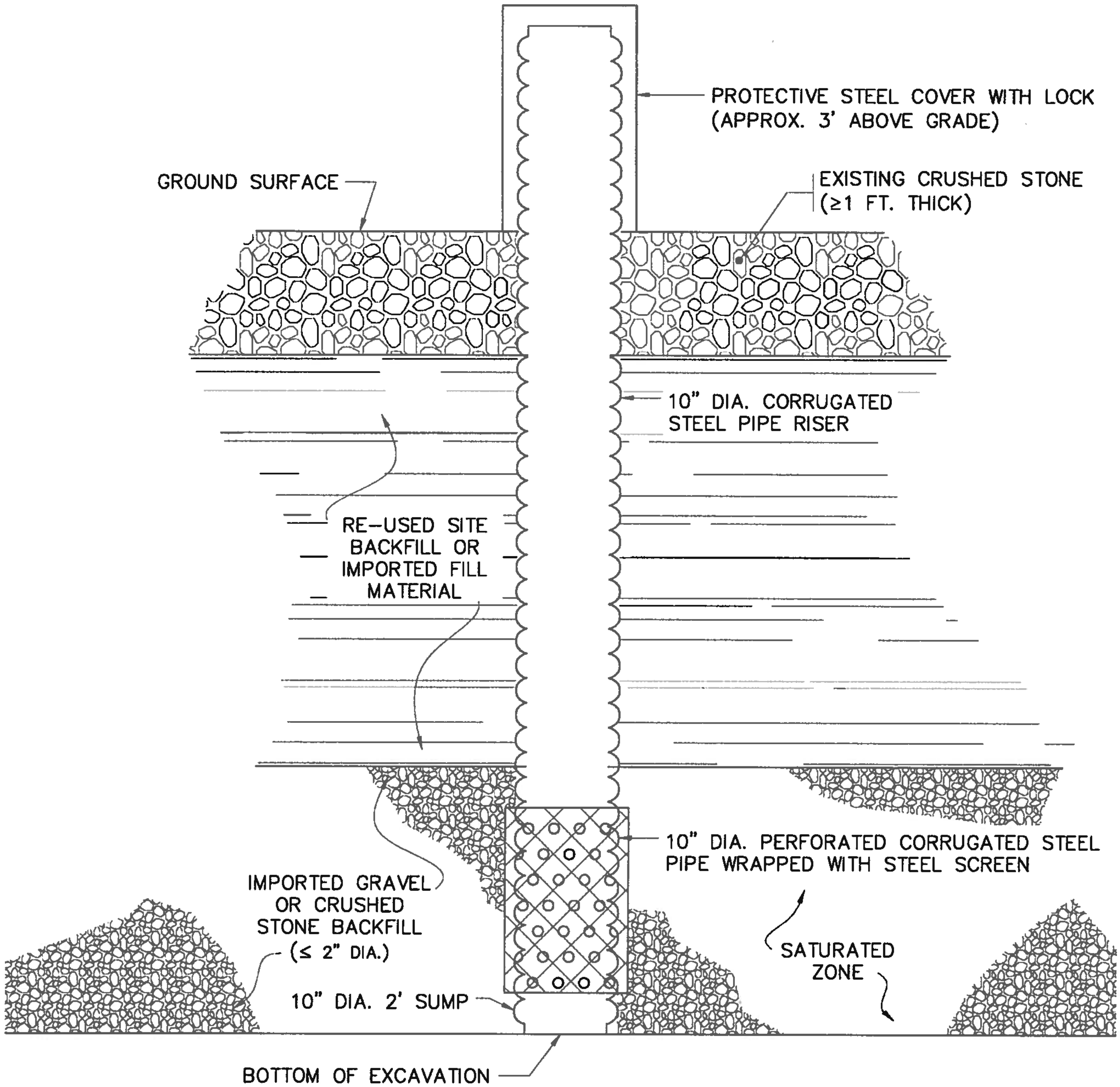
Drawing Title
IRM Sample Location Plan

Project No.

FIGURE 8



SCHEMATIC IRM BACKFILL WELL DETAIL

NOT TO SCALE

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FIGURE 9

300, 304-308, 320 ANDREWS STREET AND 25 EVANS STREET IRM WORK PLAN

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SCALE:	NONE
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P.N.	30503

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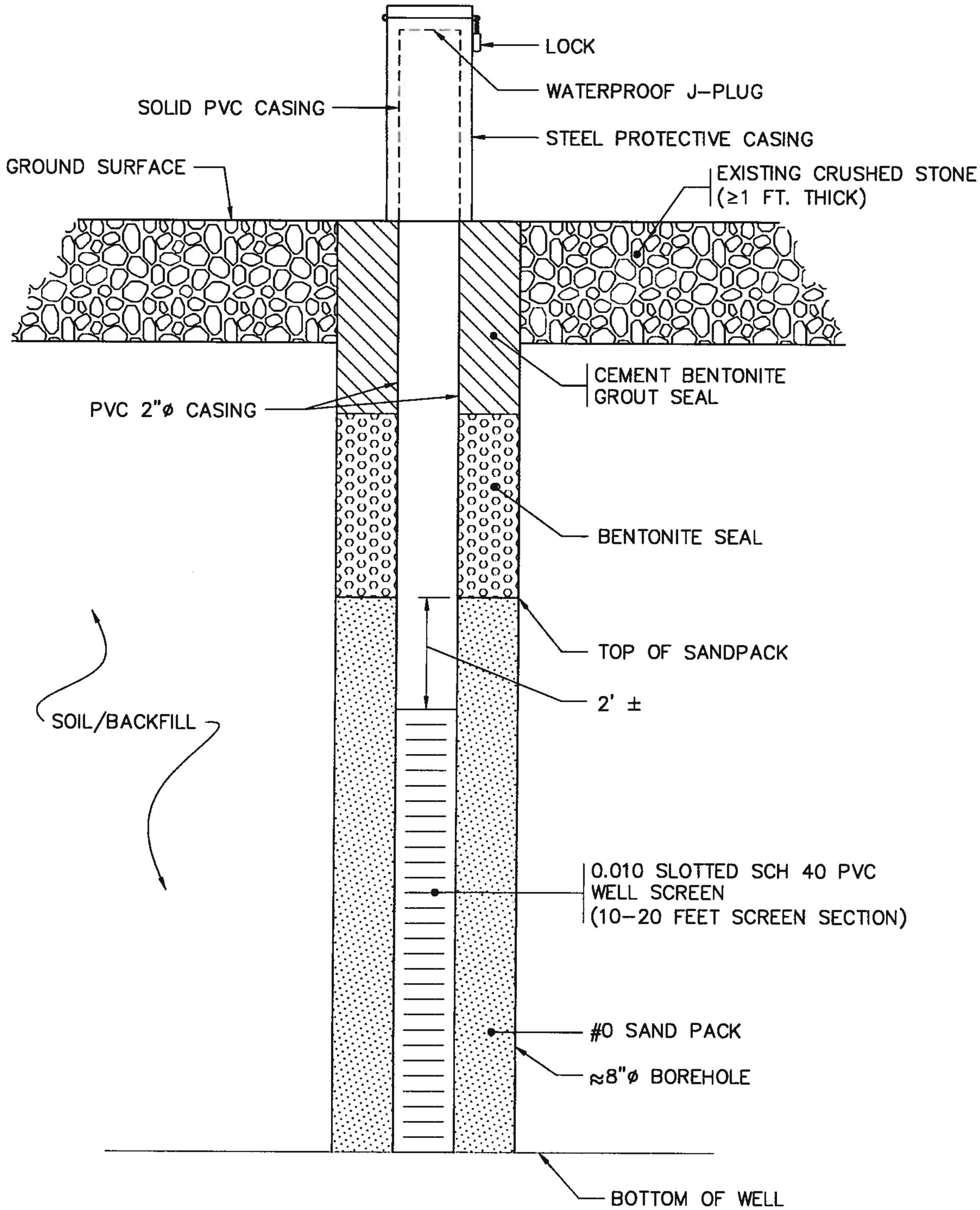

SCHEMATIC OVERBURDEN MONITORING WELL DESIGN

NOT TO SCALE

Lu Engineers

ENVIRONMENTAL • TRANSPORTATION • CIVIL

FIGURE 10

300, 304–308, 320 ANDREWS STREET
AND 25 EVANS STREET
IRM WORK PLAN

DATE:	JULY 2012
SCALE:	NONE
DRAWN/CHECKED	JRM/LMN
P.N.	30503

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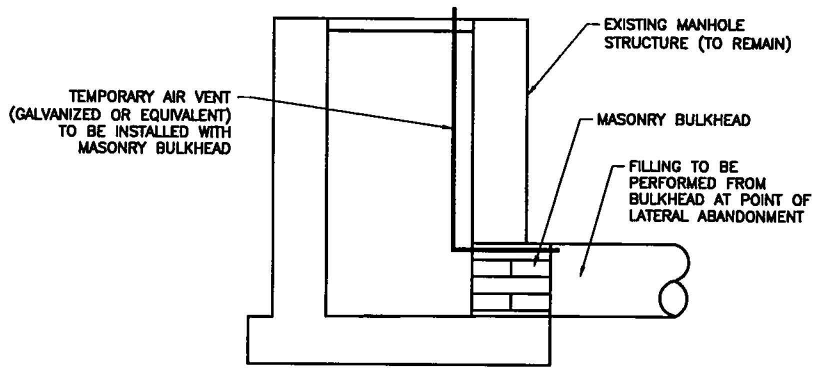
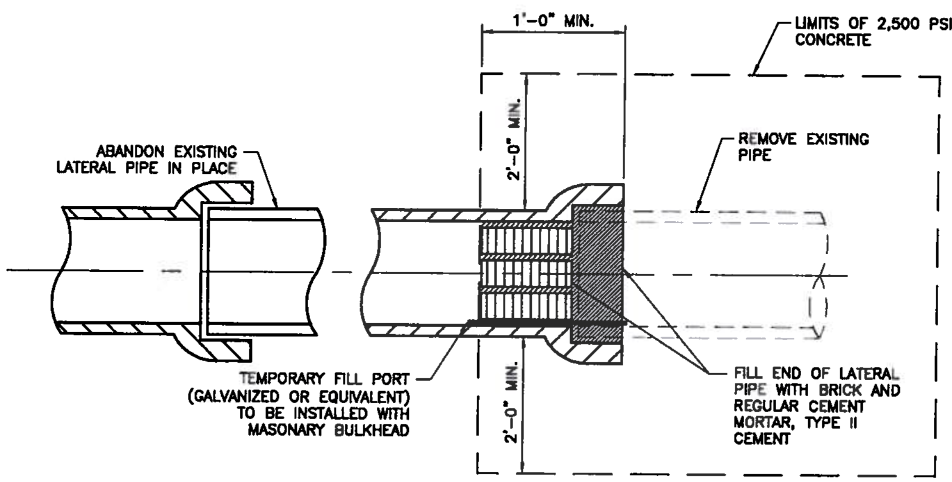


NOTE:

1. TEMPORARY AIR VENT WILL BE CAPPED IN PLACE AT MASONRY BULKHEAD (VERTICAL PORTION OF VENT TO BE REMOVED) FOLLOWING FILLING FILL OF SEWER LATERAL.

SEWER MANHOLE ABANDONMENT DETAIL
N.T.S.



NOTES:

1. LATERAL ABANDONMENT MUST BE WITNESSED BY A REPRESENTATIVE OF THE DISTRICT. NOTIFY PURE WATERS A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION FOR INSPECTION OF THE LATERAL ABANDONMENT. TELEPHONE (585) 760-7600, OPTION 5.
2. Brick for plug: ASTM C-32, Grade SS.
3. SEWER TO BE FILLED WITH CONTROLLED DENSITY FLOWABLE FILL; FOLLOWING FILL, FILL PORT WILL BE CAPPED.

SEWER LATERAL ABANDONMENT DETAIL
N.T.S.

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

FIGURE 11

300, 304-308, 320 ANDREWS STREET AND 25 EVANS STREET IRM WORK PLAN

DATE:	JULY 2012
SCALE:	NONE
DRAWN/CHECKED	JRM/ED
P.N.	30503

Appendix A –
Quality Assurance Project Plan

Appendix A

Brownfields Site-Specific Quality Assurance Project Plan (QAPP)

300, 304-308, 320 Andrews Street & 25 Evans Street Rochester, New York 14604

NYSDEC Site #E828144 USEPA ID #BF-97207900-0

Brownfields QAPP Template #1
Title and Approval Page

Title: Andrews Street IRM Quality Assurance Project Plan (QAPP)
Project Name/Property Name: 300, 304-308, 320 Andrews St. & 25 Evans St.
Property/Site Location: Rochester, New York 14604
Revision Number:
Revision Date:

Brownfields Cooperative Agreement Number:___ BF-97207900-0 __________________________

City of Rochester
Brownfields Recipient

Lu Engineers, 175 Sully's Trail, Suite 202, Pittsford, NY 14534 (585) 385-7417
gregandrus@luengineers.com
and
Day Environmental, Inc., 1563 Lyell Ave., Rochester, NY 14606 (585) 454-0210
JDanzinger@daymail.net
Preparer's Name and Organizational Affiliation
Preparer's Address, Telephone Number, and E-mail Address

Preparation Date (Day/Month/Year)

Brownfields Recipient Program Manager: ______________________________
Signature

Joseph Biondolillo/ City of Rochester/
Printed Name/Organization/Date

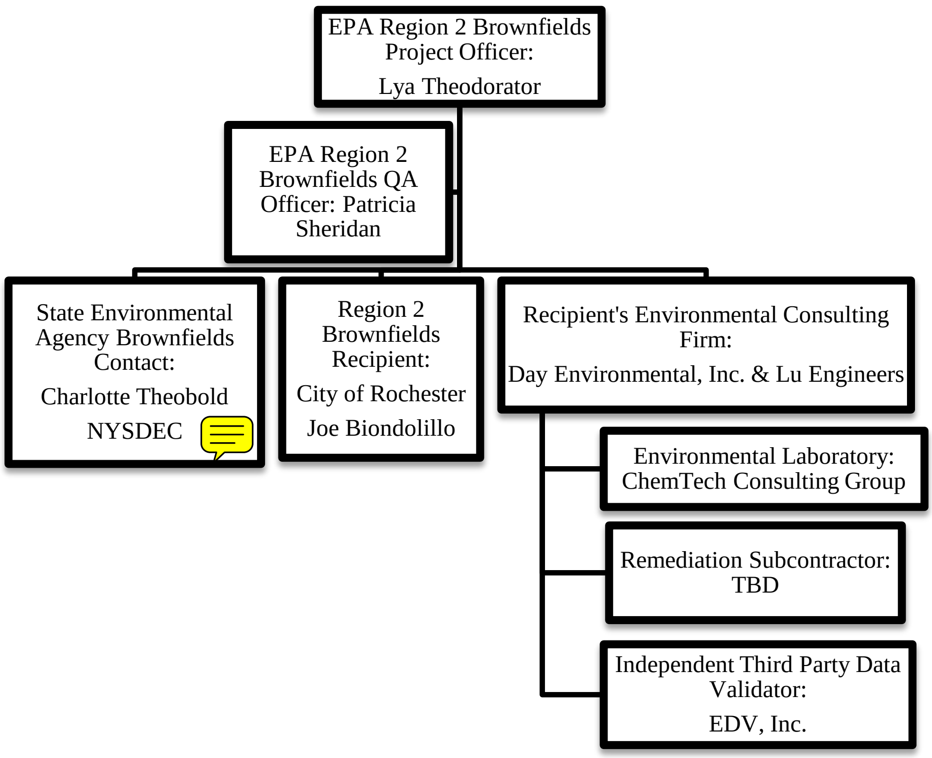
Environmental Consultant Quality Assurance Officer:
(QAO) ______________________________
Signature

Laura Neubauer/ Lu Engineers/
Printed Name/Organization/Date

EPA Region 2 Brownfields Project Officer: ______________________________
Signature

Lya Theodorator/USEPA/
Printed Name/Organization/Date

Brownfields QAPP Template #2a
Project Organizational Chart



Brownfields QAPP Template #2b
Personnel Responsibilities

Name	Title	Telephone Number	Organizational Affiliation	Responsibilities[1]
Jeffrey Danzinger*	Environmental Consultant Project Manager	(585) 454-0210	Day Environmental, Inc.	Overall responsibility for implementing the project and ensuring that objectives are met. Primary point of contact and control.
Gregory Andrus*	Environmental Consultant Project Manager	(585) 385-7417	Lu Engineers	Responsible for implementation and deliverables for the work that Lu Engineers is performing.
Joseph Biondollilo	Brownfields Recipient Program Manager	(585) 428-6649	City of Rochester	Review of project documents, assist in key decisions, etc.
Charlotte Theobold	State Brownfields Contact	(585) 226-5354	NYSDEC	Provide regulatory oversight of the project; review/approval of documents.
Lya Theodorator	EPA Brownfields Project Officer (BPO)	(212) 637-3260	EPA Region 2	Oversee and monitor the grant.
Patricia Sheridan	EPA Brownfields Quality Assurance Officer (QAO)	(732) 321-6780	EPA Region 2	Provide QA/QC technical assistance to the Project Manager and provide internal review/approval of the QAPP.
Joseph Dockery	Environmental Laboratory Contact	(908) 728-3144	Chemtech Consulting Group, Inc.*	Work in conjunction with the lab QA unit regarding QA elements of specific analytical tasks.
Dr. Maxine Wright-Walters*	Third Party Data Validator	(412) 341-5281	Environmental Data Validation Inc. (EDV)	Completion of a data usability summary report for data generated as part of the project.

* Consultant and sub-consultant resumes included in Attachment A-3.

Brownfields QAPP Template #3a
Problem Definition/Project Description

PROBLEM DEFINITION

Samples will be collected for laboratory analysis to determine concentrations of remaining contaminants following Interim Remedial Measure (IRM) work at the Site. The goal of the IRM work is to remove contaminant sources including: two underground storage tanks (USTs), remaining portions of a trench drain, chlorinated solvent-impacted soils, petroleum-impacted soils, PCB-impacted soils, and underground piping with contents contaminated with perchloroethylene (PCE). Post-excavation samples will be collected to determine the effectiveness of the source removal IRM work in meeting the NYSDEC Part 375 soil cleanup objectives (SCOs) for the Site and assess residual contamination to be addressed by the final remedy.

Sampling is also needed to determine appropriate on-site re-use or off-site disposal options for excavated material.

PROJECT DESCRIPTION

The Site is currently owned by the City of Rochester (City). The focus of this IRM project is removal of PCE-contaminated soil and an impacted section of sewer pipe. In addition to the PCE source area, the following IRMs will be completed:

- Removal of two closed-in-place 5,000-gallon USTs and petroleum-impacted soils;
- Removal of contaminated soils associated with a former trench drain;
- Removal of a small PCB-impacted soil area; and
- Removal of underground piping with contents contaminated with PCE on the southeastern portion of the Site (320 Andrews St.).

Subsequent to the soil removal work, Lu Engineers will collect approximately 34 soil samples from excavation sidewalls and floors for confirmation of remaining soil concentrations. Sample locations will be selected based on the requirements in NYSDEC's *DER-10 Technical Guidance for Site Investigation and Remediation*, dated May 2010. A proposed IRM Sample Location Plan is provided as Figure A-3 in this Quality Assurance Project Plan (QAPP).

Samples will also be collected from excavated soil/concrete staged on-site to determine disposal and/or reuse options. Waste characterization sampling frequency and analyses will be determined based on the requirements set forth in New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 guidance and the selected disposal facility.

The samples will be analyzed by Chemtech Consulting Group, Inc. (ChemTech) of Mountainside, New Jersey. National Environmental Laboratory Accreditation Program (NELAP) #20012; NY ELAP Certification #11376.

In accordance with the QAPP, Quality Assurance/Quality Control (QA/QC) samples including field duplicates, matrix spike/matrix spike duplicate (MS/MSD) samples, and equipment rinsate blanks will be collected for the post-excavation soil samples. QA/QC samples are not deemed necessary for waste characterization sampling. Samples will be collected in accordance with established standard operating procedures (SOPs) (see Template #6 for SOP information).

Site Location and Description

The Site consists of four parcels totaling approximately 1.5 acres, and is located in a commercial-use urban area in downtown Rochester, Monroe County, New York. Demolition of on-site structures was completed between the fall of 2010 and the spring of 2011. Prior to demolition, the Site was improved with four buildings with associated paved parking lots and city streets. The Site is now vacant; covered with a layer of crushed stone and some remaining building floor slabs. A fence with locked gates surrounds the Site, and access is limited to the project team members. A project locus map and a site plan are provided with this plan as Figures A-1 and A-2, respectively.

Site History

The Site has been used for various commercial and industrial purposes since the early 1920's including plumbing supply, electrical supply, bakery, printer, commercial bus depot and bus garage, gasoline station, chemical sales/distribution, dry cleaning equipment distributor, fuel oil contractor, and warehousing.

In 2006, Phase I and II Environmental Site Assessments (ESAs) were completed for the Site. The Phase II ESA identified shallow soil, subsurface soil, and groundwater impacts by volatile organic compounds (VOCs), in particular PCE and petroleum fuel related VOCs. During building demolition in 2010-2011, additional soil samples were collected as part of the At-Grade and Sub-Grade Demolition Phase Study. In 2011, a remedial investigation (RI) commenced under the NYSDEC Environmental Restoration Program (ERP). Findings of the investigations conducted to date reveal PCE is the predominant contaminant detected in soil and groundwater at the Site. The source of the PCE may be associated with the former dry cleaning equipment and supply company that historic records indicate was located on the 304-308 Andrews Street parcel between 1984 and 1988.

Using all soil data obtained to date, the extent of PCE in soil at concentrations greater than 1.3 mg/kg (which is the Protection of Groundwater SCO for PCE) was modeled using Geographic Information System (GIS) Spatial Analyst. Based on this modeling, it is estimated that approximately 703 cubic yards (1,160 tons) of PCE-contaminated soil above 1.3 mg/kg is located in the PCE source area. Figure A-2 shows the general location of the PCE source area, identified as IRM-01. PCE contamination from this area appears to have impacted the sewer that is located in the adjoining right-of-way of Evans Street, identified as IRM-02 on Figure A-2.

Overburden groundwater impacts were identified within and down-gradient of the PCE source area. Groundwater flow in the souce area is generally to the northeast. PCE and associated breakdown compounds (trichloroethene and cis-1,2-dichloroethene) were detected above NYSDEC guidance values (TOGS 1.1.1) in six overburden wells located in and around the PCE source area (MW-01, MW-02, MW-03, MW-05, MW-06, and MW-11 shown on Figure A-2). PCE was also detected in some bedrock wells, but at much lower concentrations (e.g., 46 ug/L or less) when compared to overburden wells in proximity to the PCE source area.

A complete site history and summary of RI findings are provided in the IRM Work Plan.

Based on the investigation findings, the IRM effort has been segregated into six (6) distinct IRM areas with contaminants of concern, as shown in the following table.

IRM Area	Contaminant(s) of Concern	Action Level
IRM-01 PCE Source Area	PCE	NYSDEC Protection of GW SCO (1.3 ppm) for reuse TCLP Extract 0.7 mg/L for haz. waste
IRM-02 Buried Sewer System in Evans St.	PCE	NYSDEC Protection of GW SCO (1.3 ppm) for reuse TCLP Extract 0.7 mg/L for haz. waste
IRM-03 UST Area	Petroleum	NYSDEC Restricted-Residential Use SCOs
IRM-04 PCB Impacted Area	PCBs	NYSDEC Restricted-Residential Use SCOs
IRM-05 Trench Drain Area	PAH SVOCs Metals	NYSDEC Restricted-Residential Use SCOs
IRM-06 Piping Area	PCE	NYSDEC Restricted-Residential Use SCO – 19 ppm

PROJECT DECISION STATEMENTS

Future redevelopment is anticipated to consist of multi-family residential (townhouse) purposes, or mixed use (e.g., commercial first floor with residential above).

1. If the concentration of VOCs in post-excavation soil samples is above the Protection of Groundwater SCOs (specifically 1.3 ppm for PCE), then additional remedial actions may be required.
2. If the concentration of semi-volatile organic compounds (SVOCs) in post-excavation soil samples is above the Restricted-Residential Use SCOs, then additional remedial actions may be required.
3. If staged soil VOC concentrations are below Protection of Groundwater SCOs, then the soil is considered suitable for re-use as backfill on-site.
4. If staged soil VOC concentrations are above Protection of Groundwater SCOs, then the soil will be sent off-site for disposal.

5. If waste characterization soil or concrete/asphalt samples fail TCLP analysis, then the soil or concrete/asphalt will be considered characteristic hazardous waste.
6. If waste characterization soil or concrete/asphalt samples pass TCLP analysis and other testing, then the soil or concrete/asphalt will be considered non-hazardous waste and acceptable for off-site disposal at a permitted landfill.
7. If excavation water concentrations are below the sewer use permit limits established by Monroe County Pure Waters (MCPW), then the water can be discharged directly to the MCPW sewer system.
8. If excavation water concentrations are above the sewer use permit limits established by MCPW, then the water will be treated/filtered and re-tested prior to discharge to the municipal sewer system; or sent off-site for treatment and disposal at a permitted facility.

Brownfields QAPP Template #3b
Project Quality Objectives/Systematic Planning Process Statements

Overall project objectives include:

- Obtain data representative of remaining levels of soil contaminants following excavation
- Obtain data to determine re-use and disposal options for excavated material
- Obtain water quality data from Frac tank water to determine disposal options

Who will use the data?
The data will be used by the City, the NYSDEC, Day Environmental, Inc. (DAY), and Lu Engineers to determine if additional remedial actions are warranted, and to also evaluate appropriate re-development options for the Site. Waste characterization data will be utilized by the project team (DAY, Lu Engineers, and the City) and the disposal facility(s) to determine appropriate waste disposal methods.

What will the data be used for?
The data will be used to select an appropriate final remedy for the Site and determine media re-use and disposal options. Post-excavation soil data will be compared to the NYSDEC Protection of Groundwater SCO (6 NYCRR Part 375-6.8(b)) for the PCE source area. The other post-excavation samples will be compared to the NYSDEC Restricted-Residential Use SCOs. Excavated soil meeting these cleanup objectives may be re-used as backfill on-site.

The Code of Federal Regulations (CFR) Part 261 RCRA toxicity characteristic criteria for determining if a solid waste is hazardous requires collection of a "representative portion" of the waste and performance of Toxicity Characteristic Leaching Procedure (TCLP). TCLP data collected from staged excavated materials will be used to determine if the materials are hazardous waste.

What types of data are needed?

- Soil and hard material (i.e., concrete and asphalt) concentrations of PCE
- Petroleum-related VOCs and SVOCs in soil
- Off-site laboratory techniques and field screening via PID
- Soil composite and grab samples
- Concrete chip samples
- Frac tank water grab samples

How "good" do the data need to be in order to support the environmental decision?
Post-excavation samples can be considered "final delineation" samples; therefore, NYSDEC Analytical Services Protocol (ASP) Category B data deliverables are required. QA/QC samples (duplicates, MS/MSD, blanks) will be necessary. Analytical data obtained to determine soil re-use will also be presented in ASP Category B data deliverables, with QA/QC samples.

Waste characterization samples do not require NYSDEC ASP Category B deliverables or QA/QC samples. NYSDEC ASP Category A deliverables are anticipated.

The quantitative analytical data quality objectives (DQOs) will be determined by the method detection limits (MDLs) and reporting limits (RLs) to be specified by the analytical laboratory. MDLs and RLs are highly dependent upon the sample matrix and concentrations of target constituents present. The MDL is a statistically derived value, representing the theoretical minimum level at which a particular analyte can be detected. MDL studies are performed annually by the laboratory. The RL (also referred to as the CRQL for CLP) is a detection limit that the laboratory is confident can be accurately achieved consistently over time.

How much data are needed?
The number of post-excavation soil samples is based on the requirements in DER-10 (i.e., one sidewall sample every 30 linear feet, and one bottom sample every 900 square feet). It is estimated that 34 post-excavation samples will be collected for analysis of target analyte list (TCL) VOCs by EPA Method 8260. Five (5) samples in the IRM-03 tank area will also be analyzed for SVOCs by EPA Method 8270, and five (5) samples in the IRM-05 trench drain area will be analyzed for SVOCs and metals. Proposed sample locations are shown on Figure A-3.

The number of soil samples collected to determine on-site soil re-use applicability will be dependent on the amount and type of material excavated and staged on-site. The City and field team leader, with approval of NYSDEC, will determine the appropriate number of 'representative' samples to be tested for soil re-use. Soil sampling will be performed in accordance with guidance in DER-10 Section 5.4.

The number of waste characterization soil samples and specific analyses are based on the requirements of the disposal facility. The number of concrete and asphalt samples will be based on the volume and location of this material removed during the IRM and requirements of the disposal facility.

Where, when, and how should the data be collected/generated?
Anticipated post-excavation soil sample locations are shown on Figure A-3. These samples will be collected prior to backfilling and submitted to the laboratory as soon as possible after collection. Standard turnaround time (15 days) is anticipated for post-excavation samples.

Soil r-euse/waste characterization samples will be collected after excavation is complete. Grab samples will be collected from staged piles for analysis of one or more of the following parameters: TCL VOCs (EPA Method 8260), TCLP VOCs, TCLP metals, and SVOCs.

Who will collect and generate the data?
Lu Engineers and Day Environmental will collect the post-excavation and waste characterization samples. City of Rochester personnel may request that additional post-excavation soil samples be collected and tested in order to more precisely define the limits and concentrations of

contamination left in-place to assist in evaluating future remedial alternatives and remedial design. ChemTech will generate the laboratory data.

How will the data be reported?
Data will be reported in accordance with the NYSDEC ASP Category B or Category A deliverable data packages. Electronic data will be provided in the NYSDEC Equis Electronic Data Deliverable (EDD) format and portable document format (PDF).

How will the data be archived?
Data will be archived in electronic version by DAY. EDDs will be loaded into the Equis database for the Site. Lab deliverables will be maintained on disc and in the project file.

Laboratory projects completed in the current year are maintained by ChemTech in the Report Production area. Other analytical data, reports, and logbooks are kept in the Document Storage Area. The electronically scanned data are archived on LIMS Server. Levels of authorization limit access to the Document Storage Area and the LIMS Server.

Brownfields QAPP Template #4
Project Schedule/Timeline

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	Lu Engineers & City of Rochester	05/15/12	07/18/12	QAPP	
Review of QAPP	Lya Theodorator and Patricia Sheridan, EPA Region 2	07/19/12	08/03/12	Approved QAPP by EPA Region BPO	
Preparation of Health and Safety Plan	Lu Engineers & City of Rochester	06/01/12	07/18/12	HASP	
Procurement of Equipment	Lu Engineers & Day Environmental	07/23/12	08/20/12	N/A	
Laboratory Request	Lu Engineers & Day Environmental	07/23/12	08/20/12	N/A	
Field Reconnaissance/Access	Lu Engineers & Day Environmental	09/03/12	09/21/12	N/A	N/A
Collection of Field Samples	Lu Engineers & Day Environmental	09/03/12	09/21/12	N/A	N/A
Laboratory Package Received	Lu Engineers & Day Environmental	09/20/12	10/19/12	Unvalidated data package	
Validation of Laboratory Results	EDV, Inc.	10/22/12	12/21/12	Validated data Packages	
Data Evaluation/ Preparation of Final Report	Lu Engineers & Day Environmental	10/19/12	4/19/13	Final Report	

Brownfields QAPP Template #5a
Sampling Methods and Locations

Matrix	Sampling Location(s)	Depth	Analytical Group	No. of Samples (*identify field duplicates*)	Sampling SOP Reference	Rationale for Sampling Location
Soil	###-IRM01 (##)	4-12 ft.	VOCs	12 + 1 field duplicate + 1 MS/MSD + 1 rinsate blank	NYSDEC DER-10 Section 5.5(c)3	Post-excavation soil samples selected based on excavation size and field observations, in accordance with DER-10, and at the professional judgement of the City Project Manager.
Soil	###-IRM02 (##)	10-14 ft.	VOCs	5	NYSDEC DER-10 Section 5.5(c)3	Post-excavation soil samples selected based on excavation size and field observations, in accordance with DER-10, and at the professional judgement of the City Project Manager.
Soil	###-IRM03 (##)	5-12 ft.	VOCs, SVOCs, TCLP Metals	5	NYSDEC DER-10 Section 5.5(c)3	Samples collected in accordance with DER-10.
Soil	###-IRM05 (##)	4 ft.	VOCs, TCLP VOCs, SVOCs, TCLP Metals	5 + 1 field duplicate + 1 MS/MSD	NYSDEC DER-10 Section 5.5(c)3	Post-excavation soil samples selected based on trench length and field observations, in accordance with DER-10.
Soil	###-IRM06 (03)	3 ft.	VOCs, TCLP VOCs, TCLP Metals	7	NYSDEC DER-10 Section 5.5(c)3	Post-excavation soil samples selected based on trench length and field observations, in accordance with DER-10.
Soil	###-TypeA##	N/A	VOCs	TBD	EPA Waste Pile Sampling SOP #2017	To determine re-use applicabilitly.
Soil	###-TypeB##	N/A	VOCs, TCLP VOCs, TCLP Metals	TBD	EPA Waste Pile Sampling SOP #2017	To determine re-use applicabilitly. Waste characterization; based on disposal requirements.
Soil	###-TypeC##	N/A	VOCs, TCLP VOCs, TCLP Metals	TBD	EPA Waste Pile Sampling SOP #2017	Waste characterization; based on disposal requirements.
Concrete chips	###-HM##	0-5 ft.	VOCs, TCLP VOCs	TBD	Concrete Waste Sampling SOP	Waste characterization; based on disposal requirements.
Water	###-IDW-#(water)	N/A	Purgeable Organics (Method 624)	TBD	-	Waste characterization; based on sewer use permit requirements.

Brownfields QAPP Template #5b
Analytical Methods and Requirements

ChemTech of Mountainside, New Jersey will provide analytical services for the project. If ChemTech is unable to meet the analytical needs of the project, Paradigm Environmental Services, Inc. of Rochester, New York may be utilized as a backup laboratory. On-site screening for VOCs via PID will be performed by Lu Engineers/Day Environmental/City of Rochester personnel. Analytical methods, sample volumes, containers, and holding times for the project are shown in the following table.

Matrix	**Analytical Group**	**Concentration Level**[1]	**Analytical & Preparation Method/ SOP Reference**	**Sample Volume**	**Containers (*number, size, type*)**	**Preservation Requirements (*chemical, temperature, light protected)***	**Maximum Holding Time (*preparation/ analysis)***
Soil	VOCs	Low-Med	SW-846 Method 8260B/5035A	4 oz.	Glass jar	Cool to 4°C	10 days from VTSR[2]
Soil	TCLP VOCs	Med-Hi	SW-846 Method 1311/8260B	4 oz.	Glass jar	Cool to 4°C	14 days for extraction; 14 days after extraction
Soil	SVOCs	Low-Med	SW-846 Method 8270C/3545A or 3541	8 oz.	Glass jar	Cool to 4°C	10 days from VTSR for extraction; 40 days after extraction
Soil	TCLP Metals	Low-Med	SW-846 Method 1311/6010B	8 oz.	Glass jar	Cool to 4°C	14 days for extraction; 180 days after extraction
Soil	TCLP Mercury	Low-Med	SW-846 Method 1311/7470A	8 oz.	Glass jar	Cool to 4°C	14 days for extraction; 28 days after extraction
Concrete chips	VOCs	Low-Med	SW-846 Method 8260B/5035A	4 oz.	Glass jar	Cool to 4°C	10 days from VTSR
Water	purgeable organics	Low	EPA Method 624	$\geq$ 25 ml	Glass VOA vial w/Teflon lined septum	1:1 HCl to pH<2; cool to 4°C	14 days

[1]Concentration Level refers to Low; Medium; High of the sample.
[2]VTSR= verified time of sample receipt at the laboratory

Brownfields QAPP Template #5c
Reference Limits and Evaluation Table

The target analytes/contaminants of concern, applicable state regulatory criteria (project-required action limits), and the published achievable detection and reporting limits for each analyte are shown below. Target analytes were determined based on laboratory data obtained to date for the IRM areas.

Matrix Soil, Concrete/Asphalt				
Analytical Group VOCs				
Concentration Level Low- Med				
Analyte	**CAS Number**	**Name of State/Territory/Tribal: Regulatory Standards/Criteria**	**Analytical Method/Method Detection Limit**	**Achievable Laboratory Method Detection Limit/ Reporting Limit**
PCE	127-18-4	NYSDEC Protection of Groundwater SCO/ 1.3 mg/kg	SW-846 Method 8260B/5035A 0.00101 mg/kg	0.00101 mg/kg/ 0.005 mg/kg

Matrix Soil, Concrete/Asphalt				
Analytical Group VOCs				
Concentration Level TCLP				
Analyte	**CAS Number**	**Name of State/Territory/Tribal: Regulatory Standards/Criteria**	**Analytical Method/Method Detection Limit**	**Achievable Laboratory Reporting Limit**
PCE	127-18-4	TCLP Extract Regulatory Action Level/ 0.7 mg/L	SW-846 Method 1311/8260B	0.05 mg/L

Matrix Soil				
Analytical Group SVOCs				
Concentration Level Low-Med				
Analyte	**CAS Number**	**Name of State/Territory/Tribal: Regulatory Standards/Criteria**	**Analytical Method/Method Detection Limit**	**Achievable Laboratory Method Detection Limit/ Reporting Limit**
Benz(a)anthracene	56-55-3	NYSDEC Restricted-Residential SCO/ 1 mg/kg	SW-846 Method 8270C/3545A or 3541 0.0159 mg/kg	0.0159 mg/kg/ 0.330 mg/kg

Benzo(a)pyrene	50-32-8	NYSDEC Restricted-Residential SCO/ 1 mg/kg	SW-846 Method 8270C/3545A or 3541 0.0072 mg/kg	0.0072 mg/kg/ 0.330 mg/kg
Benzo(b)fluoranthene	205-99-2	NYSDEC Restricted-Residential SCO/ 1 mg/kg	SW-846 Method 8270C/3545A or 3541 0.0109 mg/kg	0.0109 mg/kg/ 0.330 mg/kg
Chrysene	218-01-9	NYSDEC Restricted-Residential SCO/ 3.9 mg/kg	SW-846 Method 8270C/3545A or 3541 0.0151 mg/kg	0.0151 mg/kg/ 0.330 mg/kg
Indeno(1,2,3-cd)pyrene	193-39-5	NYSDEC Restricted-Residential SCO/ 0.5 mg/kg	SW-846 Method 8270C/3545A or 3541 0.0111 mg/kg	0.0111 mg/kg/ 0.330 mg/kg

Matrix Soil
Analytical Group Metals
Concentration Level TCLP

Analyte	CAS Number	Name of State/Territory/Tribal: Regulatory Standards/Criteria	Analytical Method/Method Detection Limit	Achievable Laboratory Reporting Limit
Arsenic	7440-38-2	TCLP Extract Regulatory Action Level/ 5.0 mg/L	SW-846 Method 1311/6010B 5.0 mg/L	0.10 mg/L
Barium	7440-39-3	TCLP Extract Regulatory Action Level/ 100 mg/L	SW-846 Method 1311/6010B 1.0 mg/L	0.5 mg/L
Lead	7439-92-1	TCLP Extract Regulatory Action Level/ 5.0 mg/L	SW-846 Method 1311/6010B 0.5 mg/L	0.06 mg/L
Cadmium	7440-43-9	TCLP Extract Regulatory Action Level/ 1.0 mg/L	SW-846 Method 1311/6010B 0.10 mg/L	0.03 mg/L
Mercury, Total	7439-97-6	TCLP Extract Regulatory Action Level/ 0.20 mg/L	SW-846 Method 1311/7470A 0.02 mg/L	0.002 mg/L

Matrix *Water*	
Analytical Group *VOCs*	
Concentration Level *Low- Med*	

Analyte	CAS Number	Name of State/Territory/Tribal: Regulatory Standards/Criteria	Analytical Method/Method Detection Limit	Achievable Laboratory Method Detection Limit/ Reporting Limit
PCE	127-18-4	Monroe County Sewer System Limit 2.13 mg/L total purgeable organics	EPA Method 624 0.86 ug/L	0.86 ug/L/ 5 ug/L
cis-1,2-DCE	156-59-2	Monroe County Sewer System Limit 2.13 mg/L total purgeable organics	EPA Method 624 0.53 ug/L	0.53 ug/L/ 5 ug/L
Vinyl chloride	75-01-4	Monroe County Sewer System Limit 2.13 mg/L total purgeable organics	EPA Method 624 0.35 ug/L	0.35 ug/L/ 5 ug/L

Brownfields QAPP Template #5d
Analytical Laboratory Sensitivity and Project Criteria

The following tables define the data quality indicators performance criteria within the analytical method, and the associated QC sample(s) used to assess the specific performance criteria.

Matrix Soil	
Analytical Group VOCs & TCLP	
Concentration Level Low-Medium	

Analytical Method/SOP	Data Quality Indicators[1]	Performance Criteria (related to analytical method)	QC Sample such as Duplicate, Matrix Spike, Surrogates etc.) Used To Assess Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SW846 Method 8260B / SOP M8260B/C-SWGCMSVOA-18	Accuracy	Compound Specific (see attached limits)	LCS	A
	Precision		Field Duplicate	S
	Accuracy	Factor of two(-50% to + 100%) from the continuing calibration	Internal standards	A
	Accuracy & Precision	20% RPD	Matrix spike/Matrix Spike Duplicate	A
	Accuracy	See attached limits	Surrogate Compounds	A
	Bias	< Reporting Limit	Method Blank	A

[1]Defined as Precision; Accuracy/Bias; Sensitivity/Quantitation Limits, Representativeness; Comparability, Completeness

Matrix Soil	
Analytical Group SVOCs	
Concentration Level Low - Med	

Analytical Method/SOP	Data Quality Indicators	Performance Criteria (related to analytical method)	QC Sample such as Duplicate, Matrix Spike, Surrogates etc.) Used To Assess Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SW846 Method 8270C SOP M8270C/D-BNA-17	Accuracy	Compound Specific (see attached limits)	LCS	A
	Precision		Field Duplicate	S

	Accuracy	Factor of two(-50% to + 100%) from the initial/continuing calibration	Internal standards	A
	Accuracy & Precision	20% RPD	Matrix spike/Matrix Spike Duplicate	A
	Accuracy	See attached limits	Surrogate Compounds	A
	Bias	< Reporting Limit	Method Blank	A

Matrix Soil
Analytical Group TCLP Metals
Concentration Level Low-Medium

Analytical Method/SOP	**Data Quality Indicators**	**Performance Criteria (related to analytical method)**	**QC Sample such as Duplicate, Matrix Spike, Surrogates etc.) Used To Assess Performance Criteria**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)**
SW846 6010B & 7471B SOP M6010B/C-Trace Elements-18 & M7471A/B-Mercury-11	Accuracy	80-120% recovery	LCS	A
	Bias	< Reporting Limit	Method Blank	A
	Precision	The 5-fold dilution result must agree within ± 10%D of the original sample result.	Serial Dilution	A

Matrix Water
Analytical Group VOCs
Concentration Level Low-Medium

Analytical Method/SOP	**Data Quality Indicators**[1]	**Performance Criteria (related to analytical method)**	**QC Sample such as Duplicate, Matrix Spike, Surrogates etc.) Used To Assess Performance Criteria**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)**
EPA Method 624 SOP M624/SM6210B-MSVOA-9	Accuracy	Compound Specific (see attached limits)	LCS	A
	Accuracy	Factor of two(-50% to + 100%) from the initial/continuing calibration	Internal standards	A
	Accuracy	See attached limits	Surrogate Compounds	A
	Bias	< Reporting Limit	Method Blank	A

Chemtech Limits 2012

Analyte	8260B Soil LCS/MS %Recovery Limits		624 Water LCS/MS %Recovery Limits		MS/MSD %RPD limit (water & soil)
1,1,1-Trichloroethane	76	121	81	129	20
1,1,2,2-Tetrachloroethane	75	124	79	125	20
1,1,2-Trichloroethane	78	124	83	116	20
1,1,2-Trichlorotrifluoroethane	67	127	77	121	20
1,1-Dichloroethane	77	129	92	131	20
1,1-Dichloroethene	70	122	82	123	20
1,2,3-Trichlorobenzene	72	122	69	88	20
1,2,4-Trichlorobenzene	73	121	55	114	20
1,2-Dibromo-3-Chloropropane	68	126	66	116	20
1,2-Dibromoethane	78	125	83	111	20
1,2-Dichlorobenzene	77	121	86	110	20
1,2-Dichloroethane	77	125	86	129	20
1,2-Dichloropropane	79	125	85	116	20
1,3-Dichlorobenzene	77	120	81	111	20
1,4-Dichlorobenzene	76	120	81	114	20
2-Butanone	72	136	88	128	20
2-Hexanone	72	137	78	140	20
4-Methyl-2-Pentanone	77	132	86	121	20
Acetone	66	132	71	124	20
Benzene	77	123	70	120	20
Bromochloromethane	77	128	70	130	20
Bromodichloromethane	78	123	77	123	20
Bromoform	73	140	79	106	20
Bromomethane	61	129	68	162	20
Carbon disulfide	56	135	89	128	20
Carbon Tetrachloride	72	125	64	130	20
Chlorobenzene	78	125	86	109	20
Chloroform	79	126	78	128	20
Chloromethane	55	129	78	136	20
cis-1,2-Dichloroethene	76	125	88	119	20
cis-1,3-Dichloropropene	77	121	81	110	20
Cyclohexane	70	127	89	118	20
Dibromochloromethane	76	125	80	117	20
Dichlorodifluoromethane	50	109	60	132	20
Ethyl Benzene	77	122	86	110	20
Isopropylbenzene	77	122	84	109	20
m/p-Xylenes	76	122	83	109	20
Methyl Acetate	69	140	71	134	20
Methyl tert-butyl Ether	74	130	81	142	20
Methyl cyclohexane	69	123	73	105	20
Methylene Chloride	74	125	79	120	20
o-Xylene	76	122	88	108	20
Styrene	77	124	81	110	20
Tetrachloroethene	60	154	27	143	20
Toluene	78	122	84	114	20
trans-1,2-Dichloroethene	72	124	89	118	20
trans-1,3-Dichloropropene	77	123	76	118	20
Trichloroethene	76	122	56	149	20
Trichlorofluoromethane	69	123	54	157	20
Vinyl chloride	61	127	82	136	20
Surrogates					
1,2-Dichloethane-d4	72	141	70	149	
Toluene-d8	77	113	78	125	
4-Bromofluorobenzene	45	124	70	128	
1,2-Dichlorobenzene-d4	70	120	NA	NA	
Dibromofluoromethane	70	139	NA	NA	

Chemtech

Limits 2012

Method/Analyte	TCLP LCS/MS %Recovery Limits	MS/MSD %RPD limit
8260B Surrogates		
1,1-Dichloroethene	70-130	20
1,2-Dichloroethane	70-130	20
1,4-Dichlorobenzene	75-125	20
2-Butanone (MEK)	30-150	20
Benzene	80-120	20
Carbon tetrachloride	65-140	20
Chlorobenzene	80-120	20
Chloroform	65-135	20
Chloromethane	40-125	20
Tetrachloroethene	45-150	20
Trichloroethene	70-125	20
Vinyl chloride	50-145	20
8260B Surrogates		
4-Bromofluorobenzene	75-120	
1,2-Dichlorobenzene-d_4	64-132	
1,2-Dichloroethane-d_4	70-120	
Toluene-d_8	85-120	

Chemtech Limits 2012

Semivolatiles SW846 8270C

Analyte	Soil LCS/MS %Recovery Limits		MS/MSD %RPD limit (water & soil)
1,1-Biphenyl	64	100	20
1,2,4,5-Tetrachlorobenzene	50	150	20
2,2-oxybis(1-Chloropropane)	57	105	20
2,3,4,6-Tetrachlorophenol	50	150	20
2,4,5-Trichlorophenol	63	103	20
2,4,6-Trichlorophenol	63	102	20
2,4-Dichlorophenol	63	102	20
2,4-Dimethylphenol	63	130	20
2,4-Dinitrophenol	38	130	20
2,4-Dinitrotoluene	65	105	20
2,6-Dinitrotoluene	65	104	20
2-Chloronaphthalene	64	102	20
2-Chlorophenol	62	100	20
2-Methylnaphthalene	63	101	20
2-Methylphenol	62	101	20
2-Nitroaniline	64	107	20
2-Nitrophenol	62	105	20
3,3-Dichlorobenzidine	28	130	20
4-Methylphenol	63	100	20
3-Nitroaniline	28	130	20
4,6-Dinitro-2-methylphenol	53	111	20
4-Bromophenyl-phenylether	62	108	20
4-Chloro-3-methylphenol	65	102	20
4-Chloroaniline	10	**130^**	20
4-Chlorophenyl-phenylether	65	102	20
4-Nitroaniline	57	102	20
4-Nitrophenol	56	103	20
Acenaphthene	64	103	20
Acetophenone	61	103	20
Anthracene	65	103	20
Atrazine	54	112	20
Benzalaldehyde	11	130	20
Benzo(a)anthracene	66	103	20
Benzo(a)pyrene	66	107	20
Benzo(b)fluoranthene	64	109	20
Benzo(g,h,i)perylene	64	108	20
Benzo(k)fluoranthene	66	107	20
bis(2-Chloroethoxy)methane	62	104	20
bis(2-Chloroethyl)ether	59	103	20
bis(2-Ethylhexyl)phthalate	70	109	20
Butylbenzylphthalate	68	111	20

Caprolactam	48	103	20
Carbazole	64	106	20
Chrysene	68	105	20
Dibenz(a,h)anthracene	63	108	20
Dibenzofuran	67	100	20
Diethylphthalate	65	102	20
Dimethylphthalate	66	103	20
Di-n-butylphthalate	67	105	20
Di-n-octyl phthalate	67	111	20
Fluoranthene	64	106	20
Fluorene	65	103	20
Hexachlorobenzene	63	106	20
Hexachlorobutadiene	58	104	20
Hexachlorocyclopentadiene	54	100	20
Hexachloroethane	55	101	20
Indeno(1,2,3-cd)pyrene	61	108	20
Isophorone	62	103	20
Naphthalene	61	103	20
Nitrobenzene	60	103	20
N-Nitroso-di-n-propylamine	61	103	20
N-Nitrosodiphenylamine	64	105	20
Pentachlorophenol	58	104	20
Phenanthrene	65	103	20
Phenol	61	101	20
Pyrene	68	107	20
8270C Surrogates			
2-Fluorophenol	28	127	
Phenol-d5	34	127	
Nitrobenzene-d5	31	132	
2-Fluorobiphenyl	39	123	
2,4,6-Tribromophenol	30	133	
Terphenyl-d14	37	115	

TABLE 3
CALIBRATION AND QC ACCEPTANCE CRITERIA

Parameter	Range for Q (ug/l)	Limit for s (ug/l)	Range for X (ug/l)	Range p, ps (%)
Benzene	12.8-27.2	6.9	15.2-26.0	37-151
Bromodichloromethane	13.1-26.9	6.4	10.1-28.0	35-155
Bromoform	14.2-25.8	5.4	11.4-31.1	45-169
Bromomethane	2.8-37.2	17.9	D-41.2	D-242
Carbon Tetrachloride	14.6-25.4	5.2	17.2-23.5	70-140
Chlorobenzene	13.2-26.8	6.3	16.4-27.4	37-160
Chloroethane	7.6-32.4	11.4	8.4-40.4	14-230
2-Chloroethylvinyl ether	D-44.8	25.9	D-50.4	D-305
Chloroform	13.5-26.5	6.1	13.7-24.2	51-138
Chloromethane	D-40.8	19.8	D-45.9	D-273
Dibromochloromethane	13.5-26.5	6.1	13.8-26.6	53-149
1,2-Dichlorobenzene	12.6-27.4	7.1	11.8-34.7	18-190
1,3-Dichlorobenzene	14.6-25.4	5.5	17.0-28.8	59-156
1,4-Dichlorobenzene	12.6-27.4	7.1	11.8-34.7	18-190
1,1-Dichloroethane	14.5-25.5	5.1	14.2-28.5	59-155
1,2-Dichloroethane	13.6-26.4	6.0	14.3-27.4	49-155
1,1-Dichloroethene	10.1-29.9	9.1	3.7-42.3	D-234
trans-1,2-Dichloroethene	13.9-26.1	5.7	13.6-28.5	54-156
1,2-Dichloropropane	6.8-33.2	13.8	3.8-36.2	D-210
cis-1,3-Dichloropropene	4.8-35.2	15.8	1.0-39.0	D-227
trans-1,3-Dichloropropene	10.0-30.0	10.4	7.6-32.4	17-183
Ethylbenzene	11.8-28.2	7.5	17.4-26.7	37-162
Methylene chloride	12.1-27.9	7.4	D-41.0	D-221
1,1,2,2-Tetrachloroethane	12.1-27.9	7.4	13.5-27.2	46-157
Tetrachloroethene	14.7-25.3	5.0	17.0-26.6	64-148
Toluene	14.9-25.1	4.8	16.6-26.7	47-150
1,1,1-Trichloroethane	15.0-25.0	4.6	13.7-30.1	52-162
1,1,2-Trichloroethane	14.2-25.8	5.5	14.3-27.1	52-150
Trichloroethene	13.3-26.7	6.6	18.5-27.6	71-157
Trichlorofluoromethane	9.6-30.4	10.0	8.9-31.5	17-181
Vinyl chloride	0.8-39.2	20.0	D-43.5	D-251

Q = Concentration measured in QC check sample, in ug/l.

Brownfields QAPP Template #5e
Secondary Data Criteria and Limitations Table

Data generated during previous investigations was used to delineate areas to be addressed during the IRM, and to identify contaminants of concern for post-excavation sampling. Secondary data sources are shown in the following table.

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Previous Investigation Sampling Results	Leader Professional Services Phase II ESA Report, October 2006	Paradigm & Columbia Analytical Services – 21 soil samples, 3 groundwater; collected May & July 2006	To assess existing contamination	1. Unvalidated data used to generate the report 2. Limited number of data points
Demolition Phase Investigation	Day Environmental, At-Grade and Sub-Grade Demolition Report, August 2011	ChemTech - 21 samples; sub-slab soil and hard material; collected Nov. 2010-Jan.2011	To assess existing contamination	1. Limited sample depths
Remedial Investigation	Day Environmental, 2011- on-going	ChemTech & Paradigm	To assess existing contamination	none

Brownfields QAPP Template #6
Project Specific Method and Standard Operating Procedures (SOPs) Reference Table

Field sampling SOPs, analytical method references (for preparation and analysis of the samples) and corresponding analytical laboratory SOPs that will be used for the Brownfields project are indicated below. Copies of field sampling SOPs are included in Appendix A-2.

ANALYTICAL METHOD REFERENCE (*Include document title, method name/number, revision number, date)*
1a. SW846 Method 8260B GCMS Volatiles, Rev. 2, Dec. 1996
2a. EPA Method 624 GCMS Purgeables, 40 CFR Part 136, Appendix A
3a. SW846 Method 8270C GCMS Semivolatiles, Rev. 3, Dec. 1996
4a. SW846 Method 6010B ICP-AES Metals, Rev. 2, Dec. 1996
5a. SW846 Method 7471B CVAA Mercury, Rev. 1, September 1994
ANALYTICAL LABORATORY SOPs * a listing of laboratory SOPs is included in Appendix A-2. Copies are available upon request.
1b. M8260B/C-SWGCMSVOA, revision 18, 2/15/2011
2b. M624/SM6210B-MSVOA, revision 9, 7/25/2011
3b. M8270C/D-BNA, revision 17, 10/1/2008
4b. M6010B/C-Trace Elements, revision 18, 5/23/2011 & M7471A/B-Mercury, revision 11, 5/23/2011
FIELD SAMPLING SOPs (*Include document title, date, revision number, and originator=s name)*
1c. EPA Waste Pile Sampling SOP#2017, 11/17/94 rev.0.0
2c. Field Equipment Decontamination SOP, Lu Engineers
3c. Concrete Waste Sampling SOP, Lu Engineers 6/2012
4c. NYSDEC DER-10 / Technical Guidance for Site Investigation and Remediation, Underground Storage Tank Closure, Section 5.5(c)3; May 3, 2010

Brownfields QAPP Template #7
Field Equipment Calibration, Maintenance, Testing, and Inspection

Field instruments to be used for health and safety monitoring include: MiniRAE PIDs for volatiles, DataRAMs for particulates, and a Multi-Gas Monitor for oxygen and LEL in confined spaces. A PID equipped with 10.6 eV lamp may also be used for field screening of volatiles in excavated material.

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Reference
MiniRAE 3000 PID, or equivalent	Zero calibration; Span calibrate with isobutylene standard gas	N/A	N/A	Prior to day's activities; anytime anomaly suspected	± 10%	Replace filter, blow-dry the sensor module, re-calibrate	MiniRAE 3000 User's Guide, 2010
DataRAM, or equivalent	Internal Span Check; Zero Calibration	Optical sensor chamber and cyclone cleaning, as needed.	N/A	Prior to day's activities; anytime anomaly suspected	"Calibration OK" output	Repair as necessary	Thermo Anderson DataRAM Operator Manual
EntryRAE Multi-Gas Monitor	Fresh air calibration; Span gas calibration	Replace sensors and charcoal filter, as needed.	N/A	Fresh air calibration prior to day's activities; anytime anomaly suspected. Full calibration every 30 days.	Methane: 0% to +20%; no "Err" code during span calibration	Replace filter, clean PID sensor, re-calibrate	EntryRAE PGM-3000 Multi-Gas Meter User Manual, Rev C, Jan. 2006

Brownfields QAPP Template #8
Analytical Laboratory Instrument and Equipment Maintenance, Testing, and Inspection

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
GC/MS - Volatiles	Check pressure, gas supply and vacuum daily. Bake out trap and column, manual tune if BFB not in criteria, change septa as needed, cut column as needed, change trap as needed, clean MS source as needed.	Volatiles/ Ion source, injector liner, column, column flow, purge lines, purge flow, trap.	Prior to ICAL and/or as necessary.	Acceptable ICAL or CCV.	Correct the problem and repeat ICAL or CCV.	Analyst/ Supervisor	Chemtech M8260B-C-SWGCMSVOA-18 and M624/SM6210B-MSVOA-9
GC/MS - Semivolatiles	Check pressure and gas supply daily. Change septa as needed, change liner as needed, cut column as needed.	SVOCs/ Ion source, injector liner, column, column flow.	Prior to ICAL and/or as necessary.	Acceptable ICAL and CCV.	Correct the problem and repeat ICAL or CCV.	Analyst/ Supervisor	Chemtech M8270C/D-BNA-17
ICP-AES	Clean torch; clean filters; replace pump tubing.	Metals / Torch, pump, pump tubing.	Prior to ICAL and as necessary.	Acceptable ICAL and CCV.	Correct the problem and repeat ICAL or CCV.	Analyst, Supervisor	Chemtech M6010B/C-Trace Elements-11
CVAA	Replace peristaltic pump tubing, replace mercury lamp, replace drying tube, clean optical cell and/or clean liquid/gas separator as needed. Other maintenance specified in lab Equipment Maintenance SOP.	Mercury / Tubing, sample probe, optical cell, waste container.	Prior to ICAL and as necessary.	Acceptable ICAL or CCV.	Correct the problem and repeat ICAL or CCV.	Analyst/ Supervisor	Chemtech M7470A-Mercury-12

Analytical Laboratory Instrument Calibration

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
GC/MS – Volatiles Soil by 8260B	Tune Verification – (BFB)	Prior to each ICAL and at the beginning of each 12-hour analytical sequence.	Must meet the ion abundance criteria required by the method (SW-846 8260B or EPA624).	Retune and/or clean or replace source. No samples may be accepted without a valid tune.	Analyst/ Supervisor	Chemtech M8260B-C-SWGCMSVOA-18 and M624/SM6210B-MSVOA-9
	Initial Calibration (ICAL) – A minimum of a 5-point calibration is prepared for all target analytes for 8260	Upon instrument receipt, instrument change (new column, source cleaning, etc.), when CCV is out of criteria.	The average response factor (RF) for System Performance Check Compound s (SPCCs) must be ≥ 0.10 or 0.30 as required. The percent relative standard deviation (%RSD) for RFs for calibration check compounds (CCCs) must be ≤ 30%; and %RSD for each target analyte must be ≤ 15%, or the linear least squares regression correlation coefficient (r) must be ≥ 0.995; or the coefficient of determination (r2) must be ≥ 0.99 (minimum of 6 points required for second order).	Correct problem then repeat ICAL. No samples may be run until ICAL has passed.	Analyst/ Supervisor	
	ICV – Second Source	The percent recovery (%R) of all target analytes must be within 80-120% of the true value. SPCC RFs must be ≥ 0.050; CCCs must be ≤ 20 percent difference or percent drift (%D.)	Correct problem and verify ICV. If that fails, correct problem and repeat ICAL. No samples may be run until ICV has been verified.	The percent recovery (%R) of all target analytes must be within 80-120% of the true value. SPCC RFs must be ≥ 0.050; CCCs must be ≤ 20 percent difference or percent drift (%D.)	Analyst/ Supervisor	
	Retention Time (RT) Window Position Establishment	Once per ICAL for each analyte and surrogate.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst / Supervisor	
	Evaluation of RTs	With each sample.	RT of each target analyte must be within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	Analyst / Supervisor	
	Continuing Calibration Verification (CCV)	Analyze a standard at the beginning of each 12-hour shift after tune and before sample analysis.	SPCC RFs must be ≥ 0.050; all target analytes and surrogates must be ≤ 20%D.	If %D is high and sample result is ND, qualify/narrate with project approval. If %D is low or project approval not received, reanalyze all samples since the last successful CCV.	Analyst/ Supervisor	

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
GC/MS-Volatiles Water by 624	Tune Verification – (BFB)	Prior to each ICAL and at the beginning of each 12-hour analytical sequence.	Must meet the ion abundance criteria required by the method (SW-846 8260B or EPA624).	Retune and/or clean or replace source. No samples may be accepted without a valid tune.	Analyst/ Supervisor	Chemtech M624/SM6210B -MSVOA-9
	Initial Calibration (ICAL) – A 6-point calibration is prepared for all target analytes	Upon instrument receipt, instrument change (new column, source cleaning, etc.), when CCV is out of criteria.	The percent relative standard deviation (%RSD) for RFs for all compounds must be ≤ 35% or the linear least squares regression correlation coefficient (r) must be ≥ 0.995; or the coefficient of determination (r^2) must be ≥ 0.99	Correct problem then repeat ICAL. No samples may be run until ICAL has passed.	Analyst/ Supervisor	
	Retention Time (RT) Window Position Establishment	Once per ICAL for each analyte and surrogate.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Analyst / Supervisor	
	Evaluation of RTs	Monitor Internal Standard RT in each sample.	RT of each must be within ± 0.50 RT units of the mid-point of the ICAL.	Correct problem, then rerun ICAL.	Analyst / Supervisor	
	Continuing Calibration Verification (CCV)	Analyze a standard at the beginning of each 12-hour shift after tune and before sample analysis.	See 624 CCV Table provided	Correct problem, then rerun CCV, if failure repeats, rerun ICAL.	Analyst / Supervisor	
GC/MS - Semivolatiles	Tune Verification – decafluoro-triphenyl-phosphine (DFTPP)	Prior to each ICAL and at the beginning of each 12-hour analytical sequence.	Must meet the ion abundance criteria required by the method (SW-846 8270D).	Retune and/or clean or replace source. No samples may be accepted without a valid tune.	Analyst/ Supervisor	Chemtech M8270C/D-BNA-17
	Initial Calibration (ICAL) – A minimum of a 5-point calibration is prepared for all target analytes	Upon instrument receipt, instrument change (new column, source cleaning, etc.), when CCV is out of criteria.	The average response factor (RF) for System Performance Check Compound s (SPCCs) must be ≥ 0.050. The percent relative standard deviation (%RSD) for RFs for calibration check compounds (CCCs) must be ≤ 30%; and %RSD for each target analyte must be ≤ 15%, or the linear least squares regression correlation coefficient (r) must be ≥ 0.995; or the coefficient of determination (r^2) must be ≥ 0.99 (minimum of 6 points required for second order).	Correct problem then repeat ICAL. No samples may be run until ICAL has passed.	Analyst/ Supervisor	
	ICV – Second Source	Perform after each ICAL, prior to beginning a sample run.	The percent recovery (%R) of all target analytes must be within 80-120% of the true value. SPCC RFs must be ≥ 0.050;	Correct problem and verify ICV. If that fails, correct problem and repeat	Analyst/ Supervisor	

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
			CCCs must be ≤ 20 percent difference or percent drift (%D.)	ICAL. No samples may be run until ICV has been verified.		
	Retention Time (RT) Window Position Establishment	Once per ICAL for each analyte and surrogate.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	Once per ICAL for each analyte and surrogate.	
	Evaluation of RTs	With each sample.	RT of each target analyte must be within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	With each sample.	
	Continuing Calibration Verification (CCV)	Analyze a standard at the beginning of each 12-hour shift after tune and before sample analysis.	SPCC RFs must be ≥ 0.050; all target analytes and surrogates must be ≤ 20%D.	If %D is high and sample result is ND, qualify/narrate with project approval. If %D is low or project approval not received, reanalyze all samples since the last successful CCV.	Analyst/ Supervisor	
ICP-AES	Initial Calibration (ICAL) – A minimum of a 5-point calibration is prepared for all target analytes	At the beginning of each day, prior to the analysis of samples.	Linear regression of calibration points; correlation must be must be ≥ 0.998.	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards.	Analyst, Supervisor	Chemtech M6010B/C-Trace Elements -18
	ICV – Second Source	Immediately after ICAL daily	% recovery of each element must be 90-110% of the true value	Do not run any samples until ICAL is verified by passing ICV	Analyst, Supervisor	
	Low-Level Calibration Check Standard	Daily after ICAL and before samples.	The %R for all target analytes must be within 70-130% of true value.	Correct problem, then reanalyze. No samples may be analyzed without a valid low-level calibration check standard (should be ≤ LOQ).	Analyst, Supervisor	
	Interference Check Standards (ICS – ICS	At the beginning of an analytical run.	The absolute value of ICS A recoveries for non-spiked analytes must be < LOD; and ICS B recoveries must be	Terminate analysis; locate and correct problem;	Analyst, Supervisor	

Instrument/ Equipment	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Responsible Person	Analytical SOP Reference
	A and ICS B)		within 80-120 %R of true value.	reanalyze ICS.		
	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence.	No target analytes detected > LOD.	Correct the problem, then re-prepare and reanalyze.	Analyst, Supervisor	
	Continuing Calibration Verification (CCV)	After every 10 samples	% recovery of each element must be 90-110% of the true value	Check problem, recalibrate, and reanalyze any samples not bracketed by passing CCVs.	Analyst, Supervisor	
CVAA	Initial Calibration (ICAL) – A minimum of a 5-point calibration is prepared	At the beginning of each day, prior to the analysis of samples.	Linear Regression, with a minimum r ≥0.995	Correct problem then repeat ICAL. No samples may be run until ICAL has passed.	Analyst/ Supervisor	Chemtech M7471A/B-Mercury-11
	ICV – Second Source	Following ICAL, prior to the analysis of samples.	The %R must be within 90-110% of true value.	Do not use results for failing elements unless the ICV >110%R and the sample < LOQ or Reporting Limit (RL). Investigate and correct problem.	Analyst, Supervisor	
	Calibration Blank	Before beginning a sample run, after every 10 samples, and at the end of the analysis sequence.	No target analytes detected > LOD.	Correct the problem, then re-prepare and reanalyze.	Analyst, Supervisor	
	CCV	Analyze a standard at the beginning and end of the sequence and after every 10 samples.	The %R for all target analytes must be within 90-110% of true value.	Check problem, recalibrate, and reanalyze any samples not bracketed by passing CCVs.	Analyst, Supervisor	
	Low-Level Calibration Check Standard	Daily after 1-point ICAL and before samples.	The %R for all target analytes must be within 70-130% of true value.	Correct problem, then reanalyze. No samples may be analyzed without a valid low-level calibration check standard (should be ≤ LOQ).	Analyst, Supervisor	

Brownfields QAPP Template #9a
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Environmental Specialist(s)/Lu Engineers, Day Environmental, City of Rochester
Sample Packaging (Personnel/Organization): Environmental Specialist(s)/Lu Engineers, Day Environmental, City of Rochester
Coordination of Shipment (Personnel/Organization): Environmental Specialist(s)/Lu Engineers, Day Environmental
Type of Shipment/Carrier: FedEx Express or UPS
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian/ChemTech
Sample Custody and Storage (Personnel/Organization): Sample Custodian/ChemTech
Sample Preparation (Personnel/Organization): Sample Technician(s)/ChemTech
Sample Determinative Analysis (Personnel/Organization): Sample Technician(s)/ChemTech
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Ideally, samples will be shipped daily for overnight delivery to the laboratory. Field samples will be stored on ice. Samples should be held no longer than two days prior to shipment.
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; See Template #6.
SAMPLE DISPOSAL
Personnel/Organization: Sample Technician(s)/ChemTech
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; See Template #6.

Brownfields QAPP Template #9b
Sample Custody Requirements

Sample Identification Procedures: Post-excavation soil samples will have the following format: sample number-IRM[IRM designation number] (sample depth)

Sample Number: a 3-digit number provided by DAY prior to collection of the first IRM sample; the remaining sample numbers will follow in sequential order (e.g., 101, 102, 103, etc).

IRM Designation Number: a unique 2-digit number assigned to each IRM area. For example:

01 – PCE Source Area
02 – Buried Sewer System in Evans St. ROW
03 – UST Area
04 – PCB Impacted Area
05 – Trench Drain Area
06 – Piping Area

Sample Depth: the depth in feet and tenths of a foot referenced from the ground surface. [Note: Do not use tic marks ' or " to indicate sample depth on chain-of-custody or field notes. Tic marks are not an acceptable character in EQUIS.]

For example, if a soil sample was collected from the PCE Source Area IRM at 12.5 feet below ground and the next sample number is 176, the sample ID would be **176-IRM01 (12.5).**

Waste characterization soil samples will have the following format: sample number-Type[A, B, C]#. For example, two soil samples are collected from Type B staged soil and the next sample number is 177, the sample IDs would be **177-TypeB1** and **178-TypeB2.**

Type A – presumed 'clean' soil for backfilling
Type B – low-medium level contaminated soil to be evaluated with lab testing on a pile by pile basis to determine re-use or off-site disposal
Type C – grossly contaminated soil for disposal

Hard material samples (concrete or asphalt) will have the following format: [sample number]-HM-##. Note: continue numbering of HM samples from demolition phase investigation (e.g., **###-HM-28)**

Frac tank water waste characterization samples will have the format: [sample number]-IDW-#(water). Note: continue numbering of IDW samples from remedial investigation

Sample IDs will be recorded in the field logbook, on sample labels, and chain-of-custody (CoC) forms.

Field Sample Custody/Tracking Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Sample containers will be obtained from the contract laboratory and are certified pre-cleaned by the manufacturer according to USEPA specifications.

Field samples will be in direct control of the environmental specialist(s) until relinquished to FedEx or UPS for delivery at ChemTech labs. 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.

After samples are carefully collected, sample jars will be tightly sealed and the outside wiped clean before being placed inside the cooler. The samples will be packed in ice in coolers to maintain the samples' integrity during shipment. Samples will be packaged carefully to avoid breakage or cross-contamination and arrive at the laboratory at proper temperatures. Glass bottles or jars will be protected with bubble wrap or foam to prevent breakage during shipping. A duplicate CoC will be placed in a plastic bag and taped to the inside of the cooler lid prior to shipment. Once the cooler is closed, custody seals will be placed on the cooler and protected from accidental damage by placing strapping tape over them. An example custody seal is included in Appendix A-1.

Sample shipments will be sent via overnight delivery to arrive at the laboratory within 24 to 48 hours.

Laboratory Sample Custody/Tracking Procedures (receipt of samples, archiving, and disposal):

Laboratory Sample Management personnel sign for the shipments received and will relinquish samples to the Sample Custodian. Upon receipt, coolers are examined for damaged or broken custody seals and the conditions are recorded on the Project Track Ticket Detail. Once the samples are accepted, a project ID is issued and documented on the CoC. Cooler temperature is recorded on the Laboratory Chronicle and CoC. Acceptable cooler temperature is 0-6^{o}C. Any discrepancies are recorded on the Project Track Ticket Detail and communicated to the Lab Project Manager, who will contact the client for instruction.

The laboratory Sample Custodian ensures that the samples are received in good condition, properly preserved, and that the information on the CoC matches the bottle labels. The Sample Custodian signs the CoC and other documentation upon receipt. Each sample is assigned a unique lab number when they are logged in the Laboratory Information Management System (LIMS). Samples are stored in walk-in refrigerators on coded shelves. Only the Sample Custodians are permitted access to sample storage. The Sample Custodian issues samples to the laboratory analysts. Samples are placed back in the refrigerator when the analysts are finished.

Chain-of-Custody Procedures:
An entry will be made for each sample on the CoC record. The custody record will include sampler names and signatures, sample ID numbers, dates, times, type of samples, locations, and analyses requested. The sample collectors are personally responsible for the care and custody of the samples until they are transferred to another person or dispatched properly under CoC. A CoC form will be used for each sample shipment. An example CoC is included as Appendix A-1.

Each cooler will be securely taped and prepared for shipping. The chain-of-custody forms will be placed in a separate plastic bag and accompany the shipment. When picked up by the carrier, the "Relinquished by" and "Received by" sections of each form will be signed and dated. Samples will be transported to the laboratory under custody by an overnight delivery service. One copy of the custody record will remain with the field team while the remaining copies will accompany the samples.

Upon arrival at the laboratory, ChemTech personnel will follow Chain-of-Custody SOP P204.

Brownfields QAPP Template #10
Field and Analytical Laboratory Quality Control Summary

Matrix	Soil
Analytical Group	Volatiles
Concentration Level	Low/Medium
Sampling SOP(s)	EPA Waste Pile Sampling SOP#2017
Analytical Method/SOP Reference	SW846 Method 8260B & 624/ Chemtech SOP M8260B-C-SWGCMSVOA-18 & M624/SM6210B-MSVOA
Sampler's Name	TBD
Field Sampling Organization	Lu Engineers/Day Environmental
Analytical Organization	ChemTech
No. of Sample Locations	34

Quality Control (QC) Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Preparation Blank/ Method Blank	1 per ≤ 20 samples	No constituent > CRQL	Suspend analysis until source rectified; redigest and reanalyze affected samples	Laboratory analyst/ Supervisor	Accuracy & Bias	No constituent > CRQL
Field Duplicate	1 per ≤ 20 samples	± 20% RPD	Flag outliers	Laboratory analyst/ Supervisor	Precision	± 20% RPD
Matrix Spike/ Matrix Spike Duplicate	1 per ≤ 20 samples	20% RPD	Report in case narrative	Laboratory analyst/ Supervisor	Accuracy & Precision	20% RPD
Laboratory Control Samples (LCS)	1 per ≤ 20 samples	Compound specific limits		Laboratory analyst/ Supervisor	Accuracy	Compound specific limits
Surrogate compounds	Every sample	Compound specific limits	Reanalyze samples with non-compliant recoveries	Laboratory analyst/ Supervisor	Accuracy	Compound specific limits
Lab internal standards		Factor of 2 (-50% to 100%) from the continuing calibration	Inspect MS and make corrections, as appropriate, and re-analyze affected samples	Laboratory analyst/ Supervisor	Accuracy	Factor of 2 (-50% to 100%) from the continuing calibration

Matrix	Soils
Analytical Group	TCLP Volatiles
Concentration Level	
Sampling SOP(s)	EPA Waste Pile Sampling SOP#2017
Analytical Method/SOP Reference	SW846 Method 1311 & 8260B/ Chemtech SOP M8260B-C-SWGCMSVOA-18
Sampler's Name	TBD
Field Sampling Organization	Lu Engineers/Day Environmental
Analytical Organization	ChemTech
No. of Sample Locations	TBD

Quality Control (QC) Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Preparation Blank/ Method Blank	1 per ≤ 20 samples	No constituent > CRQL	Suspend analysis until source rectified; redigest and reanalyze affected samples	Laboratory analyst/ Supervisor	Accuracy & Bias	No constituent > CRQL
Field Duplicate	Not applicable					
Matrix Spike/ Matrix Spike Duplicate	Not applicable					
Laboratory Control Samples (LCS)	1 per ≤ 20 samples	Compound specific limits		Laboratory analyst/ Supervisor	Accuracy	Compound specific limits

Matrix	Soils
Analytical Group	Semi-volatiles
Concentration Level	Low/Medium
Sampling SOP(s)	EPA Waste Pile Sampling SOP#2017
Analytical Method/SOP Reference	SW846 Method 8270C/ Chemtech SOP M8270C/D-BNA-17
Sampler's Name	TBD
Field Sampling Organization	Lu Engineers/Day Environmental
Analytical Organization	ChemTech
No. of Sample Locations	10

Quality Control (QC) Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Preparation Blank/ Method Blank	1 per ≤ 20 samples	No constituent > CRQL	Suspend analysis until source rectified; redigest and reanalyze affected samples	Laboratory analyst/ Supervisor	Accuracy & Bias	No constituent > CRQL
Field Duplicate	1 per ≤ 20 samples	± 20% RPD	Flag outliers	Laboratory analyst/ Supervisor	Precision	± 20% RPD
Matrix Spike/ Matrix Spike Duplicate	1 per ≤ 20 samples	20% RPD	Report in case narrative	Laboratory analyst/ Supervisor	Accuracy & Precision	20% RPD
Lab internal standards		Factor of 2 (-50% to 100%) from the continuing calibration	Inspect MS and make corrections, as appropriate, and re-analyze affected samples	Laboratory analyst/ Supervisor	Accuracy	Factor of 2 (-50% to 100%) from the continuing calibration
Laboratory Control Samples (LCS)	1 per ≤ 20 samples	Compound specific limits		Laboratory analyst/ Supervisor	Accuracy	Compound specific limits
Surrogate compounds	Every sample	Compound specific limits	Reanalyze samples with non-compliant recoveries	Laboratory analyst/ Supervisor	Accuracy	Compound specific limits

Matrix	Soils
Analytical Group	TCLP Metals
Concentration Level	Low/Medium
Sampling SOP(s)	EPA Waste Pile Sampling SOP#2017
Analytical Method/SOP Reference	SW846 Method 6010B & 7471B/ Chemtech SOP M6010B/C-Trace Elements-18 & M7471A/B-Mercury-11
Sampler's Name	TBD
Field Sampling Organization	Lu Engineers/Day Environmental
Analytical Organization	ChemTech
No. of Sample Locations	TBD

Quality Control (QC) Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Preparation Blank/ Method Blank	1 per ≤ 20 samples	No constituent > CRQL	Suspend analysis until source rectified; redigest and reanalyze affected samples	Laboratory analyst/ Supervisor	Accuracy/ Bias	No constituent > CRQL
Field Duplicate	Not applicable					
Matrix Spike/ Matrix Spike Duplicate	not applicable					
LCS	1 per ≤ 20 samples	Compound specific limits		Laboratory analyst/ Supervisor	Accuracy	Compound specific criteria

Brownfields QAPP Template #11a
Data Management and Documentation

Copies of CoC forms and air monitoring logs will be included in the final report. All field notes and the Site logbook will be maintained in the project file(s). All laboratory records will be included in the Category B Deliverable package to be submitted with the final report.

Field Sample Collection Documents and Records	Analytical Laboratory Documents and Records	Data Assessment Documents and Records	Project File
• Site and field logbook • Chain-of-Custody (CoC) forms • Air Monitoring Data Logs	• Sample receipt logs • Internal and external CoC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Laboratory Audit checklist (if performed) • Review forms for electronic entry of data into database • Corrective action documentation	• Project files will be maintained and stored at the Environmental Contractors' offices for a minimum of 5 years after completion of the project. • Files will also be kept at the City of Rochester Division of Environmental Quality Office • Laboratory data, logbooks, and client reports are retained for 5 years unless specified otherwise.

Brownfields QAPP Template #11b
Project Reports

This table identifies the types of reports that will be routinely provided during the Brownfields project (e.g., status reports, final reports, etc.).

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Data Usability Summary Report	Once. When all final SDGs are received from the laboratory.	12/19/2012	Dr. Maxine Wright-Walters, Environmental Data Validation Inc. (EDV)	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental
IRM Construction Completion Report	Upon project completion.	1/11/2013	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental	Joe Biondolillo, City of Rochester
Quarterly Progress Reports	Quarterly		Vicki Brawn & Joe Biondolillo, City of Rochester	Lya Theodorator, EPA Region 2 Brownfields Project Officer

Brownfields QAPP Template #12a
Planned Project Assessments Table

Not applicable to this project. This is a relatively short-term Brownfield project; therefore, assessment activities will be limited to oversight of the field team and subcontractors, and peer review of the final report. No performance evaluation (PE) samples are planned for this project. However, the ChemTech Final Report for EPA's WP-206 WatR Pollution Proficiency Testing dated May 12, 2012 (i.e., PE samples) can be provided upon request.

Brownfields QAPP Template #12b
Assessment Findings and Corrective Action Responses

Not applicable to this project.

Brownfields QAPP Template #13a
Project Data Verification Process (Step I) [1]

Verification Input	Description	Internal/ External[2]	Responsible for Verification (Name, Organization)
Site/Field Logbooks	Field notes will be prepared daily by Lu Engineers/Day Environmental and will be complete, appropriate, legible and pertinent. Upon completion of field work, logbooks will be placed in the project files.	Internal	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental
Chains of custody	CoC forms will be reviewed against the samples packed in the specific cooler prior to shipment. The reviewer will sign the form. An original CoC will be sent with the samples to the laboratory, while copies are retained for (1) the Sampling Trip Report and (2) the project files.	Internal	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental
Laboratory analytical data package	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	Internal	ChemTech
Laboratory analytical data package	Data packages will be reviewed as to content and sample information upon receipt by the Project Team and the Third Party Data Validation Personnel.	External	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental; Dr. Maxine Wright-Walters, EDV Inc.
Equis Electronic Data Deliverable (EDD)	Electronic data package will be reviewed using the Equis Electronic Data Processor (EDP) to check for errors and omissions prior to submission to NYSDEC.	Internal	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental
Final IRM Report	The project data results will be compiled in a final report for the project. Entries will be reviewed/verified against hardcopy information.	Internal	Greg Andrus, Lu Engineers Jeff Danzinger, Day Environmental

[1]Step I – Completeness Check

[2]Internal or External is in relation to the data generator.

See Table 1 for additional examples of data elements.

Brownfields QAPP Template #13b
Project Data Validation Process (Steps IIa and IIb) [1]

Step IIa/IIb[1]	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.	Greg Andrus, Lu Engineers & Jeff Danzinger, Day Environmental
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	Greg Andrus, Lu Engineers & Jeff Danzinger, Day Environmental
IIa	Chains of custody	Examine CoC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).	Dr. Maxine Wright-Walters, EDV Inc.
IIa	Laboratory data package	Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	Dr. Maxine Wright-Walters, EDV Inc.
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	Dr. Maxine Wright-Walters, EDV Inc.
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	Dr. Maxine Wright-Walters, EDV Inc.

[1]Step IIa – Compliance with Methods, Procedures, and Contracts
Step IIb – Comparison with Performance Criteria in QAPP

See Table 1 for additional examples of data elements.

Brownfields QAPP Template #13c
Project Matrix and Analytical Validation (Steps IIa and IIb) [1] Summary

This table identifies the matrices, analytical groups, and concentration levels that each entity performing validation will be responsible for, as well as criteria that will be used to validate those data.

Step IIa/IIb[1]	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	Soil	VOCs	Low-Med	National Functional Guidelines for Superfund Organic Methods Data Review-June 2008	Dr. Maxine Wright-Walters, EDV Inc.
IIa / IIb	Soil	SVOCs	Low	National Functional Guidelines for Superfund Organic Methods Data Review-June 2008	Dr. Maxine Wright-Walters, EDV Inc.
IIa / IIb	Soil	Metals	Low-Med	National Functional Guidelines for Superfund Inorganic Superfund Data Review-Jan2012	Dr. Maxine Wright-Walters, EDV Inc.

[1]Step IIa – Compliance with Methods, Procedures, and Contracts
Step IIb – Comparison with Performance Criteria in QAPP

See Table 1 for additional examples of data elements.

Brownfields QAPP Template #13d
Usability Assessment (Step III) [1]

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

Determine if any detectable amounts of contaminant(s) are present. If no detectable amounts are indicated and the data are acceptable for the verification and validation, then the data is usable. If verification and validation are not acceptable then take corrective action (determine cause, data impact, evaluate the impact and document the rationale for resampling).

Describe the evaluative procedures used to assess overall measurement error associated with the project:
Determine if the quality control data is within the performance criteria (precision, accuracy, etc) through validation process IIb (Validation Activities).

Identify the personnel responsible for performing the usability assessment:
Project Management Team:
Greg Andrus, Lu Engineers
Jeff Danzinger, Day Environmental
Joe Biondolillo, City of Rochester
Dr. Maxine Wright-Walters, EDV Inc.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:
The Data Usability Summary Report (DUSR) will describe the rationale for the data and the presentation of any data limitations. For example, if the performance criteria are not usable to address the regulatory requirements or support the project-decision for the City of Rochester, then the DUSR should address how this problem can be resolved and can discuss the alternative approach.

[1] Step III – Usability Assessment

Table 1

Data Elements for Data Review Process

Item	Step I - Data Verification	Step IIa - Data Validation Compliance	Step IIb - Data Validation Comparison	Step III - Data Usability
Planning Documents				
Evidence of approval of QAPP	X			Use outputs from previous steps
Identification of personnel	X			
Laboratory name	X			
Methods (sampling & analytical)	X	X	X	
Performance requirements (including QC criteria)	X	X		
Project quality objectives	X		X	
Reporting forms	X	X		
Sampling plans – locations, maps grids, sample ID numbers	X	X		
Site identification	X			
SOPs (sampling & analytical)	X	X		
Staff training & certification	X			
List of project-specific analytes	X	X		
Analytical Data Package				
Case narrative	X	X	X	Use outputs from previous steps
Internal lab chain of custody	X	X		
Sample condition upon receipt, & storage records	X	X		
Sample chronology (time of receipt, extraction/digestion, analysis)	X	X		
Identification of QC samples (sampling /lab)	X	X		
Associated PE sample results	X	X	X	
Communication Logs	X	X		
Copies of lab notebook, records, prep sheets	X	X		
Corrective action reports	X	X		
Definition of laboratory qualifiers	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of individual QC results (e.g., spike, duplicate, LCS)	X	X	X	
Documentation of laboratory method deviations	X	X	X	
Electronic data deliverables	X	X		
Instrument calibration reports	X	X	X	
Laboratory name	X	X		
Laboratory sample identification no.	X	X		
QC sample raw data	X	X	X	
QC summary report	X	X	X	

Data Elements for Data Review Process				
Raw data	X	X	X	Use outputs from previous steps
Reporting forms, completed with actual results	X	X	X	
Signatures for laboratory sign-off (e.g., laboratory QA manager)	X	X		
Standards traceability records (to trace standard source form NIST, for example)	X	X	X	
Sampling Documents				
Chain of custody	X	X		Use outputs from previous steps
Communication logs	X	X		
Corrective action reports	X	X	X	
Documentation of corrective action results	X	X	X	
Documentation of deviation from methods	X	X	X	
Documentation of internal QA review	X	X	X	
Electronic data deliverables	X	X		
Identification of QC samples	X	X	X	
Meteorological data from field (e.g., wind, temperature)	X	X	X	
Sampling instrument decontamination records	X	X		
Sampling instrument calibration logs	X	X		
Sampling location and plan	X	X	X	
Sampling notes & drilling logs	X	X	X	
Sampling report (from field team leader to project manager describing sampling activities)	X	X	X	
External Reports				
External audit report	X	X	X	Use outputs from previous steps
External PT sample results	X	X		
Laboratory assessment	X	X		
Laboratory QA plan	X	X		
MDL study information	X	X	X	
NELAP accreditation	X	X		

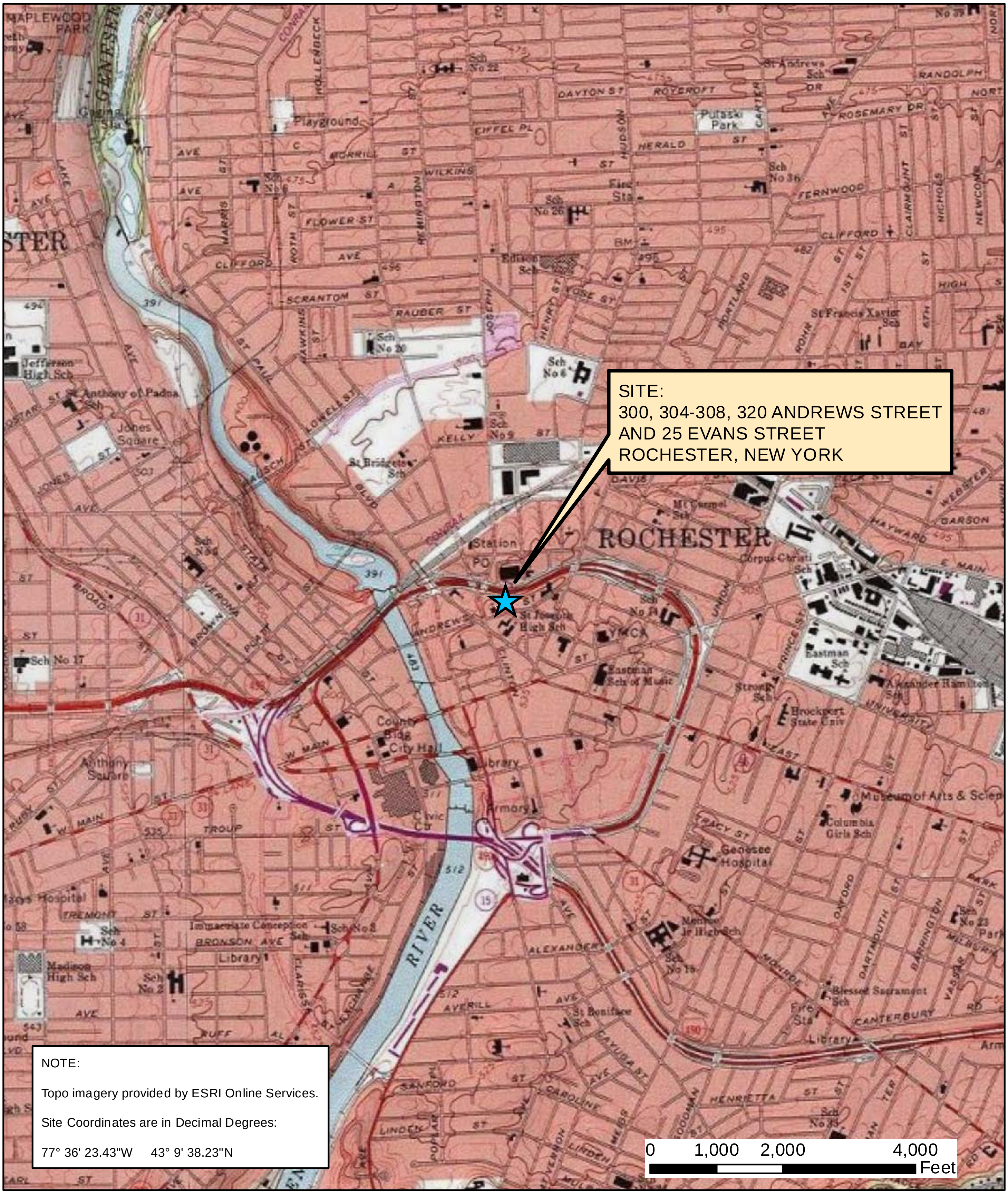
Figures

Brownfields Site-Specific QAPP

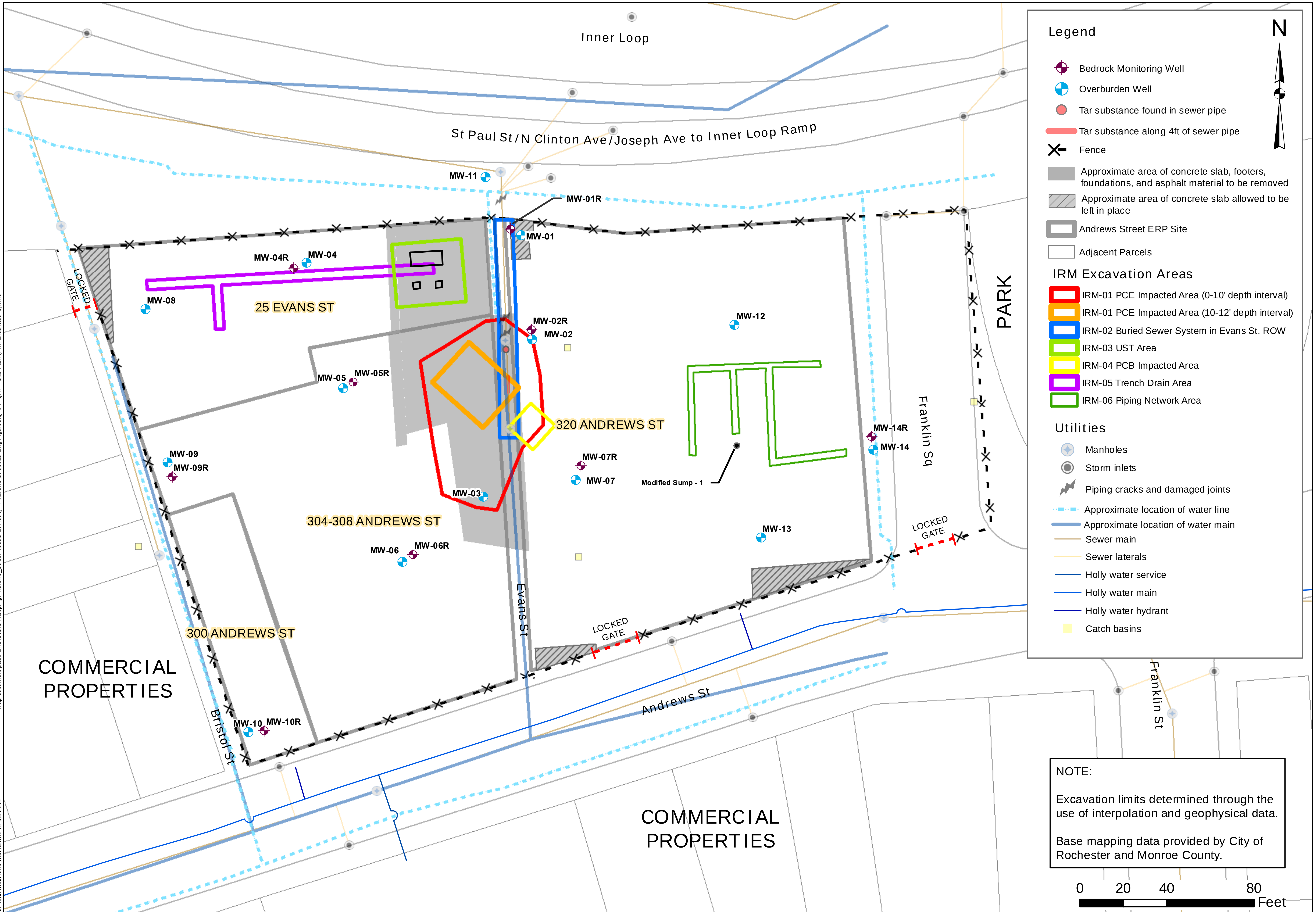
300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144
USEPA ID #BF-97207900-0

\GIS\GIS Mapping\Andrews Street\4355S-1A.mxd



Date	Lu Engineers	Project Title	Project No.
07-03-2012	ENVIRONMENTAL • TRANSPORTATION • CIVIL	300, 304-308, 320 ANDREWS STREET AND 25 EVANS STREET ROCHESTER, NEW YORK (NYSDEC SITE NO.: E828144) QUALITY ASSURANCE PROGRAM PLAN	FIGURE A-1
Drawn By: CPS	175 Sully's Trail, Suite 202	Drawing Title	
Scale: AS NOTED	Pittsford, NY 14534	Project Locus Map	



Map document path: E:\GIS\GIS Mapping\Andrews_Street\4355-10Rocky - Andrews Street\Lu Eng Figures\QAPP\QAPP Site Plan (IRM Excavations).mxd

Last date document was saved: 03 Jul 2012

DESIGNED BY: GA | DATE: 06-2012

DRAWN BY: CPS | DATE DRAWN: 06-2012

SCALE: AS NOTED | DATE ISSUED: 06-06-2012

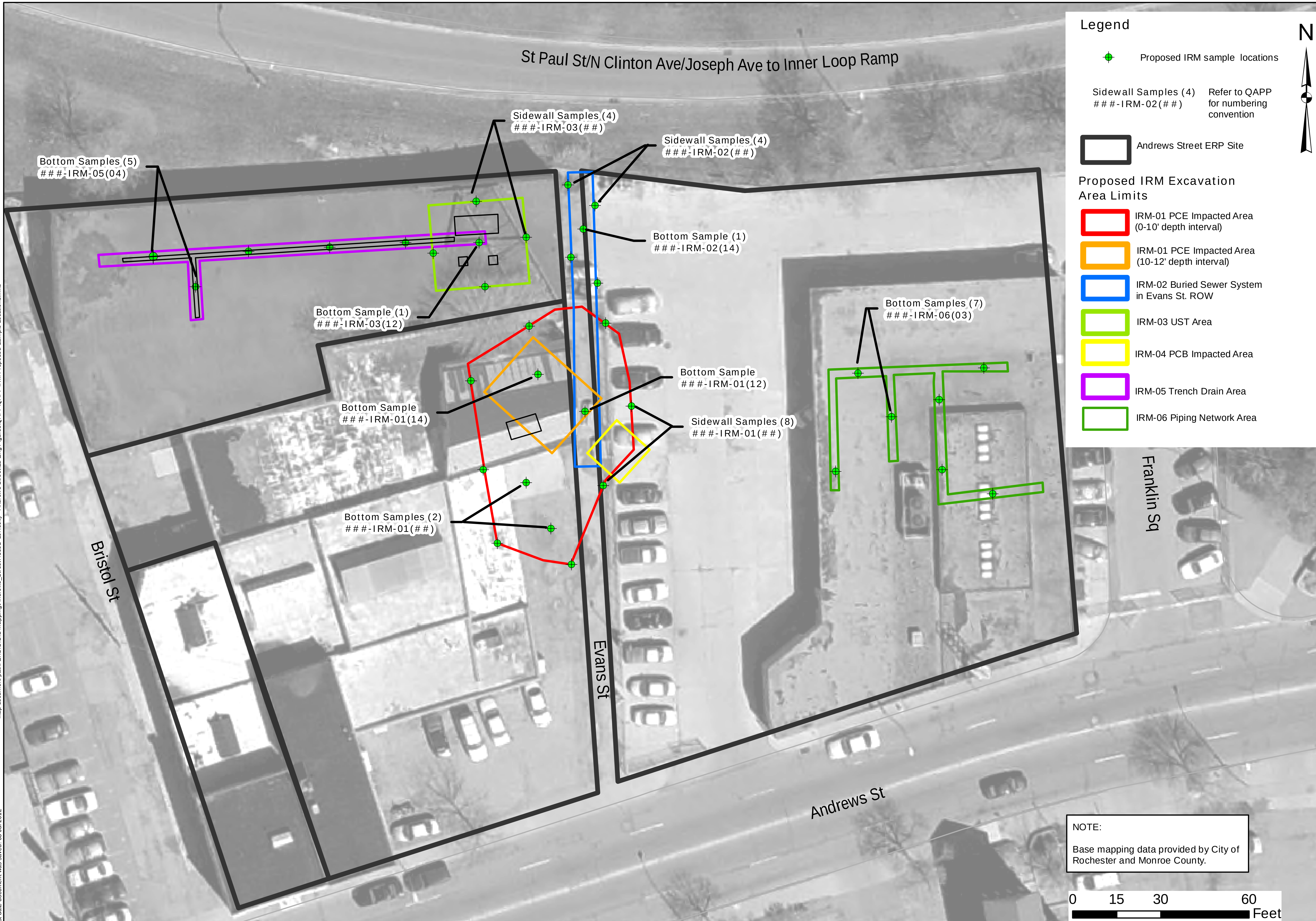
Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL
175 Sully's Trail, Suite 202
Pittsford, NY 14534

Project Title
300, 304-308, 320 ANDREWS STREET
AND 25 EVANS STREET
ROCHESTER, NEW YORK
QUALITY ASSURANCE PROGRAM PLAN

Drawing Title
Overall Site Plan Identifying the Six IRM Areas

Project No.

FIGURE A-2



Map document path: E:\GIS\GIS Mapping\Andrews_Street\4355S-10\Rocky - Andrews Street\Lu Eng Figures\QAPP\QAPP IRM Proposed Sample Locations.mxd

Last date document was saved: 03 Jul 2012

DESIGNED BY	DATE
GA	06-2012
DRAWN BY	DATE DRAWN
CPS	06-2012
SCALE	DATE ISSUED
AS NOTED	06-29-2012

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL
175 Sully's Trail, Suite 202
Pittsford, NY 14534

Project Title
300, 304-308, 320 ANDREWS STREET
AND 25 EVANS STREET
ROCHESTER, NEW YORK

QUALITY ASSURANCE PROGRAM PLAN

Drawing Title
IRM Sample Location Plan

Project No.

FIGURE A-3

Appendix A-1

Brownfields Site-Specific QAPP

300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144
USEPA ID #BF-97207900-0

Example Chain-of-Custody and Custody Seal

CHEMTECH

CHAIN OF CUSTODY RECORD

284 Sheffield Street, Mountainside, NJ 07092
(908) 789-8900 Fax (908) 789-8922
www.chemtech.net

Chemtech Project Number
COC Number

CLIENT INFORMATION	PROJECT INFORMATION	BILLING INFORMATION
Report to be sent to	PROJECT NAME:	BILL TO: PO#
COMPANY:	PROJECT #: LOCATION:	ADDRESS:
ADDRESS:	PROJECT MANAGER:	CITY: STATE: ZIP:
CITY: STATE: ZIP:	E-MAIL:	ATTENTION:
ATTENTION:	PHONE: FAX:	PHONE:
PHONE: FAX:		

DATA TURNAROUND INFORMATION

FAX:_________________________________ DAYS*
HARD COPY:____________________________DAYS*
EDD__________________________________DAYS*
* TO BE APPROVED BY CHEMTECH
STANDARD TURNAROUND TIME IS 10 BUSINESS DAYS

DATA DELIVERABLE INFORMATION

q RESEULTS ONLY q USEPA CLP
q RESULTS * QC q New York State ASP "B"
q New Jersey REDUCED q New York State ASP "A"
Q New Jersey CLP q Other________________
q EDD FORMAT__________________________________

ANALYSIS

1 2 3 4 5 6 7 8 9

PRESERVATIVES | COMMENTS

CHEMTECH SAMPLE ID	PROJECT SAMPLE IDENTIFICATION	SAMPLE MATRIX	SAMPLE TYPE COMP	SAMPLE TYPE GRAB	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	# of Bottles	1	2	3	4	5	6	7	8	9	<-- Specify Preservatives A-HCI B-HNO4 C-H2SO13 D-NaOH E-ICE F-OTHER	
1.																		
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE PROSSESSION INCLUDING COURIER DELIVERY

RELINQUISHED BY	DATE/TIME	RECEIVED BY
RELINQUISHED BY SAMPLER 1.	DATE/TIME	RECEIVED BY 1.
RELINQUISHED BY 2.	DATE/TIME	RECEIVED BY 2.
RELINQUISHED BY 3.	DATE/TIME	RECEIVED FOR LAB BY 3.

Conditions of bottles or collers at receipt: Q COMPLIANT Q NON COMPLIANT Q COOLER TEMP_______
MeOH extraction requires an additional 4oz. Jar for percent solid
Comments:

Page_______of_______

CLIENT: Q Hand Delivered Q Overnight
CHEMTECH: Q Picked Up Q

Shipment Complete
q YES Q NO

10/18/2004

WHITE - CHEMTECH COPYFOR RETURN TO CLIENT **YELLOW** - CHEMTECH COPY **PINK** - SAMPLER COPY #

CUSTODY SEAL

DATE ______________________________

SIGNATURE ______________________________

QEC
Quality Environmental Containers
800-255-3950 • 304-255-3900

CUSTODY SEAL

DATE ______________________________

SIGNATURE ______________________________

QEC
Quality Environmental Containers
800-255-3950 • 304-255-3900

Appendix A-2

Brownfields Site-Specific QAPP

300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144
USEPA ID #BF-97207900-0

SOPs

WASTE PILE SAMPLING

SOP#: 2017
DATE: 11/17/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The objective of this standard operating procedure (SOP) is to outline the equipment and methods used in collecting representative samples from waste piles, sludges or other solid or liquid waste mixed with soil.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or other procedure limitations. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Stainless steel shovels, trowels, or scoops should be used to clear away surface material before samples are collected. For depth samples, a decontaminated auger may be required to advance the hole, then another decontaminated auger used for sample collection. For a sample core, thin-wall tube samplers or grain samplers may be used. Near surfaces, samples can be collected with a clean stainless steel spoon or trowel.

All samples collected, except those for volatile organic analysis, should be placed into a Teflon lined or stainless steel pail and mixed thoroughly before transfer to appropriate sample container.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is generally not recommended. Refrigeration to 4°C is usually the best approach, supplemented by a minimal holding time, depending on contaminants of concern.

Wide mouth glass containers with Teflon lined caps are typically used for waste pile samples. Sample volume required is a function of the analytical requirements and should be specified in the work plan.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There are several variables involved in waste sampling, including shape and size of piles, compactness, and structure of the waste material. Shape and size of waste material or waste piles vary greatly in areal extent and height. Since state and federal regulations often require a specified number of samples per volume of waste, the size and shape must be used to calculate volume and to plan for the correct number of samples. Shape must also be accounted for when planning physical access to the sampling point and the equipment necessary to successfully collect the sample at that location.

Material to be sampled may be homogeneous or heterogeneous. Homogeneous material resulting from known situations may not require an extensive sampling protocol. Heterogeneous and unknown wastes require more extensive sampling and analysis to ensure the different components (i.e. layers, strata) are being represented.

The term "representative sample" is commonly used to denote a sample that has the properties and composition of the population from which it was collected and in the same proportions as found in the population. This can be misleading unless one is dealing with a homogenous waste from which one sample can represent the whole population.

The usual options for obtaining the most "representative sample" from waste piles are simple random sampling or stratified random sampling. Simple random sampling is the method of choice unless: (1) there are known distinct strata; (2) one wants to prove or disprove that there are distinct strata; or (3) one is limited in the number of samples and desires to statistically minimize the size of a "hot spot" that could go unsampled. If any of these conditions exist, stratified random sampling would be the better strategy.

Stratified random sampling can be employed only if all points within the pile can be accessed. In such cases, the pile should be divided into a three-dimensional grid system with, the grid cubes should be numbered, and the grid cubes to be sampled should be chosen by random number tables or generators. The only exceptions to this are situations in which representative samples cannot be collected safely or where the investigative team is trying to determine worst case conditions.

If sampling is limited to certain portions of the pile, a statistically based sample will be representative only of that portion, unless the waste is homogenous.

5.0 EQUIPMENT/APPARATUS

Waste pile solids include powdered, granular, or block materials of various sizes, shapes, structure, and compactness. The type of sampler chosen should be compatible with the waste. Samplers commonly used for waste piles include: stainless steel scoops, shovels, trowels, spoons, and stainless steel hand augers, sampling triers, and grain samplers.

Waste pile sampling equipment check list:

- Sampling plan
- Maps/plot plan
- Safety equipment, as specified in the Health and Safety Plan
- Compass
- Tape measure
- Survey stakes or flags
- Camera and film
- Stainless steel, plastic, or other appropriate homogenization bucket or bowl
- Appropriate size sample jars
- Ziplock plastic bags
- Logbook
- Labels
- Chain of Custody records and seals
- Field data sheets
- Cooler(s)
- Ice
- Decontamination supplies/equipment
- Canvas or plastic sheet
- Spade or shovel
- Spatula
- Scoop
- Plastic or stainless steel spoons
- Trowel
- Continuous flight (screw) augers
- Bucket auger
- Post hole auger
- Extension rods
- T-Handle
- Thin-wall tube sampler with cutting tips
- Sampling trier
- Grain sampler

6.0 REAGENTS

No chemical reagents are used for the preservation of waste pile samples; however, decontamination solutions may be required. If decontamination of equipment is required, refer to the Sampling Equipment Decontamination SOP, and the site specific work plan.

7.0 PROCEDURES

7.1 Preparation

1. Review all information available on the waste pile and expected or unknown contaminants.

2. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies required.

3. Obtain necessary sampling and monitoring equipment.

4. Decontaminate or pre-clean equipment, and ensure that it is in working order.

5. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.

6. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.

7. Use stakes or flagging to identify and mark

all sampling locations. Specific site factors, including extent and nature of contaminant should be considered when selecting sample locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

7.2 Sample Collection

7.2.1 Sampling with Shovels and Scoops

Collection of samples from surface portions of the pile can be accomplished with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth with this equipment, then a stainless steel or plastic scoop, or equivalent can be used to collect the sample.

Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by sample team members. Use of a flat, pointed mason trowel to cut a block of the desired material can be helpful when undisturbed profiles are required. A stainless steel scoop, lab spoon, plastic spoon, or equivalent will suffice in most other applications. Care should be exercised to avoid the use of devices plated with chrome or other materials. Plating is particularly common with implements such as garden trowels.

The following procedure is used to collect the surface samples:

1. Carefully remove the top layer of material to the desired sample depth with a pre-cleaned spade.

2. Using a pre-cleaned stainless steel scoop, plastic spoon, trowel, or equivalent remove and discard a thin layer of material from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent, and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7.2.2 Sampling with Bucket Augers and Thin-Wall Tube Samplers

These samplers consist of a series of extensions, a "T" handle, and a bucket auger or thin-wall tube sampler (Appendix A, Figure 1). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the bucket auger. If a core sample is to be collected, the auger tip is then replaced with a thin-wall tube sampler. The sampler is then lowered down the borehole, and driven into the pile to the completion depth. The sampler is withdrawn and the core collected from the thin-wall tube sampler.

Several augers are available. These include: bucket, continuous flight (screw), and post hole augers. Bucket augers are better for direct sample recovery since they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights, which are usually at five (5) foot intervals. The continuous flight augers are satisfactory for use when a composite of the complete waste pile column is desired. Post hole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy areas.

The following procedure will be used for collecting waste pile samples with the bucket augers and thin-wall tube samplers:

1. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris. It may be advisable to remove the first three to six inches of surface material for an area approximately six inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated materials onto a plastic sheet spread near the hole. This prevents accidental brushing of loose

material back down the borehole when removing the auger or adding drill rod extensions. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from the borehole. When sampling directly from the auger, collect the sample after the auger is removed from the borehole and proceed to Step 10.

5. Remove auger tip from drill rods and replace with a pre-cleaned thin-wall tube sampler. Install proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the pile. Care should be taken to avoid scraping the borehole sides. Avoid hammering the drill rod extensions to facilitate coring as the vibrations may cause the borehole walls to collapse.

7. Remove the tube sampler, and unscrew the drill rod extensions.

8. Remove the cutting tip and the thin-wall tube sampler.

9. Discard the top of the core (approximately one-inch), as this represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container. Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the bucket auger to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the bucket auger and thin-wall tube sampler between samples.

7.2.3 Sampling with a Trier

This sampling device consists of a trier, and a "T" handle. The trier is driven into the waste pile and used to extract a core sample from the appropriate depth.

The following procedure will be used to collect waste pile samples with a sampling trier:

1. Insert the trier (Appendix A, Figure 2) into the material to be sampled at a 0E to 45E angle from horizontal. This orientation minimizes spillage of the sample. Extraction of the samples might require tilting of the sample containers.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are being collected, place samples from the other sampling intervals into the homogenization container and mix thoroughly. When compositing is complete, place the sample

into appropriate, labeled containers and secure the caps tightly.

7.2.4 Sampling with a Grain Sampler

The grain sampler (Appendix A, Figure 3) is used for sampling powdered or granular wastes or materials in bags, fiber drums, sacks, similar containers or piles. This sampler is most useful when the solids are no greater than 0.6 cm (1/4") in diameter.

This sampler consists of two slotted telescoping brass or stainless steel tubes. The outer tube has a conical, pointed tip at one end that permits the sampler to penetrate the material being sampled. The sampler is opened and closed by rotating the inner tube. Grain samplers are generally 61 to 100 cm (24 to 40 in.) long by 1.27 to 2.54 cm (1/2 to 1 in.) in diameter and are commercially available at laboratory supply houses.

The following procedures will be used to collect waste pile samples with a grain sampler:

1. With the sampler in the closed position, insert it into the granular or powdered material or waste being sampled from a point near a top edge or corner, through the center, and to a point diagonally opposite the point of entry.

2. Rotate the sampler inner tube into the open position.

3. Wiggle the sampler a few times to allow material to enter the open slots.

4. Place the sampler in the closed position and withdraw from the material being sampled.

5. Place the sampler in a horizontal position with the slots facing upward.

6. Rotate the outer tube and slide it away from the inner tube.

7. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA/OSHA and corporate health and safety procedures.

12.0 REFERENCES

Test Methods for Evaluating Solids Waste (SW-846), Third Edition, Vol. II Field Manual U.S. EPA Office of Solid Waste and Emergency Response, Washington, D.C. November, 1986.

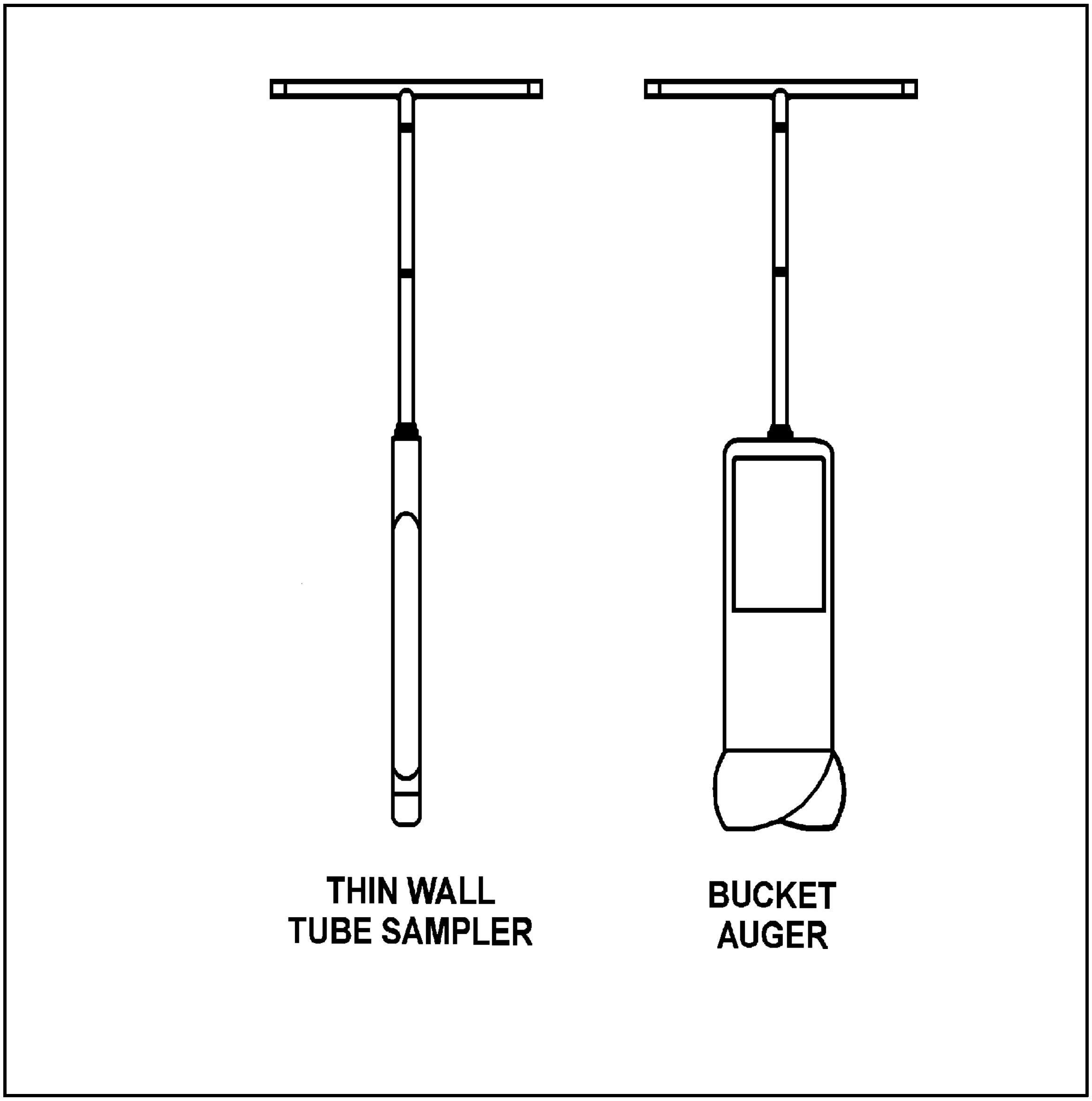
Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, U.S. Environmental Protection Agency, Region IV, April 1, 1986.

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, February, 1988.

APPENDIX A

Figures

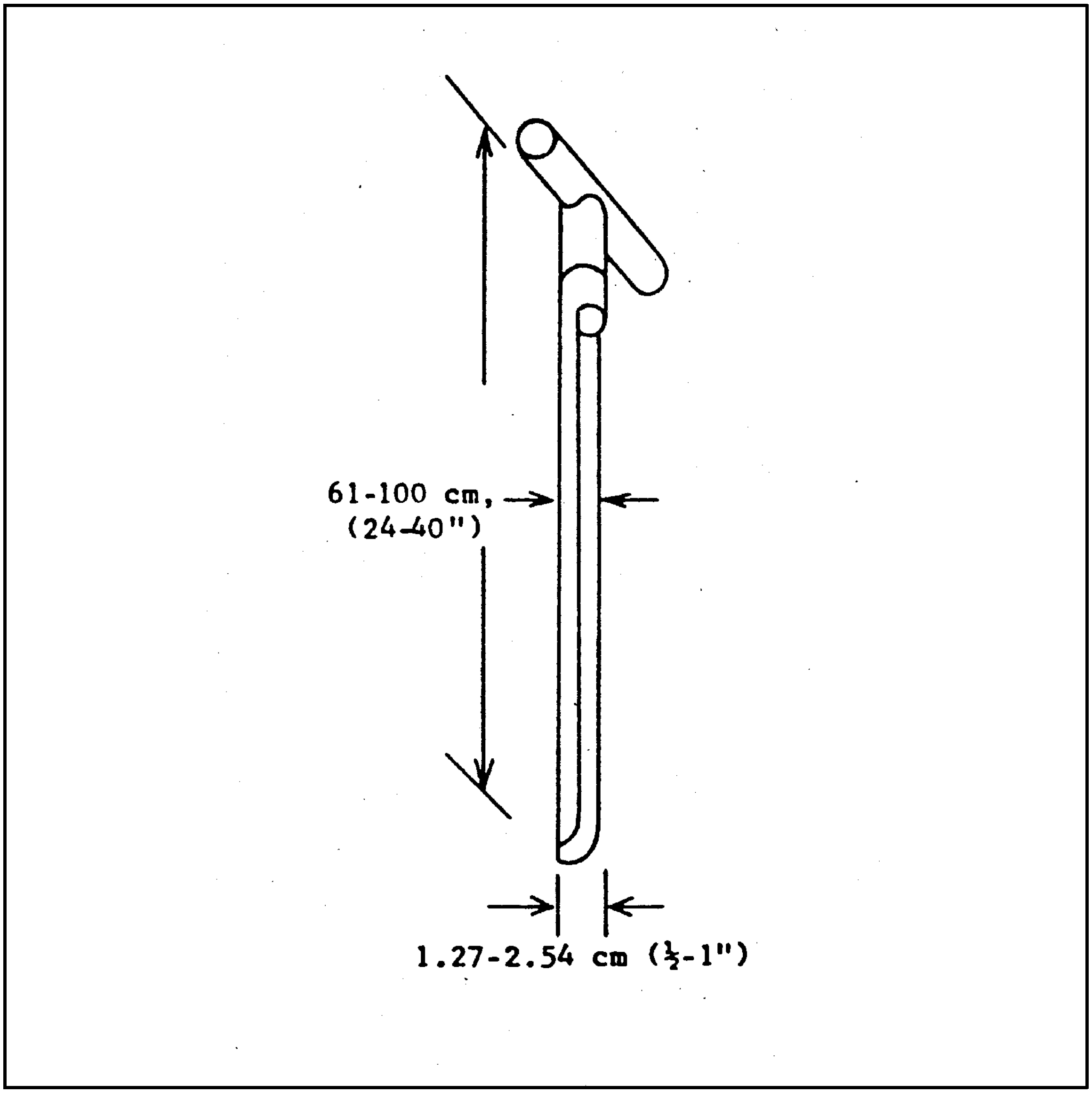
FIGURE 1. Sampling Augers



APPENDIX A (Cont'd)

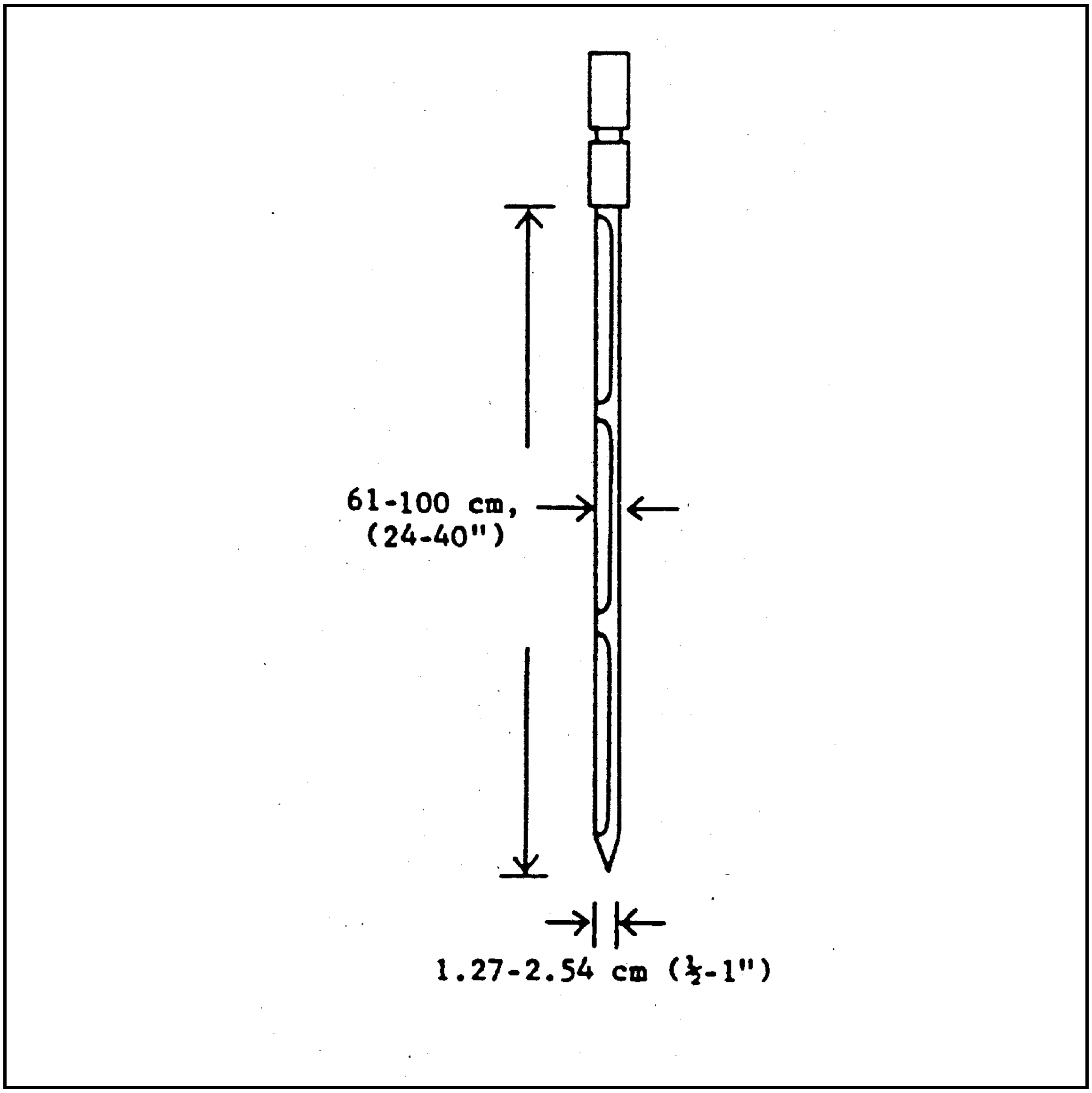
Figures

FIGURE 2. Sampling Trier



Figures

FIGURE 3. Grain Sampler



Field Equipment Decontamination Procedures

1.0 OBJECTIVE

This guideline is to provide general reference information on field decontamination.

2.0 LIMITATIONS

These limitations apply to all field decontamination activities excepting requirements of project-specific plans for field decontamination.

3.0 DEFINITIONS

The following terminology is applicable to field decontamination.

Decontamination. The process of neutralization, washing, rinsing, and removing contamination from exposed surfaces of equipment to minimize the potential for contaminant migration.

Cross-Contamination. The transfer of contaminants from their known or suspected location into a noncontaminated location.

4.0 GUIDELINES

Effective decontamination procedures are implemented to minimize the potential for cross-contamination and to minimize the potential for off-site contaminant migration.

The generalized sequence of routine decontamination procedures for sampling equipment consists of a detergent wash (i.e., low-phosphate Alconox detergent), followed by two rinses with tap water. If muddy conditions prevail, it is recommended that the equipment be rinsed with tap water into a separate tub prior to the detergent wash. Heavy equipment, such as drill rigs and drilling equipment, are normally steam-cleaned or pressure-washed to remove all adhered materials.

4.1 Routine Decontamination Procedures for Sampling Equipment

The following decontamination procedure is applicable for all equipment used to collect routine samples for Substances of Concern (SOC).

1. Wash and scrub equipment with detergent.
   Alconox and water are generally used.*
2. Rinse with tap water.
3. Final rinse with tap water.
4. Air-dry.
5. Wrap in aluminum foil, shiny side out, for transport.

* If equipment is muddy, it should first be rinsed with water in a separate tub prior to the detergent and water scrub.

  If the equipment is visibly oily and not disposable, then it is rinsed with methanol, hexane, and methanol again, prior to the detergent and water scrub. Otherwise discard.

4.1 Decontamination Procedure of Tubing and a Pump if Used to Evacuate a Well

The pump and tubing must be decontaminated according to the following procedure prior to each use. If tubing is dedicated to the well and stored in the well, then it will not require decontamination.

1. Alconox soap and water wash.
2. Tap (or potable) water rinse.
3. Pump a minimum of 4 liters of tap water through the pump.
4. Distilled/deionized water rinse.

4.2 Decontamination Procedure for Field Instruments

1. All field instruments will be cleaned as per the manufacturer's instructions.
2. All probes will be rinsed with DI water between sample locations.

Concrete Sampling Procedure for Waste Characterization
Andrews Street Project

1.0 Objective

This standard operating procedure (SOP) is to provide general reference information for waste characterization sampling of concrete or other hard material.

2.0 Limitations

This SOP may be varied or changed as required, dependent on site conditions, equipment limitations, or limitations imposed by the procedure or other procedure limitations. In all instances, the ultimate procedures employed should be documented in the field logbook.

3.0 Sampling Methodology

- To the extent possible, samples of the full thickness of the concrete floor/wall/structure will be collected. If this is not possible, the penetration depth of the samples will be recorded.
- Samples will be collected using a hammer drill or chisel.
- The crushed concrete chips/pieces will be placed in the appropriate sample jars and submitted to the laboratory.
- The lab requires one 4 oz. jar for total VOC analyses (Method 8260B), and an additional 16 oz. jar for waste characterization analysis (if necessary).
- Representative composite samples should be collected. The number of samples will be based on the amount of material and requirements of the disposal facility.
- Samples should be biased to the pieces of greatest suspected contamination based on previous analytical results, staining, odors, PID readings, etc.

4.0 Decontamination

Tools used for sampling should be decontaminated between samples in accordance with the Field Equipment Decontamination Procedure.

27. Laboratory SOP list

Title: QAM-20
Revision#: 20 Revision Date: 9/28/2009
File: QA Manual Rev.20.doc

Title: Chemical Hygiene Plan-08
Revision#: 08 Revision Date: 3/31/2009
File: Chemical Hygiene Plan 2008.doc

Title: Conflict of Interest Plan-04
Revision#: 4 Revision Date: 9/10/2009
File: Conflict of Interest Plan-04.doc

Title: Affirmative Action Program Executive 11246-02
Revision#: 2 Revision Date: 6/1/2009
File: Affirmative Action Program Executive 11246-02.doc

Title: AAP Section 503 and 4212-01
Revision#: 1.0 Revision Date: 6/1/2009
File: Affirmative Action Program Section 503&4212-01.doc

Field Methods

Title: M4020-PCB Inmmunoassay-04
Revision#: 04 Revision Date: 3/31/2009
File: M4020-PCB Immunoassay-04.doc

Title: M3815-Field GC-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M3815-Field GC-03.doc

General Chem

Title: M1010A-Flash Point-05
Revision#: 5.0 Revision Date: 9/9/2009
File: M1010A-Flash Point-05.doc

Title: M1110-Corrosivity-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M7.2-Corrosivity-04.doc

Title: M1311-TCLP-06
Revision#: 6 Revision Date: 9/9/2009
File: M1311-TCLP-06.doc

Title: MSM2540B &160.4,SM2540G- TS&T&VS-07
Revision#: 7.0 Revision Date: 3/31/2009
File: MSM2540B & 160.4-SM2540G-TS & T&VS-07.doc

Title: M180.1 Turbidity-09
Revision#: 9.0 Revision Date: 3/31/2009

File: M180.1-Turbidity-09.doc

Title: M300.0-Inorganic Anions-10
Revision#: 10 Revision Date: 10/26/2009
File: M300.0-Inorganic Anions-10.doc

Title: M3060A,7196A-Hex.Chromium-12
Revision#: 12 Revision Date: 10/15/2009
File: M3060A,7196A-Hex.Chromium-12.doc

Title: M3500-CRD- Hex. Chromium-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M3500-CRD-Hex.Chromium-04.doc

Title: M365.3&SM4500-P E-08
Revision#: 8.0 Revision Date: 3/31/2009
File: M365.3 & SM4500-P E,B5-08.doc

Title: MSM5210B-BOD-CBOD-06
Revision#: 6 Revision Date: 10/26/2009
File: MSM5210B-BOD-CBOD-06.doc

Title: MSM4500-Cl G-Residual Chlorine-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M4500-Cl-04.doc

Title: MSM4500- SO4 E-Sulfate-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M4500E-Sulfate-04.doc

Title: MChpt.7- Reactivity-05
Revision#: 5.0 Revision Date: 3/31/2009
File: MChpt.7-Reactivity-05.doc

Title: M9010-Total Cyanide-09
Revision#: 9 Revision Date: 9/9/2009
File: M9010C-Total Cyanide-09.doc

Title: M9020B TOX-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M9020B-TOX-04.doc

Title: M9023EOX-Total Organic Halide-05
Revision#: 5.0 Revision Date: 3/31/2009
File: M9023EOX-Total Organic Halide-05.doc

Title: M9040C-pH-05
Revision#: 5 Revision Date: 9/9/2009
File: M9040C-pH-05.doc

Title: M9045C-pH-05
Revision#: 5 Revision Date: 9/9/2009
File: M9045C-pH-05.doc

Title: M9060/A-TOC-11
Revision#: 11 Revision Date: 9/24/2009
File: M9060-A-TOC-11.doc

Title: MASTM-grain size-04
Revision#: 4.0 Revision Date: 3/31/2009
File: MD422-Grain Size-04.doc

Title: MAVS-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M-AVS-03.doc

Title: MLloyd Kahn-TOC-03
Revision#: 3.0 Revision Date: 3/31/2009
File: MLloyd Kahn-TOC-03.doc

Title: Musathama-Nitrocellulose-soil-03
Revision#: 3.0 Revision Date: 3/31/2009
File: MUSATHAMA-Nitrocellulose-soil-03.doc

Title: Musasthama-Nitrocellulose-water-03
Revision#: 3.0 Revision Date: 3/31/2009
File: MUSATHAMA-Nitrocellulose-water-03.doc

Title: M120.1-Conductivity-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M120.1-Conductivity-03.doc

Title: M2150B-Odor-03
Revision#: 3.0 Revision Date: 6/16/2009
File: M2150B-odor-03.doc

Title: M2320B-Alkalinity-05
Revision#: 5.0 Revision Date: 3/31/2009
File: M2320B-Alkalinity-05.doc

Title: M2120B-Color-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M2120B-Color-04.doc

Title: M5220 C&D-COD-07
Revision#: 7 Revision Date: 3/15/2009
File: M5220D-COD-07.doc

Title: M4500HB-pH-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M4500HB-pH-03.doc

Title: M5310-TOC-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M5310 C-TOC-03.doc

Title: M5540C-MBAS-05

Revision#: 5 Revision Date: 10/26/2009
File: M5540C-MBAS-05.doc
Title: M9041A-pH-03
Revision#: 3 Revision Date: 9/9/2009
File: M9041A-pH-03.doc
Title: M9056/A-Inorganic Anions-06
Revision#: 6 Revision Date: 10/15/2009
File: M9056-A-Inorganic Anions-06.doc
Title: M9065-Phenolics-04
Revision#: 4 Revision Date: 9/24/2009
File: M9065-Phenolics-04.doc
Title: M9071B-Oil & Grease-07
Revision#: 7 Revision Date: 9/24/2009
File: M9071B-Oil & Grease-07.doc
Title: M9080-Cation Exchange-03
Revision#: 3 Revision Date: 9/9/2009
File: M9080-Cation Exchange-03.doc
Title: M9081-Cation Exchange-03
Revision#: 3 Revision Date: 9/9/2009
File: M9081-Cation Exchange-03.doc
Title: M9095A/B-Free liquids-06
Revision#: 6 Revision Date: 9/9/2009
File: M9095A-B-Free Liquids-06.doc
Title: M-percent solids-04
Revision#: 4.0 Revision Date: 6/16/2009
File: M-percent solids-04.doc
Title: M1312-SPLP-05
Revision#: 5 Revision Date: 9/9/2009
File: M1312-SPLP-05.doc
Title: M1664-O&G-NPM-07
Revision#: 7 Revision Date: 9/24/2009
File: M1664A-O&G-NPM-07.doc
Title: MSM4500-NH3 G,H-Ammonia-07
Revision#: 7 Revision Date: 10/26/2009
File: MSM4500-NH3 G,H-Ammonia-07.doc
Title: M9012A-Total Cyanide-11
Revision#: 11 Revision Date: 9/11/2009
File: M9012A-Total Cyanide-11.doc
Title: M9030B-Sulfide-04
Revision#: 4 Revision Date: 9/9/2009

File: M9030B-Sulfide-04.doc

Title: MILM05.2CN-Cyanide-05
Revision#: 5.0 Revision Date: 3/31/2009
File: MILM05.2CN-Cyanide-05.DOC

Title: M9050-Conductivity-02
Revision#: 2.0 Revision Date: 3/31/2009
File: M9050-Conductivity-02.DOC

Title: MSW846,7.1-Ignitability-04
Revision#: 4.0 Revision Date: 3/31/2009
File: MSW846 7.1-Ignitability-04.doc

Title: M7.2-Corrosivity-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M7.2-Corrosivity-04.doc

Title: M1030-Ignitability-04
Revision#: 4 Revision Date: 9/9/2009
File: M1030-Ignitability-04.doc

Title: MILM4.1CN-Cyanide-04
Revision#: 4.0 Revision Date: 3/31/2009
File: MILM04.1CN-Cyanide-04.doc

Title: M9034-Sulfide-05
Revision#: 5 Revision Date: 9/9/2009
File: M9034-Sulfide-05.doc

Title: M420.1-Phenolics-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M420.1-Phenolics-03.doc

Title: MILM05.3CN-Cyanide-07
Revision#: 7.0 Revision Date: 3/31/2009
File: MILM5.3CN-Cyanide-07.pdf

Title: MD1498-Redox Potential-02
Revision#: 2.0 Revision Date: 3/31/2009
File: M1498-Redox Potential-02.doc

Title: M9038-Sulfate-02
Revision#: 2 Revision Date: 9/24/2009
File: M9038-Sulfate-02.doc

Title: MILM5.4CN-Cyanide-04
Revision#: 4.0 Revision Date: 9/15/2009
File: MILM5.4CN-Cyanide-04.doc

Title: M-percent solids-01 (ILM05.4)
Revision#: 1.0 Revision Date: 3/31/2009
File: M-percent solids-01 (ILM05.4).doc

Title: MASTM D1067-92-Acidity-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MASTM D1067-92-Acidity-01.doc

Title: MSM2130B-Turbidity-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM2130B-Turbidity-02.doc

Title: MSM2510B-Conductivity-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM2510B-Conductivity-02.doc

Title: MSM2540C-Total Dissolved Solids-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MSM2540C-Total Dissolved Solids-01.doc

Title: MSM2540D-Suspended Solids-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MSM2540D-Suspended Solids-01.doc

Title: MSM2540F-Settleable Solids-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MSM2540F-Settleable Solids-01.doc

Title: MSM2550B-Temperature-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MSM2550B-Temperature-01.doc

Title: MSM4500 Cl-C-Chloride-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500 Cl-C, E-Chloride-02.doc

Title: MSM4500-CN C,E-Cyanide-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-CN C,E-Cyanide-02.doc

Title: MSM4500-CN C,G-Amenable Cyanide-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-CN C,G-Amenable Cyanide-02.doc

Title: MSM4500-O C-Dissolved Oxygen-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-O C-Dissolved Oxygen-02.doc

Title: MSM4500-O G-Dissolved Oxygen-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-O G-Dissolved Oxygen-02.doc

Title: MSM4500-SO3 B-Sulfite-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-SO3 B-Sulfite-02.doc

Title: MSM4500-NO2 B-Nitrite-02

Revision#: 2.0 Revision Date: 3/31/2009
File: MSM4500-NO2 B-Nitrite-02.doc

Title: MSM4500-N Org BorC-TKN-03
Revision#: 3 Revision Date: 10/26/2009
File: MSM4500-N Org BorC-TKN-03.doc

Title: M9013-Cyanide Distillation-04
Revision#: 4 Revision Date: 9/24/2009
File: M9013-Cyanide Distillation-04.doc

Title: M9031-Sulfide-03
Revision#: 3 Revision Date: 9/24/2009
File: M9031-Sulfide-03.doc

Title: MOQA-QAM-025-TPH-02
Revision#: 2.0 Revision Date: 3/31/2009
File: MOQA-QAM-025-TPH-02.doc

Title: MHACH8146-Ferrous Iron-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MHACH8146-Ferrous Iron-01.doc

Title: MHACH8110-Formaldehyde-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MHACH8110-Formaldehyde-01.doc

Metals

Title: M3010A-Digestion-09
Revision#: 09 Revision Date: 9/11/2009
File: M3010A-Digestion-09.doc

Title: M7470A-Mercury-10
Revision#: 10 Revision Date: 9/11/2009
File: M7470A-Mercury-10.doc

Title: M200.7-2340B-Hardness-05
Revision#: 5.0 Revision Date: 3/31/2009
File: M200.7-2340B-Hardness-05.doc

Title: M7471A-Mercury-09
Revision#: 9 Revision Date: 9/11/2009
File: M7471A-B-Mercury-09.doc

Title: M200.7-Trace Elements-08
Revision#: 8 Revision Date: 10/26/2009
File: M200.7-Trace Elements-08.doc

Title: M245.1-Mercury-07
Revision#: 7 Revision Date: 10/26/2009
File: M245.1-Mercury-07.doc

Title: M3050B-Digestion-12
Revision#: 12 Revision Date: 9/11/2009

File: M3050B-Digestion-12.doc

Title: M6010B/C-Trace elements-16
Revision#: 16 Revision Date: 9/11/2009
File: M6010B-C-Trace Elements-16.doc

Title: M3005A-Digestion-06
Revision#: 6.0 Revision Date: 3/31/2009
File: M3005A-Digestion-06.doc

Title: M200.8-Trace Elements-07
Revision#: 7 Revision Date: 10/26/2009
File: M200.8-Trace Elements-07.doc

Title: MILM05.3-Trace Metals-08
Revision#: 8.0 Revision Date: 3/31/2009
File: MILM05.3-Trace Metals-08.doc

Title: MILM5.3HGS-Mercury in soil-06
Revision#: 6.0 Revision Date: 3/31/2009
File: MILM5.3HGS-Mercury in Soil-06.doc

Title: MILM5.3HGW-Mercury in water-06
Revision#: 6.0 Revision Date: 3/31/2009
File: MILM5.3HGW-Mercury in Water-06.doc

Title: MILM05.3-Metals ICPMS-03
Revision#: 3.0 Revision Date: 3/31/2009
File: MILM05.3-Metals ICPMS-03.doc

Title: M6020/6020A-Metals ICPMS-11
Revision#: 11 Revision Date: 10/26/2009
File: M6020-6020A-Metals ICPMS-11.doc

Title: MILM5.4HGS-Mercury in Soil-03
Revision#: 3.0 Revision Date: 8/14/2009
File: MILM5.4HGS-Mercury in Soil-03.doc

Title: MILM5.4HGW-Mercury in Water-03
Revision#: 3.0 Revision Date: 9/14/2009
File: MILM5.4HGW-Mercury in Water-03.doc

Title: MILM05.4-Metals ICPMS-06
Revision#: 6.0 Revision Date: 9/15/2009
File: MILM05.4-Metals ICPMS-06.doc

Title: MILM05.4-Trace Metals-03
Revision#: 4.0 Revision Date: 9/15/2009
File: MILM05.4-Trace Metals-04.doc

Title: M6010-SM2340B-Hardness-01
Revision#: 1.0 Revision Date: 3/31/2009
File: M6010-SM2340B-Hardness-01.doc

Title: MPM-10-Digestion-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MPM-10-Digestion-01.doc

Procedural

Title: P201-Data Review-14
Revision#: 14 Revision Date: 9/9/2009
File: P201-Data Review-14.doc

Title: P202-Reagent Check-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P202-Reagent Check-05.doc

Title: P203-MDL, IDOC-11
Revision#: 11 Revision Date: 3/31/2009
File: P203-MDL, IDOC-11.doc

Title: P205-Chemical Waste Disposal-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P205-Waste Disposal-06.doc

Title: P206-Bottle Check-04
Revision#: 4.0 Revision Date: 3/31/2009
File: P206-Bottle Check-04.doc

Title: P207-ASTM Type II Water-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P207-ASTM Type II Water-05.doc

Title: P208-Thermometer Calibration-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P208-Thermometer Calibration-06.doc

Title: P209-Scale Calibration-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P209-Scale Calibration-06.doc

Title: P210-Corrective-Preventive Action-07
Revision#: 7 Revision Date: 10/15/2009
File: P210-Corrective-Preventive Action-07.doc

Title: P211-Control Charts-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P211-Control Charts-05.doc

Title: P212-Water Purity-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P212-Water purity-06.doc

Title: P213-Calibration of Auto Pipettes-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P213-Calibration of Auto Pipettes-06.doc

Title: P214-Subcontracting-07
Revision#: 7 Revision Date: 9/30/2009
File: P214-Subcontracting-07.doc

Title: P215-Hood Calibration-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P215-Hood Calibration-05.doc

Title: P216-Calibration and Temperature Setting-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P216- Calibration and Temperature setting-06.doc

Title: P217-Glassware Cleaning-07
Revision#: 7.0 Revision Date: 3/31/2009
File: P217-Glassware Cleaning-07.doc

Title: P218-Chemical Storage-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P218-Chemical Storage-06.doc

Title: P219-Disposal of Chemicals-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P219-Disposal of Chemicals-05.doc

Title: P220-Traceability-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P220-Traceability-06.doc

Title: P222-Standard Operating Procedures Prep-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P222-Standard Operating Procedures Prep-06.doc

Title: P225-Rules for Rounding-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P225-Rules for Rounding-06.doc

Title: P223-Material Safety Data and Records-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P223-Material Safety Data and Records-05.doc

Title: P226-Corrections-06
Revision#: 6 Revision Date: 10/30/2009
File: P226-Corrections-06.doc

Title: P227-Services and Daily Maintenance-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P227-Services and Daily Maintenance-06.doc

Title: P250-Log-in Procedure-13

Revision#: 13 Revision Date: 9/21/2009
File: P250-Log-in Procedure-13.doc

Title: P229-Computer Security and Backup-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P229-Computer Backup and Storage-06.doc

Title: P230-Sample Aliquot-04
Revision#: 4.0 Revision Date: 3/31/2009
File: P230-Sample Aliquot-04.doc

Title: P231-Data Archive-06
Revision#: 6 Revision Date: 10/30/2009
File: P231-Data Archive-06.doc

Title: P232-Data Storage-06
Revision#: 7 Revision Date: 10/30/2009
File: P232-Data Storage-07.DOC

Title: P204-COC Procedure-06
Revision#: 6.0 Revision Date: 3/31/2009
File: P204-COC Procedure-06.doc

Title: P228-Storage and Disposal of PCBs-04
Revision#: 4.0 Revision Date: 3/31/2009
File: P228-Storage & Disposal PCB Materials-04.doc

Title: P236-fax procedure-02
Revision#: 2.0 Revision Date: 3/31/2009
File: P236-fax procedure-02.doc

Title: P235-Worklist-03
Revision#: 3.0 Revision Date: 3/31/2009
File: P235-Worklist-03.doc

Title: P234-Field Sampling-02
Revision#: 2.0 Revision Date: 3/31/2009
File: P234-Field Sampling-02.doc

Title: P224-Bottle Prep-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P224-Bottle Prep-05.doc

Title: P237-Training-05
Revision#: 5.0 Revision Date: 3/31/2009
File: P237-Training-05.doc

Title: P238-Field Chlorine test-01
Revision#: 1.0 Revision Date: 3/31/2009
File: P238-Field Chlorine test-01.doc

Title: P243-Manual Integration Policy and Electronic Logbook-05
Revision#: 5 Revision Date: 10/15/2009

File: P243-Electronic Logbook-05.doc

Title: P244-Calibration Policy-04
Revision#: 4 Revision Date: 10/26/2009
File: P244-Calibration Policy-04.doc

Title: P241-Air Canister Cleanup-04
Revision#: 5.0 Revision Date: 9/9/2009
File: P241-Air Canister Cleanup-05.DOC

Title: P251-Quotation Project Chronicle-03
Revision#: 3 Revision Date: 10/26/2009
File: P251-Quotation Project Chronicle-03.doc

Title: P252-Ethics Policy-01
Revision#: 1.0 Revision Date: 3/31/2009
File: P252-Ethics policy-01.doc

Title: P253-Uncertainty Policy-02
Revision#: 2.0 Revision Date: 3/31/2009
File: P253-Uncertainty Policy-02.doc

Title: P255-Maintenance-01
Revision#: 1.0 Revision Date: 11/18/2009
File: P255-Maintenance-01.doc

Title: P254-Purchasing and supplies-02
Revision#: 2 Revision Date: 10/30/2009
File: P254-Purchasing and supplies-02.doc

Title: P256-Storage blank-01
Revision#: 1.0 Revision Date: 10/15/2009
File: P256-Storage blank-01.doc

GC VOA

Title: M8015-GRO-11
Revision#: 11 Revision Date: 10/26/2009
File: M8015B-C-GRO-11.doc

Title: MRSK-175
Revision#: 1.0 Revision Date: 1/15/2010
File: MRSK-175-01.doc

GCMS VOC

Title: M524.2-DWVOA-10
Revision#: 10 Revision Date: 9/9/2009
File: M524.2-DWVOA-10.doc

Title: M5035-Closed P&T-06
Revision#: 6 Revision Date: 3/31/2009
File: M5035-5035A-Closed P&T-06.doc

Title: M624-WWMSVOA-07
Revision#: 07 Revision Date: 9/9/2009

File: M624-WWMSVOA-07.DOC

Title: M8260B/C-SWGCMSVOA-15
Revision#: 15 Revision Date: 9/9/2009
File: M8260B-C-SWGCMSVOA-15.doc

Title: M5030-P&T-05
Revision#: 5.0 Revision Date: 3/31/2009
File: M5030B-P&TWater-05.doc

Title: MTO-15-Air VOC-06
Revision#: 7 Revision Date: 9/9/2009
File: MTO15-Air VOC-07.doc

Title: MLow Level USEPA TO-15-Air VOC-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MLow Level USEPA TO-15-Air VOC-01.doc

Title: MSOM01.2-GCMS VOA-02
Revision#: 2 Revision Date: 11/17/2009
File: MSOM01.2-GCMS VOA-02.doc

Title: MSOM01.2-GCMS VOA Trace and SIM-02
Revision#: 2 Revision Date: 11/17/2009
File: MSOM01.2-GCMS VOA Trace and SIM-02.doc

Extractions

Title: M3510C,3580A-Extraction SVOC-11
Revision#: 11 Revision Date: 9/14/2009
File: M3510C,3580A-Extraction SVOC-11.doc

Title: M3510C,3580A-Extraction DRO-06
Revision#: 6.0 Revision Date: 9/14/2009
File: M3510C,3580A-Extraction DRO-06.doc

Title: M3510C,3580A-Extraction PCB-08
Revision#: 08 Revision Date: 9/14/2009
File: M3510C,3580A-Extraction PCB-08.doc

Title: M3510C,3580A-Extraction Pesticide-07
Revision#: 7.0 Revision Date: 9/14/2009
File: M3510C,3580A-Extraction Pesticide-07.doc

Title: M3510C,3550B-Extraction HPLCPAH-04
Revision#: 4.0 Revision Date: 3/31/2009
File: M3510C,3550B-Extraction HPLCPAH-04.doc

Title: M3610-Alumina cln up-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M3610-Alumina cleanup-03.doc

Title: M3620C-Florisil cleanup-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3620C-Florisil cleanup-04.doc

Title: M3630C-Silica Gel CleanUp-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3630-SilicaGelcleanup-04.doc

Title: M3640A-GPC cleanup-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3640A-GPC cleanup-04.doc

Title: M3660B-Sulfur Cleanup-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3660-Sulfur cleanup-04.doc

Title: M3665A-Sulfuric Acid Cleanup-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3665A-Sulfuric Acid cleanup-04.doc

Title: M3545A-Pressurized Fluid Extraction-06
Revision#: 6.0 Revision Date: 9/14/2009
File: M3545A-Pressurized Fluid Extraction-06.doc

Title: M3520C-Pest-PCB Liquid-Liquid extraction-03
Revision#: 3.0 Revision Date: 3/31/2009
File: M3520C-Pest-PCB Liquid-Liquid extraction-03.doc

Title: M3541-ASE Extraction-04
Revision#: 4.0 Revision Date: 9/14/2009
File: M3541-ASE extraction-04.doc

Title: MSOM01.2-Sample Prep-01
Revision#: 1.0 Revision Date: 3/31/2009
File: MSOM01.2-Sample Prep-01.doc

Title: M3535A-HPLC EXP prep-02
Revision#: 02 Revision Date: 9/14/2009
File: M3535A-HPLC EXP prep-02.doc

Title: M8330/A-Explosives salting prep-02
Revision#: 2.0 Revision Date: 9/23/2009
File: M8330-A-Explosives salting prep-02.doc

GC SVOC

Title: M608-WW Pesticide PCB-07
Revision#: 7.0 Revision Date: 3/31/2009
File: M608-WW Pesticide PCB-07.doc

Title: M8015B/C-DRO-13
Revision#: 13 Revision Date: 9/11/2009

File: M8015B-C-DRO-13.doc

Title: M8081A/B-Pesticide-13
Revision#: 13 Revision Date: 9/11/2009
File: M8081A-B-Pesticide-13.doc

Title: M8082/8082A-PCB-11
Revision#: 11 Revision Date: 9/24/2009
File: M8082-8082A-PCB-11.doc

Title: M8151-Herbicide-12
Revision#: 12 Revision Date: 9/25/2009
File: M8151A-Herbicide-12.doc

Title: MOLC03.2-Pesticide-PCB-03
Revision#: 3.0 Revision Date: 3/31/2009
File: MOLC03.2-Pesticide-PCB-03.doc

Title: M8082-PCB screening-01
Revision#: 1.0 Revision Date: 3/31/2009
File: M8082-PCB screening-01.doc

Title: M8015Modified-Direct Inject-01
Revision#: 1.0 Revision Date: 3/31/2009
File: M8015Modified-Direct Inject-01.doc

Title: MSOM01.2-PCB-02
Revision#: 2 Revision Date: 11/17/2009
File: MSOM01.2-PCB-02.doc

Title: MSOM01.2-Pesticide-02
Revision#: 2 Revision Date: 11/17/2009
File: MSOM01.2-Pesticide-02.doc

GCMS SVOC

Title: M625-BNA-08
Revision#: 8.0 Revision Date: 3/31/2009
File: M625-BNA-08.doc

Title: M8270C/D-BNA-15
Revision#: 15 Revision Date: 9/9/2009
File: M8270C-D-BNA-15.doc

Title: MSOM01.2-SVOC-02
Revision#: 2 Revision Date: 11/17/2009
File: MSOM01.2-SVOC-02.doc

Title: M8330A-Nitroaromatics-09
Revision#: 09 Revision Date: 9/25/2009
File: M8330-A-Nitroaromatics-09.doc

Appendix A-3

Brownfields Site-Specific QAPP

300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144
USEPA ID #BF-97207900-0

Resumes

JEFFREY A. DANZINGER

EXPERIENCE

Day Environmental, Inc.: October 1991 to present
Years with Other Firms: 5 years

AREAS OF SPECIALIZATION

- Environmental Site Assessment
- Environmental Restoration/Remediation
- Environmental Computer Modeling
- Risk Assessment/Geology/Hydrogeology

EDUCATION

University of Colorado at Boulder; B.A. Geology; 1986
Various continuing education courses/seminars in environmental studies and remediation

REGISTRATION/AFFILIATIONS

- OSHA Hazardous Waste Site Worker and Supervisor Training, and Confined Space Training
- Member of the National Groundwater Association (NGWA)

RESPONSIBILITIES AND PROJECT EXPERIENCE

Mr. Danzinger has over 22 years of professional experience working on environmental projects as a consultant. Mr. Danzinger is responsible for development and completion of Phase II studies, hydrogeologic studies, environmental restoration, remediation and Brownfield projects for independent clients and government agencies. He also serves as the company Assistant Health and Safety Officer. Mr. Danzinger has performed over 240 Phase I Environmental Site Assessments, over 180 Phase II Environmental Site Assessments and over 20 environmental restoration projects. Examples are provided below:

Former Air Force Plant No. 51, Greece, New York: This Site was used for the manufacture of ocean-going ships and cranes during and immediately following World War II, and for the manufacture of B-52 aircraft parts and Talos ground handling equipment during the 1950's. Mr. Danzinger acts as Project Manager for the investigation of this Site under the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP). Fifteen areas of concern (AOCs) have been incorporated into seven operable units (OUs) and investigation/remediation is on-going. Tasks Mr. Danzinger has managed include: development of environmental work plans and site-specific health and safety plans; inventory, characterization and disposal of abandoned wastes; sampling and dismantling of abandoned wet-type electrical equipment; investigation of, and development of a remedial work plan for a former wastewater treatment lagoon/pond area; investigation of the existing stormwater system and former septic system areas; investigation and remediation of the former underground storage tank area; and monitoring and recovery of dense non-aqueous phase liquid (DNAPL) as an interim remedial measure.

Former Photech Imaging Systems, 1000 Driving Park Avenue, Rochester, New York: Mr. Danzinger was responsible for managing the completion of a SI/RA report (NYSDEC Environmental Restoration Program Site ID B-00016-8) at this Brownfield Site that consists of 12 vacant buildings of varying degrees of disrepair that are situated on an approximate 12.5-acre parcel. The buildings formerly housed various manufacturing, laboratory, office and warehouse operations. Various underground and aboveground storage tank systems and a wastewater silver recovery system were operated at the Site. Other features at the Site included a burn pit area, and a retention pond basin.

Former Ford Garage, 2624 Main Street, Gorham, New York: On behalf of the Town of Gorham, New York, Mr. Danzinger is managing environmental services at this Brownfield Site under the New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Program (Site ID#B-00153-8). These services include a Phase I ESA report, a Site Investigation/Remedial Alternatives (SI/RA) report, development of a Remedial Work Plan (RWP), Health and Safety Plan (HASP), and Citizen Participation Plan (CPP). The Site was formerly operated as an automobile sales and service facility, and also as a gasoline station. Remediation consists of a source area soil removal, in-situ bioremediation, institutional controls and engineering controls.

Slag and Fill Management Project, Greece and Rochester, New York: Project Manager to address fill material containing regulated solid waste (slag) that was generated during a City of Rochester redevelopment project and was inadvertently placed on a vacant residential subdivision parcel in the Town of Greece. Mr. Danzinger's responsibilities included: preparing for and attending meetings with municipalities, regulators, and the general public; development of work plans; coordination and management of field activities; and development of closure reports.

Former Vogt Manufacturing Facility, 100 Fernwood Ave., Rochester, New York: Under the NYSDEC Brownfield Cleanup Program (BCP Site #C828119), Mr. Danzinger managed remedial investigation and implementation of interim remedial measures at this Brownfield Site. Mr. Danzinger was also responsible for the development of a Remedial Investigation/Remedial Alternatives Analysis (RI/RAA) report and a subsequent remedial work Plan (RWP). The RWP was approved by the NYSDEC and will be implemented in the near future. This industrial-zoned Site consists of eleven contiguous parcels totaling approximately 8.14 acres that was originally occupied by Vogt Manufacturing Corporation, which manufactured auto trimmings (e.g., textile trimmings spinning and weaving). The main building was later converted for multi-tenant light industrial/commercial use, including plastic products manufacturer, tool and die makers, machine shops, painters, printers, graphics companies, and sheet metal contractors.

High-Rise Apartment Complex, 185 Mt. Hope Ave., Rochester, New York: Under the NYSDEC Brownfield Cleanup Program (BCP Site #C828124), Mr. Danzinger managed remedial investigation and implementation of remedial measures at this Brownfield Site. This Site consists of an apartment building with an associated paved parking lot located on approximately 1.106 acres of land. The apartment building houses 202 residential units, totals approximately 143,000 square feet, and consists of a multi-level eight to twelve-story brick and concrete-block, slab-on-grade building constructed in 1975. Prior to the residential development in 1975, former uses at the Site included: rail yards, former Erie Canal feeder, and possibly a portion of a gasoline station.

Low-Rise Apartment Complex, 225-405 Mt. Hope Ave., Rochester, New York: Under the NYSDEC Brownfield Cleanup Program (BCP Site #C828125), Mr. Danzinger is managing a remedial investigation at this Brownfield Site. This Site consists of approximately 6.016 acres of land improved with five four-story apartment buildings. The brick and concrete-block, slab-on-grade apartment buildings were constructed in 1975, and these buildings house 200 units totaling approximately 205,000 square feet. Prior to residential development in 1975, past uses/activities at the Site included commercial, warehouse, feeder canal, rail yards, a work shop, auto repair, car sales, a wagon shop, a junk-yard and iron cutting facility, a brick storage yard, a tannery, and a coal yard.

Former Hallman's Auto Dealership, Rochester, New York: Site was formerly used as an automobile dealership and service center for over 50 years. Redevelopment plans for this Brownfield site included demolition of the service garage, construction of new residential apartments and townhouses, and conversion of a portion of the existing building (including former automobile showroom) into retail/restaurant commercial space. Mr. Danzinger completed an ASTM RBCA risk assessment using site-specific data generated during a Phase II environmental study and the proposed residential and commercial uses of portions of the site. As a result of performing the risk assessment, risk-based corrective measures that were completed in conjunction with redevelopment at this Site included: removal of over 20 underground storage tanks, removal and off-site disposal of petroleum-contaminated soils and fill material containing ash with elevated levels of heavy metals; design and installation of a free product recovery system; design and installation of passive venting systems with a vapor barrier; and design and installation of a soil vapor extraction system. Mr. Danzinger was responsible for developing and implementing an environmental project work plan, a health and safety plan, and an environmental management plan for this redevelopment project. In addition, DAY provided on-site environmental air monitoring services and site documentation services during construction activities that had the potential to disturb contaminated media. After the project was completed, Mr. Danzinger was involved with the development of a closure report for this Site.

Assessment of Transformer Maintenance Shop at Utility Company, Rochester, New York: A utility company's facility contained a transformer maintenance shop that had been operated since the 1950s. Mr. Danzinger managed the development and implementation of a characterization sampling plan; evaluated the characterization data and identified areas requiring remediation; and developed a report documenting the investigation and proposed remedial actions. This project was conducted in accordance with 40 CFR §§ 761. The USEPA documents titled "Verification of PCB Spill Cleanup by Sampling and Analysis" dated August 1985, "Field Manual for Grid sampling of PCB Spill Sites to Verify Cleanup" dated May 1986, "Wipe Sampling and Double Wash/Rinse Cleanup" dated April 18, 1991, and. Region 1 "Draft" document titled "Standard Operating Procedure For Sampling Concrete in the Field" dated December 1, 1997 were utilized in the sampling protocol.

Former Manufactured Gas Plant (MGP), Canandaigua, New York: Mr. Danzinger was involved with the development and implementation of a work plan and health and safety plan to evaluate this Site. Mr. Danzinger managed the associated site studies consisting of test borings/monitoring well installation, soil gas studies, sampling and testing of impacted media (e.g. soil/fill, groundwater, surface waters/sediments) to characterize site conditions and delineate contaminant plumes. Based upon the assessment of site conditions, Mr. Danzinger assisted in the development of a report that summarized the findings of the environmental studies, identified various remedial options consisting of a combination of waste removal/isolation and in-situ treatment, and presented conceptual remedial design schemes with estimated implementation costs.

Former Railroad Car Shops Site, East Rochester, New York: Mr. Danzinger was responsible for managing subsurface studies and an ASTM RBCA risk assessment on a portion of this former railroad car shop site. The Site was confirmed to be impacted with fill containing elevated heavy metals and weathered petroleum product. Mr. Danzinger was involved with the development and implementation of a health and safety plan and environmental management plan that included the design and monitoring of a passive vapor barrier vent system that was installed beneath a new industrial building that was constructed on this Site. In addition, DAY provided on-site environmental air monitoring services and site documentation services during construction activities that had the potential to disturb contaminated media. This project was successful in identifying pre-existing environmental conditions prior to transfer of ownership while obtaining regulatory agency approvals for the new owner to redevelop the vacant parcel with a new industrial facility.

Residential Care Facility, Rochester, New York: DAY's Client developed this approximate 3-acre property into a residential care facility on property that formerly contained several vehicle repair shops/gasoline stations, the City of Rochester Streets Department maintenance facility and the City of Rochester automobile pound. In addition, a portion of the Erie Canal, later converted to a trolley system, traversed the property. Subsequently, the canal/trolley line was backfilled with various, construction-type debris and other assorted material (including petroleum-contaminated material). Mr. Danzinger was involved with development of a health and safety plan and an environmental management plan (EMP), which included the removal of localized areas of petroleum-contaminated soil for treatment via an on-site 4,500 cubic yard biopile, the installation of an active venting system installed beneath the building footprint, and long-term monitoring. DAY also provided on-site environmental air monitoring services and site documentation services during construction activities that had the potential to disturb contaminated media.

Multiple-Parcel Brownfield Site, Rochester, New York: Responsible for the completion of a Phase I ESA for the City of Rochester at a five-parcel Brownfield site. The Site is located within the Western Gateway Zone of the New York State Economic Development Zone (EDZ) Program, and the City of Rochester was evaluating the restoration of these parcels for incorporation into an adjoining industrial park. Site improvements encompassed over 610,000 square feet of floor space in multiple level industrial buildings of varying structural condition. Former uses of the Site included: appliance manufacturing, tool and die shops, printing/lithographing operations, shoe manufacturing, circuit board manufacturing, box manufacturing; cabinet manufacturing; possible foundry operations, chromium plating operations, basket manufacturing, automobile services, welding operations, and warehousing/distribution operations. Mr. Danzinger was also responsible for the management of Phase II Studies on a portion of this Site.

Former Petroleum Bulk Storage Facility, Mt. Morris, New York: Mr. Danzinger managed an environmental site investigation at this former petroleum bulk storage facility under the New York State Environmental Restoration Bond Act Program. Mr. Danzinger was involved in the preparation and implementation of detailed work plans, implementation of fieldwork, and preparation of a Site Investigation/Remedial Alternatives Report (SI/RAR).

14-60 Charlotte Street, Rochester, New York: This Brownfield Site consists seven parcels of underutilized commercial land totaling approximately 1.3 acres. Mr. Danzinger was responsible for managing a Phase I ESA, Phase II studies, and remediation services at the Site. Contamination addressed at this Site was attributable to an on-site UST, on-site former automobile repair operations, on-site fill materials, and off-site dry-cleaning and automobile repair operations. Project deliverables included: a Phase I ESA report, Phase II reports, a Corrective Action Plan (CAP); a Health and Safety Plan (HASP) that included a Community Air Monitoring Plan (CAMP); an Environmental

Management Plan (EMP); an exposure assessment with site-specific PSSI calculations; a closure report, and conceptual sub-slab depressurization system (engineering control) designs for use during redevelopment of the Site.

80-100 Charlotte Street, Rochester, New York: DAY initially completed Phase I ESA, Phase II ESA and cost estimating services for this Site using City of Rochester funding mechanisms. Through a competitive request for proposal process, the City of Rochester subsequently awarded DAY the Brownfield Cleanup Project for this Site that was funded with a USEPA Brownfield Initiative Grant. DAY's services under the USEPA Brownfields Initiative Grant included: the development of an Analysis of Brownfields Cleanup Alternatives (ABCA) report; review of a Citizens Participation Plan (CPP) that was developed by the City of Rochester; the development of a corrective action plan (CAP) and a health and safety plan HASP); coordination, management, documentation and implementation of a source area soil removal enhanced by the placement of bioremediation stimulant product in a portion of the excavation; utilization of global positioning system (GPS) and geographical information system (GIS) on the project, installation and monitoring of groundwater wells on a long-term basis; and associated reporting of the work completed at the Site. No further action is required by the NYSDEC for this Site.

Greg Andrus, CHMM

Greg Andrus, Project Manager, will lead the Lu Engineers team for the Andrews Street IRM Project. Greg brings more than 23 years of experience including a diverse range of geologic and environmental engineering projects. Greg's areas of expertise include remedial investigation, geology and hydrogeology.

PERSONAL PROFILE

EDUCATION

B.S., Geology, 1987
Washington & Lee
University, VA

Hydrogeology, Graduate
Level Studies
SUNY Brockport
Brockport, NY

CERTIFICATIONS

Certified Hazardous Materials Manager (CHMM)

OSHA 40-Hour Training and Refresher Courses

Air Program Information Management Systems

ACHMM Finger Lakes Chapter Former President

PC Application in Risk Assessment, Modeling, and GIS

NYS Council of Professional Geologists

National Groundwater Association

PAPERS/PUBLICATIONS

Joint Services Environmental Management Conference, Presenter-Columbus, OH 2008

National Brownfield Conference
Denver, CO 2007
Philadelphia, PA 2011

National Air and Waste Management Association Conference
Detroit, MI 2010

PROJECT EXPERIENCE

Orchard Whitney Brownfield Investigation, Rochester NY

- Project Manager for City of Rochester Environmental Restoration Project
- Remedial Investigation/ Interim Remedial Measures
- Geophysical Investigation
- Contaminated soil and groundwater remediation

Sewall's Island City of Watertown, NY

- Managed remediation
- Remedial Investigation/ Alternatives Analysis Report
- Geophysical investigation
- Extensive soil and groundwater remediation

Former Frink America Site Clayton, NY

- Project Engineer for Environmental Restoration Project
- Identified vertical and horizontal contamination
- Conducted hydro -geologic and engineering review

Karenlee Drive, Henrietta NY

- Provided oversight for the VCP investigation and remediation
- Installation of seven monitoring wells

Town of Clarkson, ERP Investigation Clarkson, NY

- Project Manager for RI/IRM of the former gas station
- Prepared a Remedial Investigation Work Plan

Port Leyden ERP Investigation Leyden, NY

- Project Manager for NYSDEC –funded ERP site
- Site a former gas/service station
- Geophysical investigation
- IRM included removal of six underground storage tanks and contaminated soils
- Engineering services included a sub-slab depressurization system

Churchville Ford Site Churchville, NY

- Identified extent of chlorinated solvent contamination
- Remedial site design
- hydrogeologic and engineering review
- Designed in-situ remedial approach facilitating site closure

Former David-Howland Oil Company Facility Rochester, NY

- Project Manager for remedial design, construction oversight, and remedial operations
- Implemented a remediation system with groundwater pump and treatment, vapor extraction and air sparging
- Treatment included a thermal/catalytic oxidizer

Rome Research Site Environmental Term Contract USAF, Rome NY

- Program Manager for civil and environmental engineering services
- UST closures and disposal area closures
- Designed backflow preventers
- On-call environmental sampling services
- Demolition and HAZMAT assessment

26. Resume of Key Personnel and Certification list

26.1 Certification List

STATE	STATUS	LABORATORY ID	Certification Categories
NJ-NELAP	Certified	20012	DW, WW, SHW
NY-ELAP	Certified	11376	DW, WW, SHW, AIR
CONNETICUT	Certified	PH-0649	DW, WW, SHW
MARYLAND	Certified	296	DW
MASSACHUSETTS	Certified	M-NJ503	WW
Maine	Certified	NJ0503	DW, WW, GRO,DRO
OKLAHOMA	Certified	9705	WW
PENNSYLVANIA	Certified	68-548	DW
RHODE ISLAND	Certified	LAO00259	DW,WW,,SHW, Air
USDA	Certified	S-47647	Soil Permit
USEPA	CLP	CHEMED	metals, cyanide

26.2 **Key Employee Resume**

NAME: Krupa Dubey **POSITION: QA/QC Director**

Dates: Feb. 2006 – Present

RESPONSIBILITIES: Enforcement of all QA/QC requirements as per EPA, CLP protocols and all state regulations, Internal Audit of the lab, write and annually update Standard Operating Procedures, Assure that lab QA/QC practices are kept by conducting Internal Audit Annually, Verify all QC Client Contract compliance and Screening, Provide clients with technical support upon request, Development and maintenance of corrective action reports, regulatory and client document review, monitor external assessments, monitor compliance of lab systems with quality system guidelines established by federal and state agencies.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
LTM Medical College Mumbai, India	*1991*	*1993*	*Medical Lab Technology*	------	*1993*
Khalsa College Mumbai, India	*1988*	*1991*	*Microbiology*	------	*BS, 1991*

Professional Experience

Name & Address of Employer: CHEMTECH Mountainside, NJ 07092 **Title of Position & Dates:** ***QC Supervisor;*** ***11/2002 – 01/06***	**Responsibilities included:** Supervision of data deliverable production, data review of GC/MS Volatile and Semi-Volatile, Pesticides, PCBs, Herbicides, Metals and Wet Chemistry based on SW-846, EPA CLP and 40 CFR methodologies, Verify all QC requirements, contract compliance, screening and requirements.
Name & Address of Employer: CHEMTECH Mountainside, NJ 07092 **Title of Position & Dates:** ***GC & GC/MS Volatiles and Extractables Supervisor;*** ***5/2000 – 11/2002***	**Responsibilities included:** Supervision of GC/MS analysts, production scheduling and co-ordination of work flow, perform and review GC/MS analyses using SW-846, EPA CLP methodologies and interpretation of mass spectra, perform SIM analysis, plot control charts for establishing QC acceptance criteria, conduct assessments, precision and accuracy, proficiency, technical data review, troubleshoot instrument operations and other technical problems.

Name & Address of Employer: CHEMTECH 205, Campus Plaza 1, Edison, NJ **Title of Position & Dates:** ***GC/MS Analyst,*** ***5/1999 – 5/2000***	**Responsibilities included:** Analysis of water, wastewater, soil, and air samples for volatile and semivolatile organics, pesticides and PCBs using SW846, CLP, and USEPA methodologies. Daily maintenance of instruments. Data reduction.
Name & Address of Employer: CHEMTECH Consulting 205, Campus Plaza 1, Edison, NJ **Title of Position & Dates:** ***Microbiologist,*** ***4/1998 – 4/1999***	**Responsibilities included:** Analysis of water samples for Bacteria Count, Total Coliform, and *E.coli*, Fecal Coliform, and Standard Plate Count using Standard Methods and EPA procedures. BOD, COD, analyses. Preparation of agar media and standard solutions.
Name & Address of Employer: Medline Pathology Laboratory **Title of Position & Dates** *Lab Manager,* *3/95 – 4/97*	**Responsibilities included:** Supervision of Medical Laboratory technologists; scheduling workflow. Microbiological detection of infectious diseases, serological testing, antibiotic testing, review of laboratory procedures.
Name & Address of Employer: Shree Hospital & ICCU **Title of Position:** ***Medical Laboratory Technologist,*** ***3/93 – 2/95***	**Responsibilities included:** Agar plating, isolation of bacteria; plate count, bacteria count; preparation of agar media; antibiotic sensitivity testing.

Professional Skills

- Troubleshooting of GC/MS, Tekmar autosampler
- Data package production using Enviroforms
- Acquisition and analysis of samples using Enviroquant and RTE software
- ASP Deliverables, CLP Deliverables

Computer Skills

- MS Office – MS Word, MS Excel, MS PowerPoint
- Use of Environmental Data Reduction Software – Enviroquant & Enviroform

NAME: Deepak Patel **POSITION: Extractions Supervisor**

DATES: Nov 2003-Present

RESPONSIBILITIES: Supervision of Extractions department, schedule and coordinate workflow for the extractions analysts. Perform extractions on samples for BNA and Pesticide/PCB analyses. Updating LIM system. Review and updating of Extractions SOPs.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Polytechnic of NY		*1975*	*Chemical Engineering*	*Environmental*	*MS 5 / 75*
Polytechnic of NY		*1976*	*Management*	*Business*	*MS 5/ 77*

Professional Experience

Name & Address of Employer: NYCTA (MTA) New York, NY **Title of Position:** *Construction Supervisor II*	**Responsibilities included:** Monitor Installation of 3 elevators.
Name & Address of Employer: CHEMTECH Edison, NJ **Title of Position:** *Organic Extraction*	**Responsibilities included:** Supervision of Extractions department, schedule and coordinate workflow for the extractions analysts. Perform extractions on samples for BNA and Pesticide/PCB analyses. Updating LIM system. Review and updating of Extractions SOPs.

Professional Skills

OSHA- training- 8 hour course

NAME: **Rajesh Parikh** **POSITION: Extraction analyst**

DATES: **June 2003-Present**

RESPONSIBILITIES: Extract samples for BNA, Pesticides, PCBs, Herbicides and TPH based on EPA 600 series, SW 846 and CLP methodologies. Assist supervisor with SOPs updates. Update LIMS system. Troubleshoot instrument. Prep and Analysis of Oil and Grease based on method SW 1664.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
University of Baroda, India	1967	1971	***Chemistry***	------	***BS 1970***

Professional Experience

Name & Address of Employer: Godak Mills India **Title of Position:** ***Chemist*** ***Jan 1977-Nov 2002***	**Responsibilities included:** Testing and analysis of raw materials and Dyes. Analysis of In-process and finished products.
Name & Address of Employer: Calico Mills India **Title of Position:** *Chemist* *Jan 1972-Dec 1976*	**Responsibilities included:** Testing and analysis of raw materials and Dyes. Analysis of In-process and finished products.

Computer Skills

Microsoft Office 2000-Excel, Windows

NAME: Danuta Roguska **POSITION: Metals analysis Supervisor**

Dates: 5/99 to Present

RESPONSIBILITIES: Supervision of Metals and General Chemistry departments. Flow of work; analyses of samples within holding times, scheduling of work with the analysts, verify the test results performed by analysts. Technical data review of analyses (ICP data run – Methods 6010, 200.7, CLP, Hg data run – Methods 7470, 7471, 245.1, CLP. Report preparation and handle centralize computer system for analytical reports.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Warsaw University Warsaw, Poland	*1976*	*1981*	*Chemistry*	------	*BS; 1981*

Professional Experience

Name & Address of Employer: Analab Inc. 205 Campus Plaza 1, Edison, NJ 08837 **Title of Position & Dates:** *Laboratory Chemist; 9/90 to 5/99*	**Responsibilities included:** Analyses of General Chemistry and Metals parameters including cyanide, nitrate-nitrite, TKN, TDS, TSS, BOD, COD, TOC, hardness, etc. of wastewater, drinking water, soil, and sludges. Reporting of data as required.
Name & Address of Employer: Analab, Inc. **Title of Position & Dates:** *Laboratory Chemist; 9/90 to 4/92*	**Responsibilities included:** Phenolics distillations, titrations, PHC, reactive CB (EPA Method 9010, 9012), pH, TSS, TDS, COD, TCLP leaching for solids, semisolids, drinking-, , ground-, and wastewater.
Name & Address of Employer: Analab Inc. 205 Campus Plaza 1, Edison, NJ **Title of Position & Dates:** *Analyst; 4/92 to 8/99*	**Responsibilities included:** Running AA spectroscope, Flame PE 1100B; AA spectroscope, Furnace PE 5100 HGA & PE4100; Cold vapor Mercury analysis; regular maintenance of AA spectroscopes; analytical reporting.
Name & Address of Employer: Analyst Chem Laboratory Parczew, Poland **Title of Position:** *Analyst; 7/83 to 9/86*	**Responsibilities included:** Wet Chemistry Analytical Methods; procedures – distillation, acid/base titrations, PHC, reactive CN, pH, TSS, TDS, COD.

Name & Address of Employer: Debowa Kloda Middle School Debowa Kloda, Poland	**Responsibilities included:** Taught Chemistry and Physics; Grades 7-9.
Title of Position: ***Science Teacher;*** ***9/81 – 6/83***	

Professional Skills

- Experience in EPA methods, NYSDOH, NJDEP, and CLP requirements.
- Hands on experience for running ICP/Hg analyzer, TOC, Lachate, UV spectrophotometer, etc.
- Troubleshooting of above-mentioned instruments.

Computer Skills

- MS Office – MS Word, MS Excel, MS PowerPoint

NAME: James Moore **POSITION: General Chemistry Supervisor**

Dates: 03/08 to Present

RESPONSIBILITIES: Perform General Chemistry analysis as per SW846 protocol. Update LIMS system. Troubleshoot instruments.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Cook College, Rutgers	2002	2004	*Env. Science*	------	*BS; 2004*

Professional Experience

Name & Address of Employer: Cook College **Title of Position & Dates:** *Graduate Assistant* 07/05 – 01/08	**Responsibilities included:** Manage surface water lab, operate Lachat Quikchem FIA autoanalyzer, test surface water for total coliforms, write SOPs.
Name & Address of Employer: Cook College **Title of Position & Dates:** *Research Assistant* 09/03 – 06/05	**Responsibilities included:** Operated autolab to measure nutrients, entered and maintained data in database, prepared media, monitored growth of species.
Name & Address of Employer: Sussex County community college **Title of Position & Dates:** *Laboratory Assistant* 09/98 – 05/02	**Responsibilities included:** Set-up lab assignments, assist and prepare media.

Computer Skills

Microsoft Windows, EISC reporting software and Internet.

NAME: Jaswal Sarabjit **POSITION: Inorganics Analyst**

Dates: 12/89 to Present

RESPONSIBILITIES: Supervision of Metals and General Chemistry departments. Flow of work; analyses of samples within holding times, scheduling of work with the analysts, verify the test results performed by analysts. Technical data review of analyses (ICP data run – Methods 6010, 200.7, CLP, Hg data run – Methods 7470, 7471, 245.1, CLP. Report preparation and handle centralize computer system for analytical reports.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Punjab University, India	*1976*	*1981*	*Chemistry*	------	*BS; 1981*

Professional Experience

Name & Address of Employer: CHEMTECH 205 Campus Plaza 1, Edison, NJ 08837 **Title of Position & Dates:** *Laboratory Chemist; 7/88 to 12/89*	**Responsibilities included:** Analyses of General Chemistry and Metals parameters including cyanide, nitrate-nitrite, TKN, TDS, TSS, BOD, COD, TOC, hardness, etc. of wastewater, drinking water, soil, and sludges. Reporting of data as required.
Name & Address of Employer: JCT Mills (Nylon Plant). **Title of Position & Dates:** *Laboratory Chemist; 1/83 to 11/85*	**Responsibilities included:** Analysis of General Chemistry methods.

Professional Skills

- Experience in EPA methods, NYSDOH, NJDEP, and CLP requirements.
- Hands on experience for running ICP/Hg analyzer, TOC, Lachate, UV spectrophotometer, etc.
- Troubleshooting of above-mentioned instruments.

Computer Skills

MS Office – MS Word, MS Excel, MS PowerPoint

NAME: **Ugochukwu Amadioha** **POSITION: GC Extractables Supervisor**

DATES : MAY 06 – PRESENT

RESPONSIBILITIES: Supervision of Pesticide/PCB department, co-ordination of workflow in the department, analysis of samples within the specified holding times, scheduling the work with the analysts, and training of the new employees.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
COLLEGE OF NEW JERSEY		*2003*	***Biology***	------	***BS 2003***

Professional Experience

Name & Address of Employer: CHEMTECH Mountainside, NJ 07092 **Title of Position:** ***GC and GC/MS analyst;*** ***10/04-05/06***	**Responsibilities included:** VOC water, soil and gases analysis by method EPA 600 and SW846. Operate Archon autosampler, GC FID. Prepare standards. Follow GLP. Daily calibration of lab scales, refrigerators, autoclaves.
Name & Address of Employer: Roche Molecular systems Branchburg, NJ **Title of Position:** ***PCR Control Scientist;*** ***06/05-02/06***	**Responsibilities included:** Support manufacturing of Qualitative standards and Internal Controls for Polymerase Chain Reaction kits. Operate PCR instruments and Real Time PCR. Review controlled testing and manufacturing documents.
Name & Address of Employer: Medco Health Solution, LLC Parsippany, NJ **Title of Position:** *Customer Services Representative;* *10/03-08/04*	**Responsibilities included:** Educate members about prescription drug benefits managed by Medco Health and on plan attributes as it relates to copay, deductible, Out of Pocket expenses and CAP.

Professional Skills

Lab Techniques in Cell and Molecular Biology and Genetics: PAGE and Agrose Gel Electrophoresis. Protein purification, DNA isolation, Column Affinity Chromatography, PCR and Restrictive Fragment Analysis, Pour Plating, Colony Isolation, and Aseptic techniques.

NAME: Jonghun Jung **POSITION: GC Semivolatile Analyst**

DATES: June 2004- Present

RESPONSIBILITIES: Perform analysis on samples for Pesticide/PCB analyses. Updating LIM system. Review and updating of GC Semi Volatile SOPs. Review and finalize data before Supervisor review

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
University of Seoul *Seoul, South Korea*	*1993*	*1996*	***Physics***	------	***BS 1996***
New York University, ***New York NY***	*1997*	*1999*	*English language and liberal arts*	------	*Certificate 1999*
New York University, ***New York, NY***	*1999*	*2002*	*Environmental Health Science*	------	*MS 2002*
College of Staten Island (CUNY)	*2002*	*Present*	*Environmental Science*	------	*Expected MS 2005*

Professional Experience

Name & Address of Employer: Chemtech 284 Sheffield Street **Title of Position:** ***Metals data processing*** ***Feb, 2004- June 2004***	**Responsibilities included:** Updating LIM system. Review and updating of Metals data per ILM05.3. Review and finalize data before Supervisor review. Generate reports and assist QC on the final data report.
Name & Address of Employer: College of Staten Island Staten Island, New York **Title of Position:** ***Lab Tech*** ***2002-2003***	**Responsibilities included:** Laboratory technician in the Engineering sciences and Physics department.

Name & Address of Employer: NY University Graduate School of Arts and Science New York, NY **Title of Position:** *Teaching assistant* *1999-2002*	**Responsibilities included:** Teaching assistant in environmental hygiene measurement course. Worked at WTC-ground zero for air sampling and monitoring. Analyzed samples using GC instrument.

Professional Skills

Indoor Air Quality Inspection, Environmental pollutants measurements, Gas Chromatography, microbalance, fluorescence spectroscopy and AA spectrophotometry.

Computer Skills

Microsoft Office, EISC

Other Achievements or Awards

Travel Award to participate in Asian Aerosol Conference

NAME: Himanshu N. Prajapati **POSITION: GC/MS Extractables Supervisor**

Dates: 10/2002 – Present

RESPONSIBILITIES: Responsible for review of CLP packages, maintenance and troubleshooting of instruments, training other lab personnel in Semi-Volatile analysis and instrumentation. Prepare and analyze proficiency samples. Schedule workflow for other analysts.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
L.D. College of Engineering Ahmedabad, Gujarat, India	*1993*	*1997*	***Chemical Engineering***	*NA*	***B.E. Chemical Engineering***
Stevens Institute of Technology NJ, USA	*1999*	-	***MS Chemical Engineering***	*NA*	------

Professional Experience

Name & Address of Employer: CHEMTECH 284 Sheffield Street Mountainside, NJ 07092 **Title of Position:** ***QC Analyst; 9/04-12/04***	**Responsibilities Included:** Assist supervisor with all aspects of data deliverable production, review data based on SW-846, CLP and 40 CFR methodology, depending on project requirement. Verify all QC requirements, contract compliance, screening and method requirements.
Name & Address of Employer: CHEMTECH 284 Sheffield Street Mountainside, NJ 07092 **Title of Position:** ***GC/MS Analyst; 04/00-10/02***	**Responsibilities Included:** Perform BNA analysis as per EPA 600 series, SW 846 and CLP protocols. Assist supervisor with SOPs updates. Update LIMS system. Troubleshoot instrument.
Name & Address of Employer: G.S.F.C Surat, Gujarat, India **Title of Position:** *Shift Engineer; 02/98-11/98*	**Responsibilities included:** Supervising a continuously running plant of plastic manufacturing. Testing of raw materials and final products.

Name & Address of Employer: ECT Engineers & Associated Ahmedabad, Gujarat, India	**Responsibilities included:** Surveying of company/factory for energy conservation. Implementing energy conservation plans.
Title of Position: *Energy Saving Engineer;* *10/97-2/98*	

Professional Skills

Proficient with the analysis of samples for inorganic parameters.

Computer Skills

MS Office- Word and Excel Data Processing software

NAME: Divyajit Mehta **POSITION: Technical Director/Chief Operating Officer**

Dates: 1989 – Present

RESPONSIBILITIES: Responsible for all technical efforts of the Laboratory to meet all terms and conditions of EPA contract as well as all of CHEMTECH's clients. Experienced in the analysis of inorganic soil and water samples according to the requirements of the EPA Superfund, Contract Laboratory Program. Hands on experience in the use of the modern analytical instrumentation and wet chemical techniques. Currently responsible for the overall technical performance of the laboratory. Review the technical and QA/QC requirements during the analysis. Oversees the laboratory operations and compliance with all regulations.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Gujarat University INDIA	*1979*	*1982*	*CHEMICAL ENGINEERING*	------	*BS, 1982*
NJIT	*1984*		*CHEMICAL ENGINEERING*	------	*INCOMPLETE*

Professional Experience

Name & Address of Employer: CHEMTECH MOUNTAINSIDE, NJ *Title of Position:* ***CHIEF OPERATIONS/LABORATORY DIRECTOR*** 1/99-Present	**Responsibilities included:** Oversee overall technical laboratory performance and compliance with regulations and contracts.
Name & Address of Employer: CHEMTECH ENGLEWOOD, NJ **Title of Position:** ***INORGANIC MANAGER*** *1/89 – 1/99*	**Responsibilities included:** Responsible for the technical efforts of the inorganic department and compliance with EPA contract

Professional Skills

Hands on experience in a variety of instruments such as GC/MS, ICP, GC and various Wet chemistry techniques. Various training such NELAC training, instrument training and other seminars related with the Analytical procedures and instrumentation.

Computer Skills

Computer literate- MS Office- MS Word, MS Excel, MS Power Point
Use and design of Environmental Data Reduction Software
Enviroquant & Enviroforms, LIMS- Sample Master, EISC data reduction Software.

Other Achievements or Awards

Divyajit has completed various training in the Environmental field. Examples of these are: Inorganic Data validation training, Region II Organic data validation, Sample Master LIMS advance course, ICP training course and others

NAME: Mildred V. Reyes **POSITION: QC Supervisor**

DATES: Feb.2006-Present

RESPONSIBILITIES: Supervision of data deliverable production, data review based on SW-846, CLP and 40 CFR methodologies. Verify QC requirements, contract compliance and screening requirements.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
UNIVERSITY OF PUERTO RICO	*1982*	*1987*	***Biology***	------	***BS 1987***

Professional Experience

Name & Address of Employer: CHEMTECH Mountainside, NJ 07092 **Title of Position:** *QA/QC Director* *2002-2006*	**Responsibilities included:** Enforcement of QA/QC requirements, Internal Audit of the lab, Write and update SOP, Verify QC Client Contract Compliance and Screening, Provide clients with technical support.
Name & Address of Employer: CHEMTECH Mountainside, NJ 07092 **Title of Position:** ***QA/QC Supervisor*** ***1999-2002***	**Responsibilities included:** Supervision of all aspects of data deliverable production, data review of GC/MS Volatile and Semi volatile, Pesticides, PCBs, Herbicides, Metals and Wet Chemistry based on SW 846, EPA, CLP and 40 CFR methodologies. Verify all QC requirements, contract compliance, screening and requirements.
Name & Address of Employer: Analab/ICM Division 205 Campus Plaza 1, Edison, NJ 08837 **Title of Position:** ***GC, Supervisor*** ***1995-1999***	**Responsibilities included**: Supervision of four GC analysts; coordination of work flow and schedule; technical review of all data generated for GC Volatile, Pest, PCB Herbicides analysis; instrument trouble shooting and other technical problems.

Name & Address of Employer: Cycle Chem, INC Elizabeth, NJ **Title of Position:** *Production Chemist* *1993-1995*	**Responsibilities included:** Perform daily lab analysis on disposal material based on SW 846 and 40 CFR requirements. Analysis included PCB analysis, Metals and Wet Chemistry; inventory of all incoming samples
Name & Address of Employer: Safety Kleen, Linden, NJ **Title of Position:** ***Laboratory Technician*** ***1990-1993***	**Responsibilities included:** Senior Technician overseen laboratory operations during night shift. Perform daily lab analysis, which included Volatile Organic analysis, PCB analysis, and Wet Chemistry.

Other Achievements or Awards

Environmental Laboratories Seminar
Internal Assessment Training

Professional Skills

GC Volatile, Pesticides, PCBs, Herbicides analysis by GC using EPA, SW 846 and 40 CFR methodology.
ASP and CLP deliverable.

Computer Skills

MS Office- MS Excel, MS Word, MS Power Point
Use of Environmental data reduction software

NAME: **Kalpana Raythatha** **POSITION: Data Reviewer**

Dates: Nov 2002 – Present

RESPONSIBILITIES: Data deliverable production, data review of GC/MS Volatile, GC/MS Semivolatile, Pesticides, PCB, Herbicides, Metals and Wet Chemistry based on SW-846, CLP and 40 CFR methodology depending on the project requirement. Verify all QC requirements; contract compliance, screening and method requirements. Verify client requirements were met. Assist on data assembly for final data package.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
HK Arts College *Gujarat University, India*	*1973*	*1977*	***Arts***	***Statistics***	***BA 1977***

Professional Experience

Employer / Position	Responsibilities
Name & Address of Employer: ***CHEMTECH*** 284 Sheffield Street Mountainside, NJ 07092 **Title of Position & Dates:** ***Metals Report Production*** ***May 00-Nov 2002***	**Responsibilities included:** Review data submitted for reports for Metals based on SW 846, EPA and CLP methodology. Process raw metals data into reporting format and integrate the sections of data for final report. Assist the QC department with any data corrections.
Name & Address of Employer: ***Chemtech*** ***Englewood, NJ*** **Title of Position & Dates:** *Wet Chemistry Report Production*	**Responsibilities included:** Review data submitted for reports for Wet Chem based on SW 846, EPA and CLP methodology. Entered data in the LIMS System and integrate the sections of data for final report. Assist the QC department with any data corrections.
Name & Address of Employer: ***Chemtech*** ***Englewood, NJ*** **Title of Position & Dates:** *Wet Chemistry Report Production*	**Responsibilities included:** Maintained hard copy and electronic file and records of analytical data. Responsible for arranging pickup and delivery of Data Packages by interfacing Fedex, UPS and courier.
Name & Address of Employer: S. Goldberg & Co. Hackensack, NJ **Title of Position & Dates:** *Production Operator*	**Responsibilities included:** Worked on molding production line.

Professional Skills

Familiar with most Quality Control/Quality Assurance procedures.
Proficient in most General Chemistry test procedures.

Computer Skills

MS Office – MS Word, MS Excel

NAME: **Shelly Guha** **POSITION: Data Reviewer**

Dates: Feb. 2006 – Present

RESPONSIBILITIES: Data deliverable production, data review of GC/MS Volatile, GC/MS Semivolatile, Pesticides, PCB, Herbicides, Metals and Wet Chemistry based on SW-846, CLP and 40 CFR methodology depending on the project requirement. Verify all QC requirements; contract compliance, screening and method requirements. Verify client requirements were met. Assist on data assembly for final data package.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Osmania University, India	*1987*	*1989*	***Organic Chemistry***	-----	***MS 1989***
Osmania University, India	*1983*	*1986*	***Science***	-----	***BS 1986***

Professional Experience

Name & Address of Employer: ***CHEMTECH*** 284 Sheffield Street Mountainside, NJ 07092 **Title of Position & Dates:** ***GC/MS analyst*** ***Dec. 04-Feb. 06***	**Responsibilities included:** Perform sample analysis as per EPA 600 series, SW 846 and CLP protocols. Assist supervisor with SOP updates. Update LIMS system. Troubleshoot instrument.
Name & Address of Employer: Molecu Wire Corp, NJ **Title of Position & Dates:** *Lab Technician* *Feb. 04-Dec. 04*	**Responsibilities included:** Carried out conductivity, resistance tests on wires. Preparation and standardization of solutions. Maintaining test results and procedures in Electronic media.

Professional Skills

Familiar with most Quality Control/Quality Assurance procedures.

Computer Skills

Windows NT Server, UNIX and DOS, Developer/2000, Visual Basic 6.0, ORACLE 7.0/8.0, MS-SQL 7.0, Chem-Win, HTML FoxPro 2.6, Office Tools and Internet

NAME: **Snehal Mehta** **POSITION:** ***Sample Management Supervisor***

Dates: Jan.01 - Present

RESPONSIBILITIES: Login samples. Prepare bottle orders and receiving samples, sample custodian.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Gujrat University	1993	1996	*Chemistry*	-----	*BS, 1996*

Professional Experience

Name & Address of Employer / Title of Position & Dates	Responsibilities
Name & Address of Employer: Kroma Dyestuffs Ltd., India	**Responsibilities included:** Analyze soil, water and sludge analysis. Supervision of analysts. Data and technical review.
Title of Position & Dates: *Analytical Chemist* *1994-1997*	

Computer Skills

MS Office – MS Word, MS Excel, MS PowerPoint

NAME: Semsetтin (Sam) Yesiljurt **POSITION: GC/MS Analyst (Volatile)**

Dates: 7/2001 – Present

RESPONSIBILITIES: Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods. Preparing data packages to be reported to the client. Keeping track of projects pertaining to the department. Troubleshooting of instruments and other technical problems according to methodology.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Gazi University Ankara, Turkey	*1976*	*1980*	*Chemical Engineering*	------	*BS, 1980*

Professional Experience

Name & Address of Employer: CHEMTECH Consulting 205 Campus Plaza, Raritan Ctr. Edison NJ **Title of Position & Dates:** *GC Analyst* *7/99 – 7/01*	**Responsibilities included:** Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods for Pest, PCB, Herb. Preparing data packages to be reported to the client. Troubleshooting of instruments and other technical problems according to methodology.
Name & Address of Employer: All Test Environmental Lab **Title of Position & Dates:** *GC/MS analyst,* *2/99 – 7/99*	**Responsibilities included:** Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods.
Name & Address of Employer: Technion **Title of Position & Dates** *GC/MS Analyst* *8/96-2/99*	**Responsibilities included:** Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods.
Name & Address of Employer: Technion **Title of Position:** *GC Analyst* *4/93-8/96*	**Responsibilities included:** Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods.

Professional Skills

- Troubleshooting of GC/MS, Tekmar autosampler
- Data package production using Enviroforms and EISC software
- Acquisition and analysis of samples using Enviroquant and RTE software
- ASP Deliverables, CLP Deliverables

Computer Skills

MS Office – MS Word, MS Excel, MS PowerPoint
Use of Environmental Data Reduction Software – Enviroquant & Enviroform, EISC, LIMS

NAME: Malgorzata Starzec **POSITION: GC/MS Analyst (Volatile)**

Dates: 11/2002 – Present

RESPONSIBILITIES: Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods. Preparing data packages to be reported to the client. Keeping track of projects pertaining to the department. Troubleshooting of instruments and other technical problems according to methodology.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Warsaw University, Poland	1987	1992	*Chemistry*	-----	*BS, 1992*

Professional Experience

Name & Address of Employer: CHEMTECH Consulting Mountainside, NJ	**Responsibilities included:** Analyze and QA/QC water and soil samples using SW 846 8000 series and EPA 600 series methods. Preparing data packages to be reported to the client. Troubleshooting of instruments and other technical problems according to methodology
Title of Position & Dates: *GC/MS Analyst* *11/02 – Present*	

Professional Skills

- Acquisition and analysis of samples using Enviroquant and RTE software
- ASP Deliverables, CLP Deliverables

Computer Skills

- *MS Office – MS Word, MS Excel, MS PowerPoint*
- Use of Environmental Data Reduction Software – Enviroquant & Enviroform, EISC, LIMS

NAME: Mohammad Ahmed **POSITION: Laboratory Manager**

Dates: Nov. 2005 - Present

RESPONSIBILITIES: Responsible for all technical efforts of the Laboratory to meet all terms and conditions of CHEMTECH clients. Hands-on experience in the use of modern analytical instrumentation and wet chemical techniques. Currently responsible for the overall technical performance of the laboratory. Review technical and QA/QC requirements during the analysis. Oversee the laboratory operations and compliance with all regulations.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
University of Punjab	1996	2001	*Science*	-----	*BS, 2001*

Professional Experience

Name & Address of Employer: CHEMTECH Mountainside, NJ **Title of Position & Dates:** *Laboratory Manager Nov. 2005-Present*	**Responsibilities included:** Oversee all technical laboratory performance and compliance with regulations and contracts.
Name & Address of Employer: Naturex **Title of Position & Dates:** *Senior Chemist Oct.2005-Nov.2006*	**Responsibilities included:** Responsible for SOP prep. and review, method development, perform analysis using different instruments, calibrate and maintain instruments.
Name & Address of Employer: Garden State Laboratories **Title of Position & Dates:** *Team Leader May 2001-Oct.2005*	**Responsibilities included:** Supervise organic department, oversee sampling projects, produce monthly reports, supervise PT analysis.
Name & Address of Employer: Accutest laboratories **Title of Position & Dates:** *Senior Chemist Sept..2002-Oct.2003*	**Responsibilities included:** Responsible for laboratory audits, review data, create SOPs, perform organic and inorganic analysis.

Professional Skills

- Hands on experience in a variety of instruments such as GC/MS, ICP, GC, and various Wet chemistry methods.

Computer Skills

- ***MS Office – MS Word, MS Excel***
- Use of Environmental Data Reduction Software – Enviroquant, EISC, LIMS

NAME: Jacob Tsvik **POSITION: Systems Manager**

DATES: October 2004- Present

RESPONSIBILITIES: Quality Control of all computer systems, including hardware, software, documentation and procedures. Generates and updates the automated deliverables in accordance to client specifications. Installation, training, maintenance and operation of programs as they pertain to providing open architecture systems that promote adaptability, efficiency, reliability and system integration. Develop, design and implement CHEMTECH's LIMS system. Develop US Army. US Navy and US Air Force and commercial client EDDs based on each individual requirement.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
COPE Institute, NY	1995	2002	-----	-----	*2002*
University of Technology, Ukraine	1978	1983	-----	-----	BS, Engineering

Professional Experience

Name & Address of Employer: Bris Avrohom, Hillside, NJ **Title of Position & Dates:** Field Network Technician, 06/2002 – 03/2004	**Responsibilities included:** Support users for Network Client Installation and support, Install and setup Windows 95/98 and Windows NT, 2000, XP workstations and create user accounts, home directories, assign permissions to shares. Install 3com cards, hubs, test connectivity. Provide Level 1, 2 support. Perform system backup. Resolve service interruptions.
Name & Address of Employer: BLS Technology Inc., Brooklyn, NY **Title of Position & Dates:** Consultant, 08/1996 – 03/2002	**Responsibilities included:** Physical inventory, Asset tag placement, Maintain and troubleshoot entire network, Administer domain accounts, Software installation and troubleshooting, Install and support Client 32, Deal with TCP/IP address, Upgrade and repair desktop computers.
Name & Address of Employer: J & R Computer World, NY **Title of Position & Dates:** Computer Technician, 01/1995 – 07/1996	**Responsibilities included:** Upgrade and repair desktop and laptop computers, Install and configure external and internal devices, Heavy phone troubleshooting and support, on-site troubleshooting and user orientation.

Professional Skills

Windows NT, 2000, XP, Linux system, Microsoft Office, PC and PC components, laptops, cables and adapters, NIC, Routers, Hubs, Switches, Cables and connectors, UPS, Printers, Scanners, Modems, ISDN, DSL, Video equipment.

Computer Skills

Microsoft Office Word, Power Point Excel

NAME: *Amit Patel* **POSITION:** ***GC/MS Volatile Supervisor***
Dates: Feb. 2005

RESPONSIBILITIES: Analyze and QA/QC water and soil samples using SW 846 8000 series, EPA CLP and EPA 600 series methods. Preparing data packages to be reported to the client. Keeping track of projects pertaining to the department. Troubleshooting of instruments and other technical problems according to methodology.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Gujarat University	1996	2000	***Chemical Engineering***	-----	***Gujarat University***

Professional Experience

Name & Address of Employer: Sanghi Industries Ltd.	**Responsibilities included:** Worked as assistant engineer in cement plant using 100% lignite as fuel.
Title of Position & Dates: ***Assistant Engineer, 11/02 – 10/04***	

Professional Skills

- Project on Thionile Chloride
- Seminar on Composting – a solid waste management system

Computer Skills

- ***MS Office 2000, C, C++, Basic, Java 2.0, HTML Languages***
- ***Windows, Linux, MD DOS***
- SQL Server 7.0

NAME: ***Kurt Hummler*** **POSITION:** ***Project Manager***

Dates: Feb. 1997 - Present

RESPONSIBILITIES: Responsible for setting up client projects and maintaining direct client contact throughout the project to ensure that all client requirements are fulfilled.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
University of North Carolina			*Political Science*	-----	*BA*

Professional Experience

Name & Address of Employer: CHEMTECH 284 Sheffield Street Mountainside, NJ **Title of Position & Dates:** Project Manager, Feb. 1997-Present	**Responsibilities included:** Responsible for communicating with client and laboratory all information pertaining to the project.
Name & Address of Employer: Lab Resources Inc. **Title of Position & Dates:** Project/Marketing Manager, 08/97 – 01/98	**Responsibilities included:** Responsible for marketing and managing the project.
Name & Address of Employer: Core Labs, Inc. **Title of Position & Dates:** Project Manager, 02/92 – 05/97	**Responsibilities included:** Worked as project manager.

Computer Skills

MS Office – MS Word, MS Excel, MS PowerPoint

NAME: Emanuel Hedvat **POSITION: President**

RESPONSIBILITIES: Primarily responsible for all operations and business activities. Develop and implement strategies and initiatives. Responsible for growth and direction of Chemtech. Responsible for the profitability of the company, the quality of analyses performed and the high level of service provided to clients. Delegate authority to Laboratory Directors, all Managers, and Quality Assurance/Quality Control Director to conduct day-to-day operations and execute quality assurance duties.

Educational Background

College/University	Dates Attended		Major	Minor	Degree & Date
	From	To			
Fairleigh Dickenson University			Chemistry	---	BS
Fairleigh Dickenson University			Chemistry	---	***MS, 1983***

Professional Experience

Name & Address of Employer: Chemtech	Responsibilities included: Oversee overall laboratory performance and compliance. Maintain quality service. Discuss analytical requirements with Disposal facilities and Regulatory Agencies. Develop Sampling and Analysis Plans. Create Site Maps. Generate Electronic Diskette Deliverables for interpretation of analytical results as per Disposal Facility requirements. Perform sampling per regulatory agency requirements.
Title of Position & Dates: ***President***	

Professional Skills

Mr Hedvat has over 25 years of experience in the environmental testing industry including on-site laboratories. With extensive experience in corporate management. He has conducted numerous field chromatography studies at various US Navy bases. Developed and implemented numerous analytical techniques in support of remedial investigations studies. His knowledge on environmental testing stems from having served as Laboratory Director, Field Services Director and Project Management Director.

Computer Skills

Microsoft office 2003; excel, word, power point

Other Achievements or Awards

Active Registration and Awards:
American Chemical Society
American Society for Testing & Materials
Water Pollution Control Federation
Society of American Military Engineers

CURRICULUM VITAE

Maxine Wright-Walters, PhD

Educational Background

University of Pittsburgh	2008 PhD. Environmental and Occupational Health (EOH)/Environmental Health Sciences (EHS)
Graduate School of Public Health Pittsburgh, PA	Dissertation Topic: Exposure Concentrations of Pharmaceutical Estrogens and Xenoestrogens in Municipal Wastewater Treatment Plant Sources, the Aquatic Environment and an Aquatic Health Risk Assessment of Bisphenol-A: Implications for Wildlife and Public Health
Duquesne University Pittsburgh, PA	1997 MSc. Environmental Science & Management Internship: Allegheny County Emergency Preparedness, and Response Center, Pittsburgh PA
New York Institute of Technology, Old Westbury, NY	1989 BS, Chemistry,
University of Technology (College of Arts Science and Technology) Jamaica W.I.	1986 Diploma in Pharmacy Thesis: Antimicrobial Properties of the *Mimosa Pudica* and its effect on the *neissera gonorrhea* organism.

Additional Training

RAB Certified EMS Lead Auditor	1998
American Chemical Society's short course in Microwave Enhanced Chemistry	1997
ISO 14000 Lead Auditor	1997
ISO 9000 auditor	1997
PACS data Validation	1997
Radiochemistry	1989
Radioactivity safety	1989
OSHA 40hr Health and Safety	1987
Data Validation	1987

Employment History

1991-present President/Project Manager, EDV, Inc., PA
Responsible for the day to day operation and management of this small environmental consulting business. Duties include: Recruiting and mentoring of staff, budgeting, marketing, environmental consulting to include development of Data Quality Objectives (DQOs), development of QA/QC and laboratory training programs and manuals, laboratory auditing, remedial investigation/feasibility studies (RI/FS), QAPPs and SAPs development. Environmental Health Assessments and Risk Assessments, ISO 9000 consulting to include implementation, training and auditing of quality systems, ISO 14000 consulting to include implementation, training and auditing of Environmental Management Systems (EMS). Environmental Health and Occupational Safety training and consulting. Laboratory consulting to include development of Good Laboratory Practices (GLP), methods development, auditing and training. Data validation of all types of parameters such as volatile target compounds (TCL), semi-volatile target compounds, pesticide/PCBs, dioxins & furans, conventional general/wet chemistry, TAL metals, leachate and reactivity characteristics (TCLP) priority pollutants-metals & organics; radiological parameters including gross alpha/beta,. gamma spectroscopy parameters; thermal ionization mass spectroscopy, fluorometric uranium,, alpha spectroscopy-strontium 89/90; alpha spectrometry- thorium-237, uranium-234, 238, neptunium-237, plutonium-238, 239, 240, americium-241 and curium-242, 243, 244 and, liquid scintillation counting parameters-tritium. QA/QC consulting under various programs such as CERCLA (superfund), RCRA and Brownfield. Sales, proposal writing, and general project management. Conduct training courses at college and professional levels in areas such as: QMS (ISO 900:2000), EMS (ISO 14001) implementation, Introduction to ISO 14001, ISO14001 Internal auditing, laboratory auditing, organic/inorganic and radiochemical data validation and many others.

1990-1991 Senior Chemist, Ecotek LSI, GA
As a senior chemist responsibilities included; method development, troubleshooting, writing of SOPs for Sample Preparation laboratory and QC department, writing of training manuals; QC compliance and surveillance audits; radiological and chemical data validation for parameters such gross alpha/beta, . gamma spectroscopy parameters; thermal ionization mass spectroscopy, fluorometric uranium spectroscopy-strontium 89/90; alpha spectrometry- thorium-237, uranium-234, 238, neptunium-237, plutonium-238, 239, 240, americium-241 and curium-242, 243, 244 and, liquid scintillation counting parameters-tritium; volatile target compounds (TCL), semi-volatile target compounds, pesticide/PCBs, dioxins & furans, conventional general/wet chemistry, TAL metals, leachate and reactivity characteristics (TCLP) priority pollutants-metals & organics.

1989-1990 Chief Chemist/Safety Officer, Syosset Labs, NY.

Responsibilities for this position included Quality Control, research, method development and validations. Training of new chemists to ensure familiarity and understanding of USP and In House methods. Testing of raw materials, in-process and finished products to confirm non-compliant results obtained by other chemists. Monitor the set-up and testing of all stability samples. Familiar with FDA regulations. Write SOPs, implementation of a Health and Safety program. Ensure the general safety of the building and all its employees within as per OSHA guidelines.

1987-1989 QC Chemist, Nytest Environmental, Port Washington, NY.
As a QC chemist duties included; wet chemistry analysis, organic and inorganic sample extraction and preparation, preparation of base-neutral, acid and pesticide spikes. Analysis of organic compounds via GC/GCMS, data validation of organic compounds such as BNAs, VOAs, Pest/PCBs.

Research

"Antimicrobial Properties of the *Mimosa Pudica* and its effect on the *neissera gonorrhea* organism." Researched the Mimosa Pudica for its antimicrobial properties and looked at its effects on the *neissera gonorrhea* organism. This research was done in 1986 at the Microbiology Department of the University of the West Indies. It was a requirement for final year pharmacy students at the College of Arts Science and Technology.

Research in Organic Chemistry, investigating the different pathways in the synthesis of organic compounds with emphasis on Opium compounds. This Research was done in 1985-1986 at the College of Arts Science and Technology-Pharmacy Department.

Instrumentation research, working specifically with the Gas Chromatograph in determining the relationship between peak areas and concentrations of compounds. This research was done in 1988 and funded by the Life Science Department, New York Institute of Technology.

Professional Training/Teaching

Consad Research, Pittsburgh, PA
Risk Assessment Expert for Department of Labor (DOL) review of risk assessment best practices within various agencies of the Federal government. Consult on drafting an exposure factors and risk characterization handbook that will be used to assist DOL in its risk assessment practices. 2008

GlaxoSmithKline, Pittsburgh, PA
Implementation of a complete ISO 14001 EMS to include executive briefings, baseline assessment, identification of aspects and impacts and chemical inventory and waste management. Internal and Lead auditor EMS training. Environmental Health and Occupational Safety training and consulting. 2006.

United States Department of Energy -National Environmental Technology Laboratory (NETL)
ISO 14001 training course in Implementation, Identifying Aspects and Impacts and Internal and Lead auditing. Environmental Health and Safety training course. 2003.

Tech-Seal, WV
Implementation of a complete EHS program. Auditor internal auditor training. Implementation of an ISO 9000 Quality Management System.2002.

Jefferson Community College, OH
ISO14001/EHS Implementation Consulting and Auditing as part of an ISO9000/14000 Consortia provided by the college to local businesses in the Weirton, WV area. 1998-2002.

Cutler-Hammer Technology, Center, Pittsburgh, PA (A former Westinghouse/DOD facility)
Implementation of a complete ISO 14001 EMS to include; executive briefings, baseline assessment, identification of aspects and impacts, and waste management. Internal and Lead auditor EMS training. Environmental Health and Safety Implementation, training and consulting. Conducted Chemical inventory and audit. The site has been certified in ISO 9001 and 14001. 2001.

Cutler-Hammer, Horsehead, NY (A former Westinghouse/DOD facility):
Implementation of a complete ISO 14001 EMS to include executive briefings, baseline assessment, identification of aspects and impacts and waste management. Internal and Lead auditor EMS training. Environmental Health and Safety training and consulting. The site has been certified in ISO 9001 and 14001. 2001.

Curtiss-Wright, EMD, Cheswick, PA (A former Westinghouse/DOD facility)
Planned and implemented records management system for Marketing, Engineering, and Human Resources using standardized databases for all functions. 2001.

Graduate Appointments

Graduate Assistant: Research Assistant for the Center for Healthy Communities. 2008

Graduate Assistant: Research Assistant for the Community Awareness Allegheny River Stewardship Project. 2007-2008

Graduate Research Assistant: Teaching and Research Assistant for the department of Environmental and Occupational Health 2001-2007

Public Teaching Experience (Public Courses)

Organic Data Validation, 1999-2006
Environmental Health and Safety Program Implementation, 1997-2007
Inorganic/Inorganic Data Validation, 1999-present
Radiochemical Data Validation, 2000-2006
ISO 14001 Implementation, 2002-2005
Environmental Management Systems Auditing, 2000-2004
Quality Management Systems, 2002

Academic Teaching Experience

University of Pittsburgh, PA. Co-Presenter/Co-Instructor: Community Awareness Presentation of the Allegheny River Stewardship Project, Alle-Kiski Health Foundation, Heinz Endowments and Highmark Foundation, 2007

University of Pittsburgh, PA. Guest Lecturer. Exposure Assessment, 2007

University of Pittsburgh, PA. Guest Lecturer. Dose-response Assessment, 2007

University of Pittsburgh, PA. Guest lecturer. Exposure Assessment for Baseline Risk Assessment for Superfund Sites, 2005

University of Pittsburgh, PA. Guest Lecturer. Risk Assessment. 2004-2005

University of Pittsburgh, PA. Guest Lecturer. Risk Communication. 2005

University of Pittsburgh, PA. Guest Lecturer. Chemical Fate and Transport in the Environment, 2004-2005

Duquesne University, PA. Co-instructor. Environmental Management Systems, 1998

Jefferson Community College, OH. Guest Lecturer. ISO 14000 Implementation. 1998-1999

Publication

Maxine Wright-Walters and Conrad Volz. Exposure of aquatic receptors to Bisphenol A: Evidence that current risk models may not be sufficiently protective. Ohio River Basin Conference, Pittsburgh,2008.

Maxine Wright-Walters and Conrad Volz. Pharmaceutical Estrogens and Xeno Estrogens in Municipal Wastewater Treatment Plants: Implications for Wildlife and Humans. Third National Conference on Environmental Science and Technology. North Carolina A&T State University on September, 2007.pp.80. Abstracts Issue.

Maxine Wright-Walters and Conrad Volz. Pharmaceutical Estrogens and Xeno Estrogens in Municipal Wastewater Treatment Plants: Implications for Wildlife and Humans. "Proceedings of the 2007 National Conference on Environmental Science and Technology", p 103-113. Springer 2009.

Volz, CD., Dabney, B.,Cohen, P., Cude, C., Dooly, I., Kyprianou, R., Malecki, K., Richter, W., Schulman, A., Shaw, S., Vanderslice, J., **Walters, M.**, and Vyas, V., September 2007. Handling Left Censored Water Contaminant Data for Descriptive Statistics and (CDC), Environmental Public Health Tracking Network (EPHT) from the Water Working Group, Non-Detect Subgroup.

R.S. Carruth; **M. Wright-Walters**; N. B. Sussman; B.D. Goldstein. The Use of Relative Risk Greater Than 2.0 in the American Court System. August 2004. International Society of Environmental Epidemiology (ISEE) Conference Proceedings, New York, NY.

Maxine M. Wright-Walters, Nancy B. Sussman, Roger S. Day, Russellyn S. Carruth and Bernard D. Goldstein An Alternative Approach to Determining the Legal Criterion of "More likely than Not" in the Absence of Statistical Significance December 2004. Society of Risk Analysis (SRA) Conference Proceedings, Baltimore, MD.

Charles Tomljanovic, **Maxine Wright-Walters** & Jules Stephensky Anthropogenic Electromagnetic Fields (EMFs) and Cancer: A Perspective. "Risk: Health Safety & Environment "- Vol 8. Pp 287-289. Summer 1997.

Additional Skill

Knowledge and ability to operate the following instruments: GC, GC/MS, ICPMS, HPLC, AA, Potentiometer, Osmometer, Ion Analyzer, UV/IR Spectrophotometer, Mass Spectrophotometer and GPC (automated and manual). Knowledge in ISO 9000, ISO 14000 and regulatory programs such as CWA, CAA, TSCA, FIFRA RCRA, NEPA and CERCLA. Familiar with FDA, DOD, DOE and other federal programs. Proficient in the use of Statistical programs such as SAS and Stata.

Professional Affiliation

Member of the American Chemical Society
Member of the Air and Waste Management Association.
Member of the American Society for Quality
Society of Risk Analysis

Appendix B –
Health & Safety Plan

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Interim Remedial Measures
Health and Safety Plan

300, 304-308, 320 Andrews Street & 25 Evans Street
Rochester, New York 14604

NYSDEC Site #E828144

Prepared For: City of Rochester
Division of Environmental Quality
30 Church Street, Room 300B
Rochester, New York, 14614-1278

Prepared By: Lu Engineers
175 Sully's Trail, Suite 202
Pittsford, New York 14534

and

Day Environmental, Inc.
1563 Lyell Avenue
Rochester, New York 14606

Table of Contents

LU ENGINEERS
SITE SAFETY PLAN

A. GENERAL INFORMATION

Project Title:	Andrews Street ERP Site #828144 Monroe County, New York Interim Remedial Measures		
Project Manager:	Gregory L. Andrus, CHMM	Project Director:	Jeff Danzinger– Day Env.
Location:	300, 304-308, 320 Andrews Street and 25 Evans Street City of Rochester, Monroe County, New York		
Prepared by:	Janet M. Bissi, CHMM	Date Prepared:	July 2012
		Date Revised:	
Approved by:	Gregory L. Andrus, CHMM	Date Approved:	
Site Safety Officer Review:	Eric Detweiler	Date Reviewed:	

Introduction:
Lu Engineers (Lu) and Day Environmental, Inc. (DAY) prepared this Health and Safety Plan (HASP) to outline the policies and procedures to protect workers and the public from potential environmental hazards during the Interim Remedial Measures (IRMs) described in the IRM Work Plan. This project is being conducted under the New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Program (ERP) for the City of Rochester (the City). The Site is comprised of four parcels with a combined area of approximately 1.49 acres, addressed as 300, 304-308, 320 Andrews Street and 25 Evans Street, City of Rochester, County of Monroe, New York (Site). Figure 1 included in the work plan depicts the general location of the Site.

Scope/Objective of Work:
The following tasks summarize the objective of the IRMs:

- Task 1: Excavation and disposal of tetrachloroethylene (PCE) impacted soil
- Task 2: Excavation and removal of PCE-impacted sewer line
- Task 3: Removal of two (2) closed in place 5,000-gallon underground storage tanks (UST)s and petroleum impacted soil
- Task 4: Removal of PCB-impacted soils
- Task 5: Removal of impacted soil in a former trench drain area
- Task 6: Removal of underground piping network contaminated with PCE
- Task 7: Post excavation soil sampling
- Task 8: Backfill and Site restoration

The primary objective of the proposed Interim Remedial Measures (IRMs) will be to address contaminants that have the highest potential for: 1) impacts to human health and the environment; and 2) migration away from the Site.

A PCE-impacted source area is located on the 304-308 Andrews Street parcel. PCE impact was also identified in proximity to an adjoining buried sewer line in the Evans Street right-of-way that could be acting as a preferential migration pathway. The two filled in-place USTs and possibly some associated petroleum contamination are present on the 25 Evans Street parcel.

A former trench drain area located in the remaining concrete floor slab at 25 Evans Street was also found to include contaminated materials requiring remediation. A piping network was identified beneath the former structure at 320 Andrews Street that was found to include low-level PCE contamination which will require remedial effort to meet cleanup objectives. In addition, a small area of PCB contaminated soils was delineated near the PCE source area immediately east of 304-308 Andrews Street, which will also require remedial effort.

Proposed Date of Field Activities: Summer and Fall 2012

Background Information: [X] Complete [ ] Preliminary (limited analytical data)

Overall Chemical Hazard: [ ] Serious [X] Moderate
[ ] Low [ ] Unknown

Overall Physical Hazard: [ ] Serious [X] Moderate
[ ]Low [ ] Unknown

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):
[X] Liquid [X] Solid [X] Sludge [X] Gas/Vapor

Characteristic(s):
[ ] Flammable/Ignitable [X] Volatile [ ] Corrosive [ ] Acutely Toxic
[ ] Explosive (moderate) [ ] Reactive [X] Carcinogen [ ] Radioactive
Other: __________

Physical Hazards:
[X] Overhead [X] Confined Space [X] Below Grade [X] Trip/Fall
[X] Puncture [ ] Burn [X] Cut [X] Splash
[X] Noise [X] Other: Heat Stress

Site History/Description and Unusual Features:
The Site is located in a commercial-use urban area in the City of Rochester, Monroe County, New York. The Site is bounded to the north by the Inner Loop highway, to the east by Franklin Square followed by a City-owned park, to the south by Andrews Street with commercial properties beyond, and to the west by Bristol Street with commercial properties beyond. The Site consists of four parcels owned by the City of Rochester that total approximately 1.5 acres and has been used for various commercial and industrial uses since the early 1920's including plumbing supply, electrical supply, bakery, printer, commercial bus depot and bus garage, gas station, chemical sales/distribution, dry cleaning equipment distributor, fuel oil contractor, and warehousing.

Known or suspected contaminants include petroleum, chlorinated solvents, and other volatile organic compounds (VOCs) which are impacting the soil, soil gas, and groundwater, as well as semi-volatile organic compounds (SVOCs), metals and PCBs which are impacting the soil and/or groundwater.

Demolition of the above-grade on-site structures was completed in the Spring of 2011. Prior to demolition, the Site was improved with four buildings with associated paved parking lots and city streets. A narrow city street known as Evans Street separates the 320 Andrews Street parcel from the other three parcels that are contiguous with each other. Evans Street is closed to vehicle traffic, but it does contain underground utilities (i.e., sewer). Bristol Street, Franklin Square, Andrews Street, and the Inner Loop also contain underground utilities. The former buildings had a total floor area of approximately 38,349 square feet and consisted of single and two-story brick or concrete block buildings with partial basements and/or slab-on-grade construction, constructed between 1925 and 1965.

A more complete site history and summary of RI findings are provided in the IRM Work Plan.

Locations of Chemicals/Wastes: underground piping, sewer line, former trench drain area, soil, and groundwater

Estimated Volume of Chemicals/Wastes: Approximately 1,400 tons of PCE-contaminated soil for disposal; 40 tons of petroleum contaminated soil; and 125 tons SVOC and metal-contaminated soil.

Site Currently in Operation: [ ] Yes [X] No [ ] Not Applicable

C. HAZARD EVALUATION

HAZARD EVALUATION:

TASK	HAZARD(S)	HAZARD PREVENTION
Tasks 1-8	General physical hazards associated with soil and tank removal operations (i.e., excavator and dumptrucks) and demolition equipment	Hard hats, eye protection, and composite-toed or steel-toed boots required at all times. Keep safe distance from machines and all moving parts. Only operator and helper are to be in "work zone". Do not enter excavations to obtain soil samples.
	Contact with or inhalation of contaminants, potentially in high concentration in subsurface media	Direct reading instruments and/or olfactory indications will be used to monitor airborne contaminants. Established Lu Engineers' action levels will limit exposure to safe levels. Respiratory protection will be used as appropriate. Standard safety procedures such as restricting eating, drinking, and smoking to the support zone and utilizing proper personal decontamination procedures will minimize ingestion as a potential route of exposure.
	Utility Lines	Identify location(s) prior to work, maintain 25-foot minimum distance from overhead utilities.
	Slip/ tripping/ fall	Observe terrain and equipment while walking to minimize slips and falls. Steel-toed boots provide additional support and stability. Use adequate lighting. Wear hard hat. Inspect all lifting equipment prior to use.
	Back strain and muscle fatigue, ergonomic stress due to lifting	Use proper lifting techniques and limit load to prevent back strain.
	Noise	Engineering controls will be used to the extent possible. Hearing protection will be made available to all workers on site. Exposure to time-weighted average levels in excess of 85 dBA is not anticipated.
	Heat stress	Implement heat stress management techniques such as shifting work hours, increasing fluid intake, and monitoring employees**. See Appendix A.**
	Sunburn	Apply sunscreen, wear appropriate clothing.
	Weather Extremes	Establish site-specific contingencies for severe weather situations. Discontinue work in severe weather.
	Native wildlife presents the possibility of insect bites and associated diseases	Avoid wildlife when possible. Use insect repellant.

CHEMICAL HAZARD EVALUATION										
		Exposure Limits (TWA)							PID	
Task Number	Compound	OSHA PEL	NIOSH REL	IDLH	Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	Relative Response	Ioniz. Poten. (eV)
1,2,4,6,7	PCE*	100 ppm 200 ppm (5 min. ceiling) 300 ppm peak	---	150 ppm	Y	Inh, Abs, Ing, Con	Irritation to eyes, nose, upper respiratory tract, throat; skin, flush face, dizziness, giddiness, headache, intoxication, nausea, vomiting, abdominal pain, diarrhea, systemic effects	Colorless liquid, mild chloroform odor	140	9.32
1,2,4,6,7	TCE*	100 ppm 200 ppm (5 min. ceiling) 300 ppm peak	25 ppm	1000 ppm	Y	Inh, Abs, Ing, Con	Irritation to eyes, skin, mucous membranes and GI, headache, vertigo, fatigue, giddiness, tremors, vomiting, nausea, may burn skin, visual disturbance	Colorless liquid, sometimes dyed blue, chloroform odor	150	9.45
1,2,4,6,7	Cis-1,2-Dichloroethene	200 ppm	200 ppm	1000 ppm	Y	Inh, Ing, Con, Abs	Irritant to skin, eyes, respiratory tract, mucous membranes, liver damage, nausea, drowsiness	Colorless liquid with a sharp, harsh odor	125	9.66
3,5,7	Xylene(s)	100 ppm	100 ppm	900 ppm	Y	Inh, Ing, Abs, Con	Irritation to eyes, nose, throat, skin; nausea, vomiting, headache, ringing in ears, severe breathing difficulties (that may be delayed in onset), substernal pain, coughing hoarseness, dizziness, excited, burning in mouth, stomach, dermatitis (removes oils from skin), corneal burns	Colorless liquid, aromatic odor (solid below 56 F	230	8.44
3,5,7	Benzene*	1 ppm 5 ppm STEL	0.1 ppm 1 ppm STEL	500 ppm	Y	Inh, Abs, Ing, Con	Irritation to eyes, skin, nose, respiratory system; headache, nausea, dizziness, drowsiness, unconsciousness, harmful, fatal if aspirated into lungs	Colorless to light yellow liquid, sweet aromatic odor	200	9.25

CHEMICAL HAZARD EVALUATION										
Task Number	Compound	Exposure Limits (TWA)			Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	PID	
		OSHA PEL	NIOSH REL	IDLH					Relative Response	Ioniz. Poten. (eV)
3,5,7	PAHs (as coal tar pitch)	0.2 mg/m^3	0.1 mg/m^3	80 mg/m^3	Y	Inh,Ing, Con, Abs	Irritation to eyes, skin, digestive tract, respiratory tract (prevent contact to skin and eyes)	Yellow to green	---	---
3,5,7	Arsenic*	0.010 mg/m^3	0.002 mg/m^3	5 mg/m^3	Y	Inh, Ing, Abs, Con	Coughing, irritation to eyes, nose, throat, respiratory tract, inflammation of mucous membranes, dyspnea (labored breathing), cyanosis, and rales (rattle breathing), vomiting	Odorless/silver gray or tin white brittle (metal, inorganic), also can be in solution (clear & odorless)	---	---
3,5,7	Lead	0.05 mg/m^3	0.05 mg/m^3	100 mg/m^3	Y	Inh, Ing, Con	Poison, abdominal pain, spasms, nausea, vomiting, headache, irritation to eyes; skin, weakness, metallic taste, anorexia/loss of appetite, insomnia, facial pallor, colic, anemia, tremor	Odorless	---	---
3,5,7	Mercury	0.1 ^{sk} mg/m^3 ceiling	0.05 mg/m^3 ceiling	10 mg/m^3	Y	Inh, Abs, Ing, Con	Severe respiratory tract damage, sore throat, coughing, pain, tightness in chest, breathing difficulties, headache, muscle weakness, anorexia, GI disturbances, bronchitis, burning in mouth, abdominal pain, vomiting	No odor. Silver-white, heavy, liquid metal	---	---

KEY:

PEL = Permissible Exposure Limit
REL = Recommended Exposure Limit
--- = Information not available
TLV = Threshold Limit Value(ACGIH)

Inh = Inhalation
Ing = Ingestion
mg/m^3 = Milligrams per cubic meter
* = Chemical is a known or suspected carcinogen

Abs = Skin Absorption
Con = Skin and/or eye Contact
ppm = Parts per million
STEL – Short-term Exposure Limit

D. SITE SAFETY WORK PLAN

Site Control: Site perimeter is fenced and gated. The Team will coordinate with the City to obtain keys to locks on the gates associated with the perimeter fencing.

Perimeter Identified?	**[Y]**	**Site Secured?**	**[Y]**
Work Areas Designated?	**[Y]**	**Zone(s) of contamination identified?**	**[Y]**

Anticipated Level of Protection (cross-reference task numbers in Section C):

A	B	C	D
		Available	X

Site work will be performed at Level D (composite-toed or steel-toed boots, work clothes, eye protection, gloves and hard hats) unless monitoring indicates otherwise. Gloves will be worn if contact with Site soil, sediment or water is anticipated, due to concerns of contamination.

If conditions are encountered that require Level A or Level B personal protective equipment (PPE), the work will immediately be stopped. The appropriate government agencies (i.e., City, NYSDEC, NYSDOH, MCDPH, etc.) will be notified and the proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.). If conditions are encountered (as indicated by PID readings) that require Level C PPE, the work will be temporarily suspended and the work site will be evaluated to limit exposure prior to implementing Level C PPE.

Respiratory Protection

Any respirator used will meet the requirements of the OSHA 29 CFR 1910.134. Both the respirator and cartridges specified shall be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910). Air purifying respirators shall not be worn if contaminant levels exceed designated use concentrations. The workers will wear respirators with approval for: organic vapors <1,000 ppm; and dusts, fumes and mists with a TWA < 0.05 milligrams per cubic meter (mg/m^3).

No personnel who have facial hair, which interferes with respirator sealing surface, will be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

Only workers who have been certified by a physician as being physically capable of respirator usage shall be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas that require respiratory protection.

Air Monitoring*:

Contaminant	Monitoring Device	Frequency
Organic Vapors	MiniRAE 3000 PID	Continuous
CO/LEL/H_2S	EntryRAE Multi-Gas Monitor	Continuous
Particulate	DataRAM	Continuous

*Continuous perimeter air monitoring for VOCs and particulates will performed during intrusive activities and is described in the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP), included as Appendix C of the IRM Work Plan.

Lu will also conduct continuous air monitoring of worker breathing zone air during excavation. If action levels are exceeded during excavation, appropriate precautions will be taken, as described below.

VOCs

VOCs in worker's breathing zone air will be monitored with a PID during activities that have the potential to disturb contaminated material to aid in determining if respiratory protection and/or vapor suppression is necessary. This ensures that respiratory protection is adequate to protect personnel from the chemicals they may be exposed to. Readings will be recorded on log sheets and/or the Site logbook.

Action Levels:

PID readings of **25 ppm to 100 ppm** above background at breathing zone, sustained for greater than 5 minutes,
Action: Stop work and implement vapor suppression techniques, such as application of Biosolve. If vapors cannot be brought below 25 ppm, upgrade PPE to Level C.

PID readings of **>100 ppm** above background at breathing zone, sustained for greater than 5 minutes,
Action: Stop work, evaluate the use of engineering controls, upgrade PPE to Level B or Level A.

Depending on circumstances observed during excavation and related IRM activities, alternative action levels and corresponding PPE levels to those described above may be considered and implemented at the discretion of the field team leader and City project manager.

O_2

O_2 readings must remain between 19.5% and 22.0%. Explosivity must be below 10% lower explosive level (LEL). The area must be evacuated and ignition sources eliminated if levels are not within their standard. These atmosphere factors will be measured at a position that would give the earliest indication of a hazardous condition forming not at the breathing zone.

Appropriate actions, initially evacuation of the immediate work area, will be taken if established action levels area exceeded.

<u>Particulates</u>
During activities where contaminated materials (i.e., soil, fill, etc.) may be disturbed, air monitoring will include real-time monitoring for particulates using a real-time aerosol monitor (RTAM) particulate meter at the perimeter of the work zone in accordance with the *Final DER-10 Technical Guidance for Site Investigation and Remediation* dated May 2010. DER-10 uses an action level of 100 g/m^3 (0.10 mg/m^3) over background conditions for an integrated period not to exceed 15 minutes. If the action level is exceeded, or if visible dust is observed leaving the Site, then work shall be discontinued until corrective actions are implemented. Corrective actions may include dust suppression, change in the way work is performed, and/or upgrade of personal protective equipment. If dust suppression is deemed necessary, clean water will be applied to excavation area.

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the work zone at temporary particulate monitoring stations. The particulate monitoring should be performed using RTAM 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 work activities.

Action Levels:
If particulate levels exceed a level of 2.5 times background (upwind levels subtracted from downwind concentration) or a level of 150 mcg/m^3, dust control measures will be initiated and the dust generating activity suspended until levels decrease below the action level. Perimeter monitoring will be conducted if the action level is obtained at the work area. Air monitoring results as well as wind direction and speed (estimates) will be documented in the site-specific log book and/or log sheets.

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.
Specified in Work Plan.

Personnel Decon Protocol: Soap, water, and paper towels or baby wipes will be available for all personnel and will be used before eating, drinking or leaving the Site. Personnel will shower upon return to home or hotel. Disposable PPE will be rendered unusable and disposed of as stated in work plan.

Special Site Equipment, Facilities or Procedures (Sanitary Facilities and Lighting Must Meet 29CFR 1910.120):
A restroom and bottled water are available for use on Site.

Site Entry Procedures and Special Considerations: Entry to the Site should be limited through the Andrews Street gate. The gate should be closed and locked when personnel are not on-site in order to restrict unauthorized individuals. The Buddy System should be employed at all times on-site and entering and exiting the Site, along with the work zone areas.

Personnel admitted into the work zone shall be properly trained in health and safety techniques and equipment usage. No personnel shall be admitted into the work zone without the property safety equipment.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements: All work will be completed during daylights hours. Heavy equipment will not be used during electrical storms.

General Spill Control, if Applicable: N/A

Investigation Derived Material (i.e., Expendables, Decon Waste, Cuttings) Disposal: Specified in work plan.

Sample Handling Procedures Including Protective Wear: Sample handling will be performed while wearing chemically-resistant gloves. To minimize hazards to lab personnel, sample volumes will be no larger than necessary, and the outside of sample containers will be wiped clean prior to shipment.

Accident and Injury Reporting: Any work-related incident, accident, injury, illness, exposure, or property loss must be immediately reported to the Lu Engineers project manager, Day Environmental Project Manager, and the City of Rochester Project Manager. This includes:

- Accident, injury, illness, or exposure of an employee;
- Injury of a subcontractor;
- Damage, loss, or theft of property, and/or
- Any motor vehicle accident regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while employee is acting in the course of employment.

E. TRAINING REQUIREMENTS

Personnel conducting field activities on-site are required to have completed training sessions in accordance with Occupational Safety and Health Administration (OSHA) for Parts 1926 and 1910 (Title 29 Code of Federal Regulations [CFR] Part 1926.65 and Part 1910.120 - Hazardous Waste Operations and Emergency Response- 'HazWOPER'). This training shall consist of a minimum of 40 hours of instruction off-site and three days of actual field experience under the direct supervision of a trained, experienced supervisor. Each employer will maintain documentation stating that its on-site personnel have complied with this regulation.

In addition, all personnel will have reviewed this HASP and received a site-specific health and safety briefing prior to participating in field work.

Visitors entering the work area must review the HASP and be equipped with the proper PPE. Site personnel and visitors shall sign the last page of the HASP as an acknowledgement that they have read and understand the Site health and safety requirements.

Medical Surveillance Requirements: Lu Engineers field staff who engage in on-site activities for 30 days or more per year participate in a medical monitoring program and have completed applicable training per 29CFR 1910.120. Lu's Respiratory Protection Program meets requirements of 29CFR 1910.134.

Key Personnel and Management

The Project Manager (PM) and Site Safety Officer (SSO) are responsible for formulating health and safety requirements, and implementing the HASP.

Project Manager

The PM has the overall responsibility for the project and will coordinate with the SSO to ensure that the goals of the project are attained in a manner consistent with the HASP requirements.

Site Safety Officer

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field while activities are in progress. The SSO's operational responsibilities will be monitoring, including personal and environmental monitoring, ensuring personal protective equipment (PPE) maintenance, and identification of protection levels. The air monitoring data obtained by the SSO will be available for review by the City, regulatory agencies, and other on-site personnel.

Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SSO.

Key Safety Personnel

The following individuals are anticipated to share responsibility for health and safety of Lu representatives at the Site.

Team Member*	Responsibility
Greg Andrus	Project Manager
Eric Detweiler	Field Team Leader
Laura Neubauer	Quality Assurance Officer
Eric Detweiler	Site Safety Officer/Geologist
Jon Becker	Team Member-Field Technician
Janet Bissi	Team Member- Field Technician

* Entries into the work zone require "Buddy System" use. Lu Engineers' field staff participated in a medical monitoring program and have completed applicable training per 29CFR 1910.120. Lu's Respiratory Protection Program meets requirements of 29CFR 1910.134.

The following individuals are anticipated to share responsibility for health and safety of DAY representatives at the Site.

Jeffrey Danzinger	Project Manager
William Battiste, Charles Hampton, or Nathan Simon	Site Safety Officer

* Entries into the work zone require "Buddy System" use. Day's field staff participated in a medical monitoring program and have completed applicable training per 29CFR 1910.120. Day's Respiratory Protection Program meets requirements of 29CFR 1910.134.

F. EMERGENCY INFORMATION

The following telephone numbers are listed in case there is an emergency at the Site:

Fire/Police Department:	911
Poison Control Center:	(800) 222-1222
NYSDEC	
Charlotte Theobald	(585) 226-5354
Spills Hotline	(585) 226-2466
NYSDOH	
Melissa Menetti	(518) 402-7860
MCDPH	
Jeffrey Kosmala, P.E.	(585) 753-5470
City of Rochester	
Joseph Biondolillo	(585) 428-6649; (585) 314-1617 (cell)
Dennis Peck	(585) 428-6884; (585) 469-6372 (cell)
Day Environmental Inc.	
Jeffrey Danzinger	(585) 454-0210 x114
Nate Simon	(585) 454-0210 x109
Lu Engineers	
Gregory Andrus	(585) 385-7417 x215
Lu Engineers, Safety Director	(585) 385-7417 (office)
Nearest Hospital:	Highland Hospital 1000 South Avenue, Rochester, NY 14620 (585) 473-2200 (Main) (585) 341-6880 (Emergency Department)

SITE RESOURCES

Site Emergency Evaluation Alarm Method:	Sound vehicle horn.
Water Supply Source:	Gallons of water will be available in vehicles
Telephone Location, Number:	None available
Cellular Phone, if Available:	Eric Detweiler (585)278-8202

EMERGENCY ROUTES

Note: Field team must know route(s) prior to start of work.

Directions from the Site to Highland Hospital (map on following page):

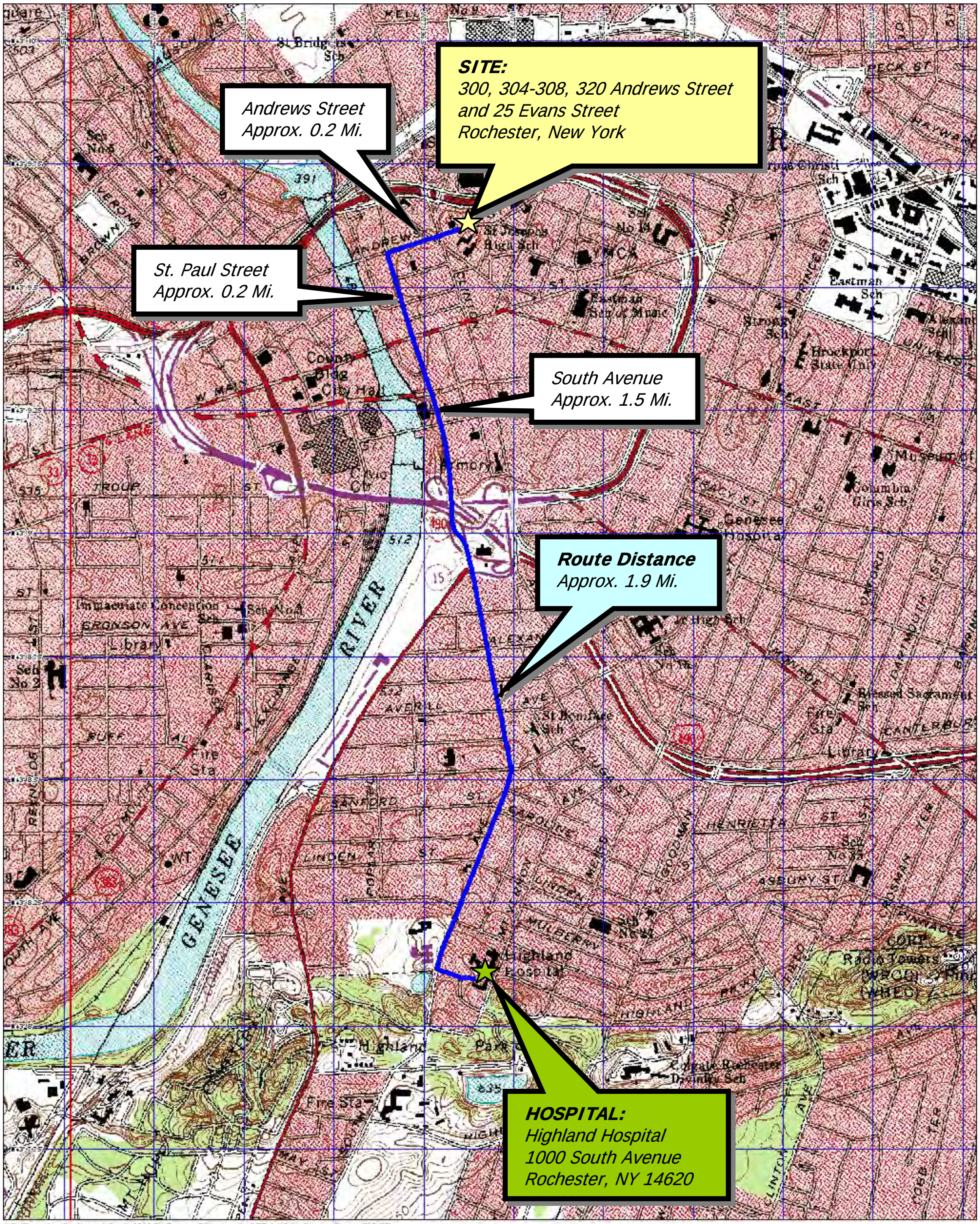
Turn west on Andrews Street toward Bristol Street. Proceed approximately 0.2 miles on Andrews Street, then turn left onto St Paul Street. Proceed approximately 0.2 miles on St. Paul Street, which then becomes South Avenue. Proceed approximately 1.5 miles on South Avenue, then turn left into Highland Hospital. Follow signs to Emergency Medical Services (Refer to Figure 1).

On-site Assembly Area: At Site entry point.

Off-site Assembly Area: South side of Andrews and Evans Street intersection.

Emergency egress routes to get off-Site: Follow Andrews Street, east or west.

Personnel shall exit the Site and shall congregate in an area designated by the SSO. The SSO shall ensure that all personnel are accounted for. If someone is missing, the SSO will alert emergency personnel. The appropriate government agencies will be notified as soon as possible regarding the evacuation, and any necessary measures that may be required to mitigate the reason for the evacuation.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 550 ft Scale: 1 : 19,200 Detail: 14-0 Datum: WGS84

Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester East (NY) 1995.

DATE **3-21-2011** DRAWN BY **RJM** SCALE **As Noted**	**day** **DAY ENVIRONMENTAL, INC.** ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **300, 304-308, 320 ANDREWS STREET** **AND 25 EVANS STREET** **ROCHESTER, NEW YORK** **NYSDEC SITE #: E828144** HEALTH AND SAFETY PLAN DRAWING TITLE **ROUTE FOR EMERGENCY SERVICES**	PROJECT NO. **4355S-10** **FIGURE 1**

G. Additional Information

Contamination Emergency
It is unlikely that a contamination emergency will occur; however, if such an emergency does occur, the specific work area shall be shut down and immediately secured. If an emergency rescue is needed, notify Police, Fire Department and EMS units immediately. Advise them of the situation and request an expedient response. The appropriate government agencies shall be notified immediately. The area in which the contamination occurred shall not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation as outlined in Section D of this HASP.

Spill or Air Release
In the event of a spill or air release of hazardous materials on-site, the specific area of the spill or release shall be shut down and immediately secured. The area in which the spill or release occurred shall not be entered until the cause can be determined and site safety can be evaluated. Non-essential site personnel shall be evacuated to a safe and secure area. The appropriate government agencies shall be notified as soon as possible. The spilled or released material shall be immediately identified and appropriate containment measures shall be implemented, if possible. Real-time air monitoring shall be implemented as outlined in Section 8.0 of this HASP. If the materials are unknown, Level B protection is mandatory. If warranted, samples of the materials shall be acquired to facilitate identification.

Locating Containerized Waste and/or Underground Storage Tanks
In the event that unanticipated containerized waste (e.g., drums) and/or USTs are located during remedial activities, the work will be stopped in the specific area until site safety can be evaluated and addressed. Non-essential Site personnel shall not work in the immediate area until conditions including possible exposure hazards are addressed. The appropriate government agencies shall be notified as soon as possible. The SSO shall monitor the area as outlined in Section D of this HASP.

Prior to any handling, unanticipated containers will be visually assessed by the SSO to gain as much information as possible about their contents. As a precautionary measure, personnel shall assume that unlabelled containers and/or tanks contain hazardous materials until their contents are characterized. To the extent possible based upon the nature of the containers encountered, actions may be taken to stabilize the area and prevent migration (e.g., placement of berms, etc.). Subsequent to initial visual assessment and any required stabilization, properly trained personnel will sample, test, remove, and dispose of any containers and/or tanks, and their contents. After visual assessment and air monitoring, if the material remains unknown, Level B protection is mandatory.

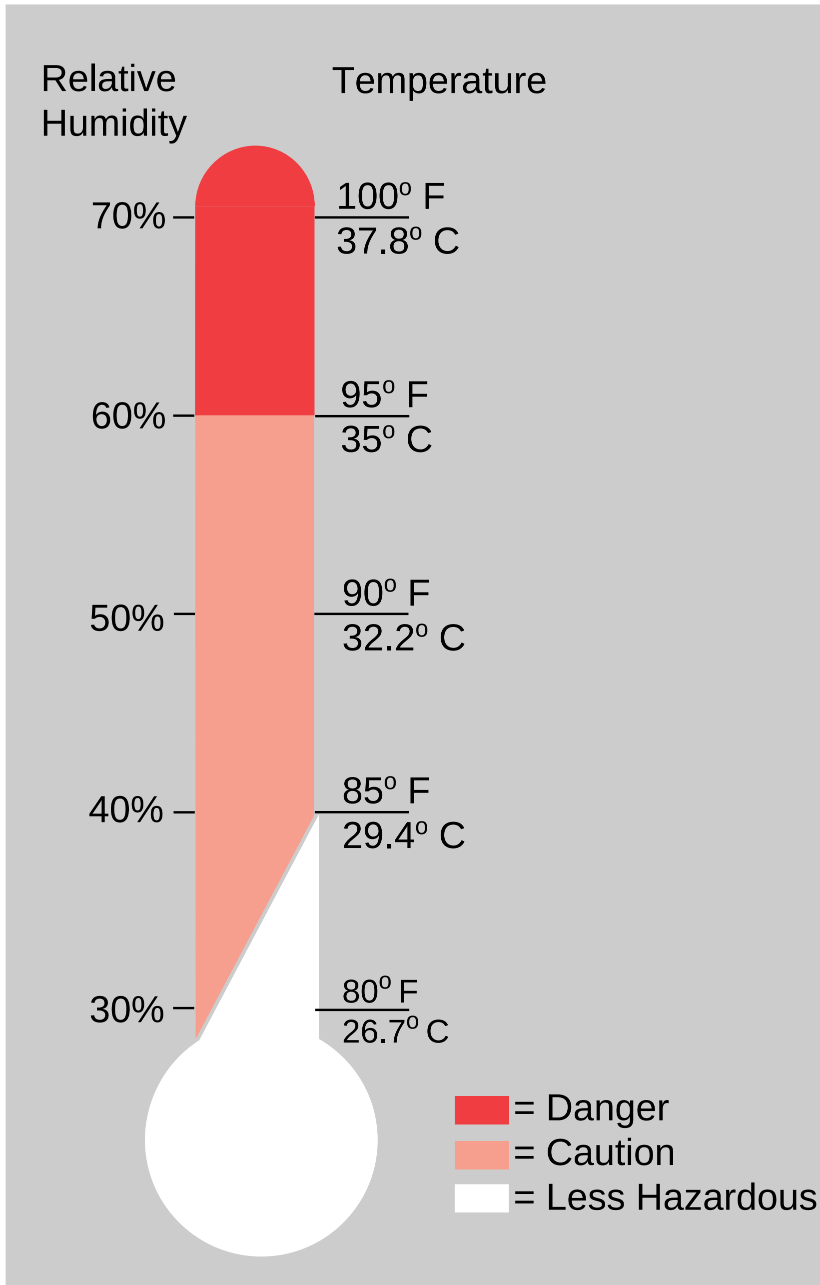
APPENDIX B-1

HEAT STRESS INFORMATION

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and possible **death**.



U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3154
1998

HEAT EXHAUSTION

What Happens to the Body:

HEADACHES, DIZZINESS/LIGHT HEADEDNESS, WEAKNESS, MOOD CHANGES (irritable, or confused/can't think straight), FEELING SICK TO YOUR STOMACH, VOMITING/THROWING UP, DECREASED and DARK COLORED URINE, FAINTING/PASSING OUT, and PALE CLAMMY SKIN.

What Should Be Done:

- Move the person to a cool shaded area to rest. Don't leave the person alone. If the person is dizzy or light headed, lay them on their back and raise their legs about 6-8 inches. If the person is sick to their stomach lay them on their side.
- Loosen and remove any heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (Ambulance or Call 911).

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE—A MEDICAL EMERGENCY

What Happens to the Body:

DRY PALE SKIN (no sweating), HOT RED SKIN (looks like a sunburn), MOOD CHANGES (irritable, confused/not making any sense), SEIZURES/FITS, and COLLAPSE/PASSED OUT (will not respond).

What Should Be Done:

- Call for emergency help (Ambulance or Call 911).
- Move the person to a cool shaded area. Don't leave the person alone. Lay them on their back and if the person is having seizures/fits remove any objects close to them so they won't strike against them. If the person is sick to their stomach lay them on their side.
- Remove any heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are alert enough to drink anything and not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs under the arm pits and groin area.

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train the workforce about heat-induced illnesses.
- Perform the heaviest work in the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks).
- Use the buddy system (work in pairs).
- Drink plenty of cool water (one small cup every 15-20 minutes)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool shaded areas (allow your body to cool down).
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk for heat illnesses).

Workers Are at Increased Risk When

- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you when working in hot environments).
- They have had a heat-induced illness in the past.
- They wear personal protective equipment (like respirators or suits).

Appendix C –
Community Air Monitoring Plan

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.

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

Continuous monitoring will be required for ground intrusive activities during implementation of the IRM. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil samples and waste characterization samples. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include sampling staged wastes near a busy urban street, near 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/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the Site, 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/m3 above the upwind level and provided that no visible dust is migrating off-site.

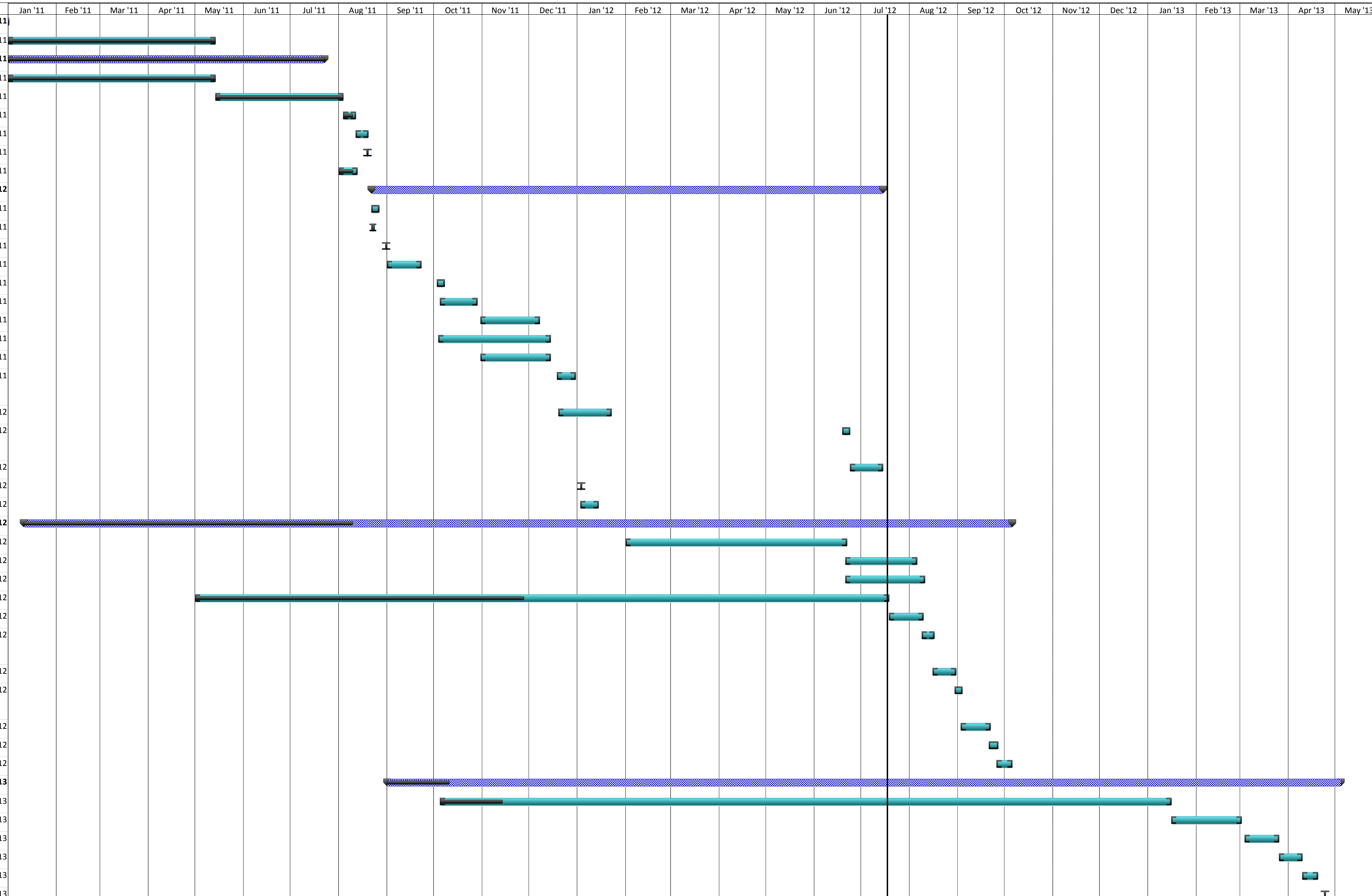
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 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.

Appendix D –
Project Schedule

Remedial Investigation/Remedial Alternatives Analysis (RI/RAA)
300, 304-308, 320 Andrews Street and 25 Evans Street
City of Rochester, NY

ID	Task Name	Start	Finish
1	**Authorization to Proceed**	**Sat 1/1/11**	**Sat 1/1/11**
2	Site and Project Preparation	Sat 1/1/11	Fri 5/13/11
3	**Prepare RI Work Plan**	**Sat 1/1/11**	**Fri 7/22/11**
4	Prepare Draft RI Work Plan	Sat 1/1/11	Fri 5/13/11
5	Agency Reviews	Sat 5/14/11	Wed 8/3/11
6	Revise RI Work Plan	Thu 8/4/11	Thu 8/11/11
7	Agency Reviews	Fri 8/12/11	Fri 8/19/11
8	Finalize RI Work Plans	Fri 8/19/11	Fri 8/19/11
9	Citizen Participation Fact Sheet	Mon 8/1/11	Fri 8/12/11
10	**Site Investigation**	**Mon 8/22/11**	**Sat 7/14/12**
11	Utility Survey	Mon 8/22/11	Fri 8/26/11
12	Geophysical Survey	Mon 8/22/11	Tue 8/23/11
13	Test Pits	Wed 8/31/11	Wed 8/31/11
14	Soil Analysis	Thu 9/1/11	Thu 9/22/11
15	MIP/Soil Borings	Mon 10/3/11	Fri 10/7/11
16	Soil Analysis	Wed 10/5/11	Fri 10/28/11
17	Soil Borings/Monitoring Wells	Mon 10/31/...	Wed 12/7/11
18	Soil Analysis	Tue 10/4/11	Wed 12/14/11
19	Develop and Survey Wells	Mon 10/31/...	Wed 12/14/11
20	Groundwater Sampling 1st Round	Mon 12/19/11	Fri 12/30/11
21	Groundwater Analysis	Tue 12/20/11	Sun 1/22/12
22	Groundwater Sampling 2nd Round	Tue 6/19/12	Sat 6/23/12
23	Groundwater Analysis	Sun 6/24/12	Sat 7/14/12
24	Waste Characterization	Tue 1/3/12	Tue 1/3/12
25	Waste Analysis	Tue 1/3/12	Sat 1/14/12
26	**Interim Remedial Measures**	**Tue 1/11/11**	**Fri 10/5/12**
27	ACBA	Wed 2/1/12	Thu 6/21/12
28	Agency Review	Thu 6/21/12	Sun 8/5/12
29	Decision Memo	Thu 6/21/12	Fri 8/10/12
30	Draft IRM Work Plan and QAPP	Sun 5/1/11	Wed 7/18/12
31	Agency Review	Thu 7/19/12	Thu 8/9/12
32	Revise IRM Work Plan and QAPP	Thu 8/9/12	Thu 8/16/12
33	Agency Review	Thu 8/16/12	Thu 8/30/12
34	Finalize IRM Work Plan and QAPP	Thu 8/30/12	Mon 9/3/12
35	Contaminated Soil Removal	Mon 9/3/12	Fri 9/21/12
36	Restoration	Fri 9/21/12	Wed 9/26/12
37	Soil Analysis	Wed 9/26/12	Fri 10/5/12
38	**RI/RAA Report Preparation**	**Thu 9/1/11**	**Sat 5/4/13**
39	Prepare Draft RI/RA Report	Wed 10/5/11	Tue 1/15/13
40	Agency Reviews	Wed 1/16/13	Fri 3/1/13
41	Revise RI/RAA Report	Mon 3/4/13	Mon 3/25/13
42	Agency Review	Tue 3/26/13	Tue 4/9/13
43	Finalize RI/RAA Report	Wed 4/10/13	Fri 4/19/13
44	Citizen Participation Meeting	Wed 4/24/13	Wed 4/24/13



Project: edited schedule 071812
Date: Wed 7/18/12

Task	Rolled Up Task	Split	Inactive Task	Duration-only	Finish-only
Critical Task	Rolled Up Critical Task	External Tasks	Inactive Milestone	Manual Summary Rollup	Progress
Milestone	Rolled Up Milestone	Project Summary	Inactive Summary	Manual Summary	Deadline
Summary	Rolled Up Progress	External Milestone	Manual Task	Start-only	