GZA GeoEnvironmental
of New York

Engineers and
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August 16, 2007
File No. 21.0056017.00

Mr. Gregory P. Sutton, P.E.
NYSDEC - Region 9
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Buffalo, New York 14203

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Buffalo
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Re: Remedial Investigation and Alternatives Analysis (RI/AAR)
Interim Remedial Measures (IRM) Work Plan
Brownfield Cleanup Program
Peters Dry Cleaning Site (#C932128)
316 Willow Street, Lockport, New York

Dear Mr. Sutton:

GZA GeoEnvironmental of New York (GZA), as requested by Peters Dry Cleaning and on its behalf, is providing the attached revised Draft Work Plans as per your letter of August 9, 2007 for New York State Department of Environmental Conservation review and approval. These attached Work Plans pertain to the Remedial Investigation (RI), Alternatives Analysis (AAR) and Interim Remedial Measures (IRM) at the above referenced Site. The following Draft Work Plans are attached.

Appendix A	Field Activities Plan (FAP)
Appendix B	Site-Specific Quality Assurance Plan (QuAP)
Appendix C	Site-Specific Health and Safety Plan (HASP)
Appendix D	Citizen Participation Plan (CPP)
Appendix E	Alternatives Analysis Report (AAR)

The Field Activities Plan includes an introduction; a detailed site description and history; our anticipated scope of work, rationale; and a reporting/schedule section. Please do not hesitate to contact the under signed if you have questions.

Sincerely,

GZA GEOENVIRONMENTAL OF NEW YORK

Christopher Z. Boron
Project Manager

Ernest R. Hanna, P.E.
Principal

Randolph W. Rakoczynski, P.E.
Senior Project Manager

Peters Dry Cleaning

Site Investigation, Interim Remedial Measures (IRM)
And Alternatives Analysis Report

SCHEDULE

Site Investigation and IRM Work Plan Public Notice	August 20, 2007
Stage 1 – Bedrock GW Monitoring Wells & Overburden GW Sampling	October 8-17, 2007
Stage 1 – Interim Progress Report	October 31, 2007
Stage 2 – Soil Probe & Soil Vapor Analysis and IRM Implementation	November 5-21, 2007
Stage 2 – Interim Progress Report	December 17, 2007
Overburden GW Sampling (IRM)	January 15-30, 2008
IRM Progress Report	February 15, 2008
ORC Injections	Upon Completion of PCE/TCE Degradation
Alternatives Analysis Report (AAR)	Following Final IRM Data Collection and Analysis

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APPENDIX A

FIELD ACTIVITIES PLAN

PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

1.0 INTRODUCTION

This Field Activity Plan (FAP) has been prepared by GZA GeoEnvironmental of New York (GZA) in accordance with the Draft Brownfield Cleanup Program Guide (May 2004) and the Draft DER-10 Technical Guidance for Site Investigation and Remediation (December 2002). Peters Dry Cleaning located at 316 Willow Street, Lockport, New York (See Figure 1), submitted a Brownfield Cleanup Program (BCP) Application, dated November 22, 2006 to the New York State Department of Environmental Conservation (NYSDEC). The Peters Dry Cleaning BCP Application was approved by NYSDEC on February 21, 2007.

1.1 INTRODUCTION

Peters Dry Cleaning (Site), located at 316 Willow Street, in the City of Lockport, New York has been operated as a dry cleaning facility since the late 1930s/early 1940s. Prior to its use as a dry cleaner, the facility was used as a clothing tailor shop. A Phase II Environmental Site Assessment (ESA)[1] performed by GZA identified petroleum and chlorinated solvent contamination in the soil and groundwater at the Site. Two storage tanks were also identified during the ESA. Based on the findings of the Phase II ESA, NYSDEC assigned Spill No. 0475193 to the Site.

The two storage tanks were identified at the Site include a 1,000-gallon aboveground storage tank (AST) and an abandoned 6,000-gallon underground storage tank (UST). Both tanks were used to store heating oil prior to the facility being connected with natural gas. In April 2005, GZA removed the AST and UST in accordance with a NYSDEC approved February 2005 Work Plan. These activities are documented in GZA's June 2005 Closure Report[2].

During the abandoned UST removal, approximately 2 cubic yards of petroleum contaminated material (sand) were removed from the Site that had previously been placed into the UST unit as part of its interim or temporary closure. Some minimal petroleum contamination was also identified around the area of the UST. There was also approximately 30 tons of chlorinated solvent contaminated soil removed as part of an additional excavation activity. The 30-tons of soil contaminated with chlorinated solvent were disposed of as hazardous waste at Chemical Waste Management in Model City, New York.

A blend of petroleum hydrocarbons known as Stoddard solvent was used for dry cleaning at the Site prior to tetrachloroethene (PCE) being used. Therefore, the petroleum contamination present at the Site may be a result of both the fuel oil previously stored and the historical use of Stoddard solvent. The chlorinated solvent contamination is likely due

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1 Phase II Environmental Site Assessment, Peter's Dry Cleaners, 316 Willow Street, Lockport, New York; completed for Earle, Delange, May, Seaman, Jones, Hogan & Brooks, LLP; by GZA GeoEnvironmental of New York; August 2004.

2 "Aboveground and Underground Storage Tank Closure Report, Peters Dry Cleaners, 316 Willow Street, Lockport, New York" prepared by GZA GeoEnvironmental of New York, dated June 2005.

to the use of PCE. Since the Site was acquired by Peters Dry Cleaning in the early 1970's, Peters Dry Cleaning did not operate either the fuel oil AST or UST. The use of PCE by Peter's Dry Cleaners, since the acquisition of the property, has involved the use of the "new generation" closed loop recycling dry cleaning equipment. PCE is no longer being used for dry cleaning at the Site.

Soil and groundwater samples were collected and analyzed during the ESA and tank closure work conducted by GZA. After review of the analytical data generated, it appears that reductive dehalogenation in the form of natural attenuation or in-situ bioremediation is occurring at the Site.

Reductive dehalogenation is a defined as the biologically-mediated replacement of chlorine (as chloride) on a chlorinated organic compound PCE with elemental hydrogen in the presence of a suitable electron donor causing a transformation of the chemical reactant to a less chlorinated product. An electron donor is defined as a compound capable of supplying electrons during oxidation-reduction reactions. Microorganisms obtain energy by transferring electrons from electron donors such as organic compounds or by the reduction of inorganic compounds to a terminal electron acceptor (TEA). Electron donors are chemically reduced materials such as fuel hydrocarbons or naturally occurring organic carbon, which become chemically oxidized during transformation

For example, reductive dehalogenation of chlorinated aliphatic hydrocarbons (CAHs) typically occurs sequentially from PCE to trichloroethylene (TCE), TCE to 1,2-dichloroethene (1,2-DCE), 1,2-DCE to vinyl chloride (VC), and VC to ethene and chloride, and ultimately ethene to carbon dioxide and water.

The reductive dehalogenation process can be shown to be occurring by comparing the concentrations of the "parent" or source compounds, PCE and TCE, to the concentration of "daughter" compounds or breakdown by-products such as; 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and VC. This process can be seen occurring at the Site by comparing the relatively high ratios of "daughter" breakdown by-products versus "parent" chlorinated compounds present thus indicating that the reductive dehalogenation degradation process is taking place.

1.2 PURPOSE

The purpose of this project is to define the extent of lateral and vertical migration of contamination at the Site (and possibly off-site) and to facilitate remediation of the soil and groundwater at the Site through the interim remedial measure (IRM) of in-situ bioremediation via enhanced reductive dehalogenation. Once the PCE and TCE have been degraded, aerobic in-situ bioremediation will be used to degrade the chlorinated solvent "daughter" breakdown products (TCE metabolites) and the petroleum hydrocarbon contamination.

1.3 SCOPE OF WORK AND RATIONALE

As part of our continuing site characterization, GZA is proposing to conduct further investigatory work and interim remedial measures through a series of six stages as summarized below.

- Stage-1: GZA will evaluate the potential concern over chlorinated solvent contamination in the bedrock groundwater at the Site. GZA proposes to install three bedrock groundwater monitoring wells: one upgradient or background bedrock monitoring well in the southern end of the property, one downgradient bedrock monitoring well in the northwestern corner of the property and a third bedrock monitoring well located immediately east of the major area of contamination (see Figure 2). Groundwater samples from each bedrock well location will be collected and analyzed for Volatile Organic Compounds (VOCs) via EPA Method 8260 Full List, Semi-Volatile Compounds (SVOCs) via EPA Method 8270 (full list), priority pollutant metals via EPA Method 6010/7470, pesticides via EPA Method 8081 and PCBs via EPA Method 8082 parameters. In addition, groundwater samples will be collected and analyzed for the compounds referenced above at three or four previously installed overburden wells for additional site characterization and to establish background water quality parameters.

- Stage-2: GZA will perform off-site soil and groundwater sampling of overburden in ten locations. Four locations will be on the Site (one point at the north side, one point at the east side and two points near the southwestern corner and western side of the Site). Four locations will be on the western adjacent residence (immediately west of the site), one between the sidewalk and the curb at the front of the property, one along the front of the driveway at the east side of the property and two on the rear of the property. Two locations will be across Willow Street in the right-of-way between the sidewalk and the curb (one across from the western adjacent residence and one across from the Site). GZA will also perform sub-slab soil vapor analysis at three locations (one in the western adjacent residence and two in the Peters Dry Cleaning building). GZA will also perform soil vapor analysis at three locations (one point across Willow Streeet from the Site, one point in the right-of-way immediately in front of the western adjacent residence and one point located on the northeast corner of the Site). See Exhibit 1 for a summary of the intended soil vapor monitoring procedure and sub-slab soil vapor monitoring procedure to be employed.

- Stage-3: Inject Electron Donor Compound (EDC) in overburden material through a series of direct push applications and gravity-fed overburden monitoring well applications to stimulate indigenous microbes responsible for the degradation of target chlorinated solvents. Bedrock injections (quantity of EDC) are subject to the analytical results.

- Stage-4: Monitor EDC degradation of target chlorinated solvents through a series of sampling events and analysis until acceptable concentrations are obtained for each respective compound in accordance with 6 NYCRR Part 375 standards, criteria and guidance values (SCGs).

- Stage-5: Upon EDC degradation completion, introduce a series of Oxygen Releasing Compounds (ORCs) and aerobic microorganisms through a series of direct push applications and overburden monitoring well applications to enhance indigenous microbes responsible for degrading target petroleum hydrocarbons and TCE metabolites. Bedrock injections (quantity of ORC) are subject to the analytical results.

- Stage-6: Monitor ORC degradation of target petroleum hydrocarbons and TCE metabolites through a series of sampling events until acceptable concentrations are obtained for each respective compound in accordance with 6 NYCRR Part 375 SCGs.

2.0 ENVIRONMENTAL CONDITIONS

2.1 SITE AND SURROUNDING AREA DESCRIPTION

Peters Dry Cleaning is located at 316 Willow Street in the City of Lockport (Site). The area surrounding the Site is mainly residential with residential dwellings adjacent to the Site to the east, west, south and across Willow Street to the north (Figure 3). Altro Park (playground and ball fields) is located approximately 200 feet east of the Site on the north side of Willow Street. Lockport Plaza, a retail plaza, is located approximately 500 southwest of the Site. The area surrounding the Site is highly developed. No industrial, urban or agricultural land is located within ½ mile of the Site.

2.2 GROUNDWATER VULNERABILITY

Groundwater flow in the overburden soils at the Site has been measured to be in a northwestern direction. Chlorinated aliphatic hydrocarbons (CAHs) (vinyl chloride, trans-1,2-dichloroethene, cis-1,2-dichloroethene, trichloroethene and tetrachloroethene) have been detected on-Site at downgradient sample locations above NYSDEC Class GA criteria (MW-1 and GP-4). These locations are approximately 10 feet from the western property line. The property to the west is a residential dwelling. A potential exists for groundwater contamination to be migrating from the Site, to the northwest following the groundwater flow direction.

The Site and surrounding area are supplied by public water provided by the City of Lockport. Water for public supply is drawn from the Niagara River. Wellhead protection or groundwater recharge areas are not located within the vicinity of the Site.

2.3 GEOGRAPHY

The City of Lockport has a total area of approximately 8.6 square miles of which 8.5 square miles is land and 0.1 square miles is water. Lockport is located in the center of Niagara County approximately 18 miles east of Niagara Falls and 30 miles northeast of Buffalo.

The Erie Canal passes through the center of Lockport, approximately 0.65 miles north of the Site, turning south toward Tonawanda Creek. Lockport is at the junction of several major trunk roads, including NY Route 78 (North Transit Road), New York State Route 31, and New York State Route 77.

The naturally existing topography in the vicinity of the Site is generally flat. The primary surface relief in the area is the Niagara Escarpment, located approximately one mile to the north. There is an approximate 200-foot difference in elevation from the ground surface elevation at the Site to the foot of the escarpment. This escarpment acts as a surface water and groundwater divide.

As of the 2000 census, there were 22,279 people, 9,459 households, and 5,609 families residing in the City of Lockport. The racial makeup of the city is reported to be 91.0% White, 5.8% Black or African American, 0.5% Native American, 0.5% Asian, , 0.5% from other races, and 1.7% from two or more races. Hispanic or Latino of any race was 2.0% of the population.

2.4 GEOLOGY

Soil conditions at the Site typically consist of 3 to 5 feet of fill material (fine grained silts and clays) overlaying native soils (granular sands and silts with lesser and varying amounts of gravel). Bedrock was encountered at depths ranging from approximately 10 to 15 feet bgs at the Site.

Regionally, the overburden consists of glacially derived soils comprised of lacustrine clays and silts which overly bedrock. The underlying upper-most bedrock unit is the Lockport Group, which consists of the following four formations: the Gasport Dolomite, Goat Island Dolomite, Eramosa Dolomite, and Guelph Dolomite. The lithology of the Lockport Group consists of approximately 160-170 feet of massive to medium-bedded, argillaceous dolomite with minor amounts of dolomitic limestone and shale. The carbonates of the Lockport Group are more resistant to weathering than the rocks belonging to the underlying Clinton and Medina Groups, hence, they form the most prominent part of the Niagara Escarpment.

It is expected that bedrock underlying the Site is the Guelph Dolomite of the Lockport Group. The Guelph Dolomite is medium-gray to dark-gray, light-gray to tan weathering, laminated, fine-grained, commonly oolitic dolomite. It is divided into three informal units: A, B and C which have a cumulative approximate thickness of about 40 feet. Explorations have not been made into the Lockport Group at the Site at this time.

2.5 GROUNDWATER

Seven overburden groundwater monitoring wells have been installed at the Site. Water levels range from about 3.5 to 5.5 feet below ground surface (bgs) with an average depth of 4.6 feet bgs. Groundwater flow direction is to the northwest with a gradient of about 0.03. The overburden groundwater flow direction appears to follow the top of bedrock elevation which also has a northwest dipping trend.

To date, bedrock groundwater wells have not been installed at the Site; therefore, groundwater flow direction within the bedrock unit (Lockport Group) is unknown. Regionally, the bedrock groundwater flow direction is affected by the east-west trending Niagara Escarpment, which is located approximately 1 mile north of the Site and the Erie Canal. The Erie Canal is approximately ½ mile west of the Site and has a southwest-northeast trend in the vicinity of the Site.

Bedrock groundwater flow within the Lockport Group is primarily related to secondary permeability through fractures and solution cavities. The principal water-bearing zones are the weathered bedrock surface and horizontal-fracture zones bounded by stratigraphic contacts (Kappel and Tepper, 1992). These horizontal fracture zones are connected by high-angle fractures and by subcrop areas where the fracture zones intersect the bedrock surface.

3.0 BEDROCK GROUNDWATER (STAGE 1)

3.1 BEDROCK MONITORING WELL INSTALLATION

As part of GZAs continuing site characterization, our Stage 1 work is intended to begin to evaluate the potential concern over chlorinated solvent contamination in the bedrock groundwater at the site. Three (3) permanent bedrock monitoring wells are proposed to be installed as part of the scope of work at the approximate locations shown on Figure 2.

Test borings will be used for monitoring well installation that are advanced into the overburden soils using a track or truck mounted rotary drill rig using 4 ¼ - inch inside diameter hollow stem augers (HSA). Soil samples will be obtained by driving a 1-3/8-inch inside diameter by 24-inch long split spoon sampler 24-inches ahead of the lead cutting shoe of the HSA, in general accordance with ASTM D1586.

Upon bedrock auger refusal, a 3-7/8-inch diameter roller bit shall be used to form a socket hole in the top of bedrock. A 3-inch PVC casing will then be grouted approximately one foot into bedrock and allowed approximately 12-24 hours to set prior to coring. Once the grout has sufficiently cured, bedrock at both locations shall be cored approximately 10 feet using HQ coring equipment. Upon reaching the appropriate depth, bedrock core samples will be examined to determine water bearing fracture zones within the upper bedrock. On the basis of the bedrock core sample evaluation an appropriate length and depth of PVC well screen (flush joint, 2-inch I.D., Schedule 40) will be chosen and the associated riser shall be installed to ground surface. Following screen/riser installation, well graded sand shall be placed into the annular space of the borehole to approximately 1 foot above the top of screen. Approximately 3 feet of bentonite pellets shall be placed above the sand. A mixture of cement/bentonite grout will extend from the bentonite seal to approximately 3-feet bgs. A flush mount casing will then be installed with a concrete seal.

GZA will attempt to keep soil cuttings generated as part of monitoring well installation to a minimum. Cuttings that do make it to the surface, including remnants from split spoon sampling, will be field screened for VOCs using visual and olfactory observations and with the use of an organic vapor meter (OVM) equipped with a photo-ionization detector. Cuttings with non-detect readings will be disposed of at a designated area on-site. Cuttings with sustained OVM readings exceeding 2 parts per million (ppm) will be containerized and sampled for proper disposal.

The volume of drilling fluid (water) used at each rock core location will be recorded. Should the drilling fluids return to the surface during rock coring, GZA will attempt to containerize and recycle the liquid at each respective core location until the rock core is complete to minimize the volume introduced to the borehole. Excess drilling fluid that is returned to the surface upon completion of each rock core will be contained in 55-gallon drums and sampled to determine the proper disposal method.

3.2 BEDROCK MONITORING WELL DEVELOPMENT

As with the existing overburden monitoring wells, the bedrock monitoring wells will be developed in accordance with NYSDEC protocols. Prior to development, the static water level and well depth will be measured and recorded. Development will performed with the use of a disposable polyethylene bailer, submersible pump, and/or surge methodologies. Well development from each bedrock monitoring well will be recorded on field forms by field personnel and considered complete when each well's respective water chemistry parameters (i.e., pH, specific conductivity, temperature) have stabilized; when the turbidity is below 50 Nephelometric Units (NTUs), or has stabilized above 50 NTUs and a maximum of 10 well volumes have been removed or until well goes dry. In addition, a field representative will perform visual NAPL and DNAPL surveillance during development of each bedrock monitoring well and perform hydraulic conductivity testing, using either rising or falling head test method, to assess whether the monitoring well is functioning and provide hydrologic information that will aid in evaluating subsurface conditions.

Purge water will be containerized in 55-gallon drums and sampled for VOCs via EPA 8260 Full List. If analytical results are non-detect, the drummed water will be discharged to the ground surface at a designated area on-site. If analysis shows compounds are detected at concentrations permissible by the Town of Lockport waste water treatment facility (POTW), the purge water shall be disposed of to the local sanitary sewer system once either a permit or written authorization is obtained from the Town of Lockport waste water treatment facility. Lastly, should the purge water analysis show compounds exceeding concentrations allowed by the POTW and their respective SCGs, the purge water will be properly disposed of at an off-site disposal facility.

4.0 GROUNDWATER SAMPLING PLAN AND METHODOLOGY

4.1 SAMPLING PLAN

Groundwater samples will be collected from the three bedrock wells and four overburden wells as part of Stage 1. Groundwater samples will also be collected from as many as ten of the soil probe locations that will be placed during Stage 2. The parameters that will be monitored in the field and tested for in the laboratory are shown on the attached Table 1. A water quality meter (YSI Model 600 or equivalent), disposable tubing and a variable speed peristaltic pump will be utilized during the monitoring and sampling.

4.2 GROUNDWATER SAMPLING AND PROCEDURES

Equipment Cleaning

Prior to the arrival to the Site, the water level indicator, water quality meter and flow-through cell will be cleaned by rinsing with potable water, washing with a solution of laboratory detergent (alconox) and potable water, and rising with deionized water. The water level indicator, flow through cell and water quality meter will also be similarly cleaned between sampling locations at the Site. Decontamination water will containerized with groundwater generated during the monitoring/sampling event.

Once the water quality readings stabilize and groundwater samples are to be collected, the tubing connecting the pump to the flow-through cell will be taken "out of line" and used to fill the sample jars. Groundwater to be collected for analysis will not enter the flow-through cell to minimize the chance of cross contamination.

New disposable polyethylene tubing (for placement down into the well and connecting to the water quality meter) and silicone tubing (for the pump head) will be used at each location. Therefore, there will be no need to clean/decon the sample tubing.

A variable speed peristaltic pump will be used to purge groundwater from the monitoring wells. Groundwater will remain within the polyethylene and silicone tubing and will not come in contact with the pump, so the pump will not need to be decontaminated between monitoring locations.

Equipment Calibration

The water quality meter and organic vapor meter (OVM) will be the two pieces of equipment used in the groundwater monitoring that will require calibration. Equipment will be calibrated twice a day, once in the morning and once in the afternoon, in accordance with the manufacturer's recommendations. Calibration values will be recorded on a daily field calibration sheet.

Monitoring & Purging Methodologies

In general, prior to accessing the monitoring wells, field staff will make observations about the exterior conditions of each monitoring well location (i.e., condition of the surface seal, damage to the protective casing, etc.). These observations will be noted on the monitoring well sampling log which will be used to record notes and data at each monitoring well sampling location.

An OVM will be used to screen the top of the well riser immediately after the removal of the riser cap. OVM readings will be recorded on the monitoring well sampling log.

Prior to the start of the monitoring and purge event, a static water level will be measured from the top of the monitoring well riser and recorded on the monitoring well sampling log. New polyethylene tubing (3/8-inch O.D. by 1/4-inch I.D) will be lowered into the monitoring well and positioned at the approximate center of the well screen intake zone.

The peristaltic pump will be started and operated at a rate determined in the field to minimize drawdown of the water column within the well and to collect water samples representative of groundwater from within the formation. The first set of water quality readings will be collected when the flow through cell is completely full and water begins to flow out. Readings will be recorded every three to five minutes once a constant head has been established and will continue until water quality readings stabilize for three successive readings. These three successive readings should be within ± 0.1 for pH, ±3% for conductivity, ± 10 mV for oxidation reduction potential (ORP) and ± 10% for turbidity and dissolved oxygen (DO). If readings stabilize prior to removing one well volume, purging/monitoring will continue until one well volume is removed while maintaining a constant head. Once a constant head is established, pumping flow rates should not be altered. Sampling flow rates will be kept consistent with purging/monitoring flow rates.

Altering the flow rates may change the chemistry within the well (i.e., stagnant water within the well will mix with formations water coming into the well).

Once the water quality readings have stabilized and at least one well volume has been removed after a constant head has been established, groundwater analytical samples will be collected. Groundwater samples will be placed in sample jars provided by the laboratory, cooled to approximately 4° C and transported under typical chain-of-custody protocol to an analytical laboratory for analysis. Immediately following groundwater sample collection, an additional round of water quality measurements and a water level will be recorded.

The polyethylene tubing from the peristaltic pump to the water quality meter will be disconnected from the input to the water quality meter and used to fill the appropriate groundwater sample jars, provided by the laboratory. After the appropriate sample containers have been filled, the pump will be shut off and the tubing removed from the monitoring well and pump head and will be disposed of as solid waste. The flow-through cell and water quality meter will be cleaned with a solution of laboratory detergent (alconox) and potable water, and rinsing with deionized water.

Once the groundwater monitoring and sampling is completed at each existing well location, the depth of the well will be measured and compared to the well construction data. This step will be done at the end to minimize agitation and suspension of sediment prior to the monitoring. If significant sediment has accumulated within the well, a bailer will be used to remove additional water and sediment from the well.

Water generated during the purging/monitoring and equipment decontamination will be containerized in 55-gallon drums. Drums will be labeled identifying the contents of the drum and date of generation. Contents from each drum will be sampled and analyzed to determine the proper disposal method.

4.3 ANALYTICAL PROGRAM

Analytical testing will be performed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) CLP-certified laboratory. Analytical results will be evaluated by a third-party data validator in accordance with guidelines described in the QAPP.

During Stage 1, groundwater samples will be collected from the three bedrock rock wells installed as part of the site characterization. In addition, groundwater will be sampled from the three or four previously installed overburden monitoring wells. The groundwater samples will be analyzed for VOCs, SVOCs, metals, pesticides and PCBs via the following methods:

- Volatile Organic Compounds via EPA Method 8260 Total Compound List (TCL)
- Semi-Volatile Organic Compounds via EPA Method 8270 (full list)

- Priority Pollutant Metals via EPA Method 6010/7470

- Pesticides via EPA Method 8081

- PCBs via EPA Method 8082

Stage 2 groundwater samples will be collected from the ten soil probe locations and tested for those constituents detected as being present in Stage 1 groundwater sampling and analysis. Based on analytical data collected by GZA during previous sampling events, the compounds of concern (COC) at the site are VOCs and SVOCs. A list of the compounds of concern are below.

- VOCs – Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, and Vinyl Chloride.

- SVOCs – Ethylbenzene, m&p-Xylene, o-Xylene, Isopropylbenzene, n-Propylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, p-Isopropyltoluene, and Naphthalene.

4.4 FIELD QUALITY CONTROL SAMPLES

In addition to the bedrock and overburden groundwater samples, GZA will collect field quality assurance/quality control (QA/QC) samples to fulfill the required third party data usability assessment effort. These samples include matrix spike, matrix spike duplicates, and blind duplicates. QA/QC sampling protocol are summarized in the QAPP. Each QA/QC sample is described below.

- <u>Trip Blank</u> – Trip blanks are supplied by the analytical laboratory. One sealed blank will be included among the sample containers for each day that groundwater samples are to be collected. Trip blanks will be transported and handled in the same manner as the groundwater samples. Each trip blank will be analyzed via EPA Method 8260 TCL. Results of the trip blank analysis will be reviewed to assess the potential for sample contamination during transportation and handling practices.

- <u>Blind Duplicate</u> – One blind duplicate will be collected and analyzed per 20 samples collected for VOCs via EPA Method 8260 TCL or SVOCs via EPA Method 8270 (full list). The location of the blind duplicate sample will not be disclosed to the analytical laboratory. The duplicate sample location will be recorded on the daily field log and the results will be compared to review analytical precision.

- <u>Matrix Spike/Matrix Spike Duplicate (MS-MSD)</u> – One MS/MSD sample will be collected for each sampling event at a location determined by field personnel. The laboratory will report the results of the analysis. Results will be reviewed to assess the laboratory's accuracy and precision.

5.0 REMEDIAL ACTION OBJECTIVES AND METHODOLOGY

Petroleum hydrocarbon and chlorinated solvent contamination has been identified in the soil and groundwater at the Site. Bedrock groundwater conditions have not been determined at this time. The following proposed remedial action objectives (RAOs) are pursuant to the soil and overburden groundwater conditions that exist at the site. These RAOs can be applied to bedrock groundwater should petroleum hydrocarbon and chlorinated solvent contamination be identified following the proposed analysis referenced above. It is anticipated that the proposed remedial action program will be successful in achieving the soil clean-up objectives for a commercial property. However, it is also possible that with the interim remedial measure that is being proposed, the soil clean-up objectives for either a residential, a restricted residential or unrestricted use of the property may be met.

Table 2 : BCP Soil Clean-up Objectives lists the standards for commercial, restricted residential, residential and unrestricted property uses compared to the analytical test results for a contaminated soil sample obtained during a Phase II – Environmental Site Assessment study conducted on the property.

RAOs may need to be expanded to include a groundwater RAO depending on the results of the off-site groundwater sampling.

6.0 INTERIM REMEDIAL MEASURES OBJECTIVES AND METHODOLOGY

6.1 OBJECTIVES

The following proposed interim remedial measures objectives are to mitigate the potential risk to human health, safety, public welfare and the environment by reducing the concentration of chlorinated solvents and petroleum hydrocarbons in the soil and overburden groundwater at the Site through the use of in-Situ bioremediation via enhanced reductive dehalogenation. Once the PCE and TCE have been degraded, aerobic in-situ bioremediation will be used to degrade the TCE metabolites and the petroleum hydrocarbon contamination.

6.2 INTERIM REMEDIAL MEASURES WORK PLAN

GZA is proposing to conduct the following interim remedial measures:

- Introduce electron donor compound to the subsurface soil and groundwater through a series of direct push injections, microwells and existing monitoring well locations to enhance anaerobic bioremediation of target chlorinated solvents (PCE and TCE);
- Collect soil and groundwater confirmatory samples for analysis. Upon reaching cleanup objectives for target chlorinated solvents in accordance with 6 NYCRR Part 375;
- Introduce oxygen releasing compounds (ORC) and aerobic microorganisms to the subsurface soil and groundwater through a series of direct push injections, microwells and existing monitoring well locations to enhance aerobic bioremediation of petroleum hydrocarbons and chlorinated solvent daughter breakdown products;
- Collect soil and groundwater confirmatory samples for analysis;
- Submit Interim Remedial Activities and Completion Reports when applicable.

A more detailed description of these activities is provided as follows.

6.2.1 ELECTRON DONOR COMPOUND INJECTIONS

Electron donor compound injections will be utilized to achieve Site remedial goals for target chlorinated solvents (PCE and TCE). For each injection cycle, the electron donor compound will be introduced to the subsurface soil and groundwater via a series of direct push injections, microwells and existing monitoring well locations.

Bulk, dry electron donor material will be brought to the Site and mixed with water in a polyethylene tank to form a slurry-phase mixture. Direct push injections will introduce the slurry-phase EDC material to the subsurface soil at a series of locations in a grid-like pattern (see Figure 2). Injection flow rate depends on the estimated volume of the bulk injection, thickness of the saturated zone and distance of the injection point to the nearest monitoring well. Four of the direct push locations will be converted into monitoring locations (1-inch diameter PVC microwells) as shown on Figure 5. Additional slurry-phase EDC will be introduced to the overburden groundwater at each subsurface monitoring well location through gravity fed delivery via dedicated 55-gallon drum containers.

GZA personnel will be on-site during EDC injection to monitor progress. The injection locations, depths and estimated volume of EDC material used per location will be recorded.

6.2.2 OXYGEN RELEASING COMPOUND INJECTIONS

Oxygen releasing compound and aerobic microorganism injections will be utilized to achieve Site remedial goals for petroleum hydrocarbons and TCE metabolites. For each injection cycle, ORC and aerobic microorganisms will be introduced to the subsurface soil and groundwater via a series of direct push injections, microwells and existing monitoring well locations.

Bulk dry ORC material will be brought to the Site and mixed with water in a polyethylene tank to form a slurry-phase mixture (20% solution). Direct push injections will introduce the slurry-phase ORC material to the subsurface soil at a series of locations in a grid-like pattern (see Figure 5). Additional slurry-phase ORC will be introduced to the overburden groundwater at each subsurface monitoring well location through gravity fed delivery via dedicated 55-gallon drum containers. Pre-mixed solutions of aerobic microorganisms will be injected in a similar manner.

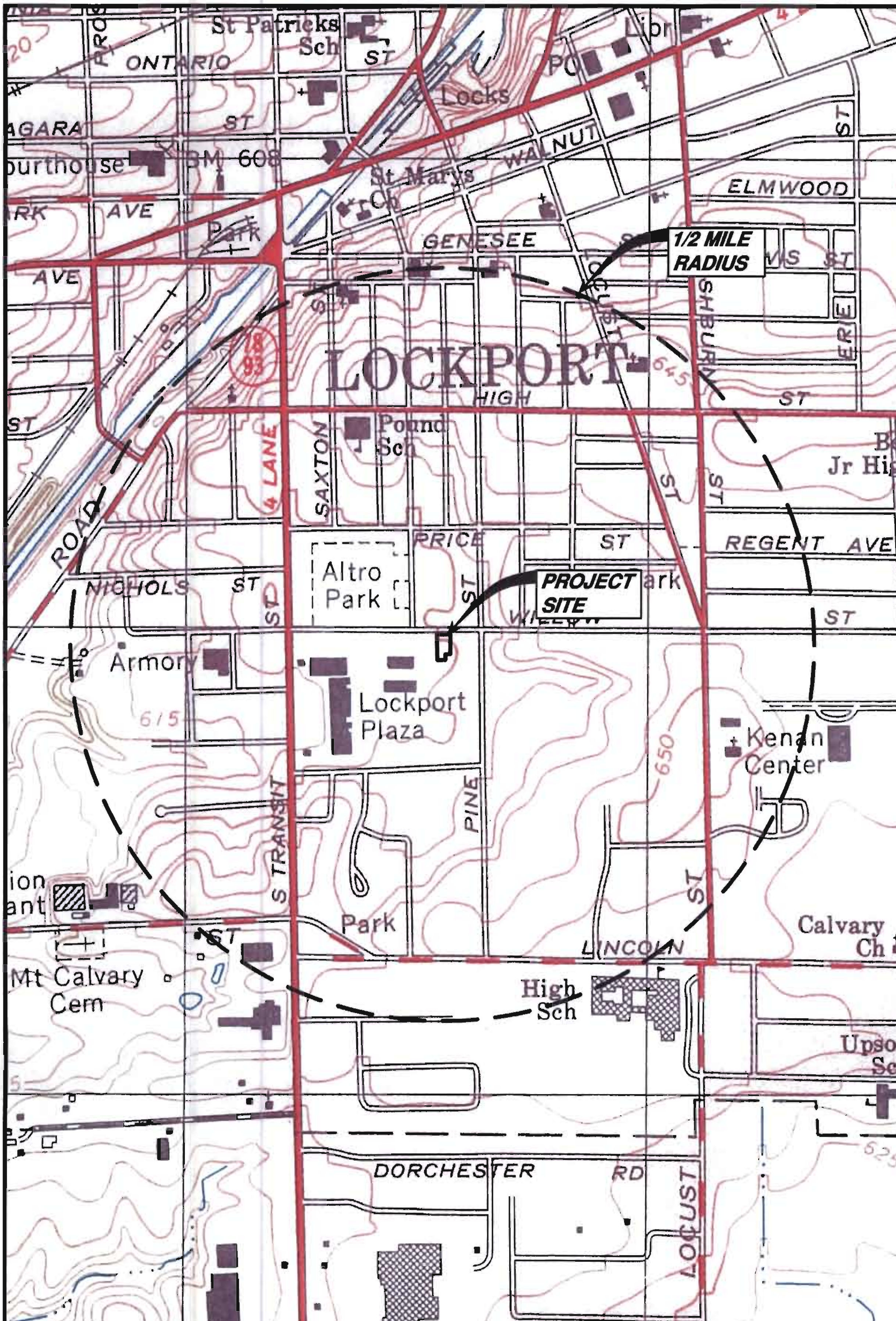
GZA personnel will be on-site during ORC/microorganism injection to monitor progress. The injection locations, depths and estimated volume of ORC/microorganism material used per location will be recorded.

6.2.3 GROUNDWATER MONITORING AND SAMPLING

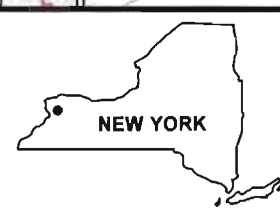
To evaluate the effectiveness of the EDC and ORC injections, groundwater quality data (i.e., pH, oxygen reduction potential, dissolved oxygen, conductivity) will be collected at approximate 45-days and 90-days after each injection. GZA will use a down hole water quality meter and a low flow peristaltic pump to measure water quality data at Site monitoring well locations.

Groundwater samples will be collected for laboratory analysis approximately two to three months after the injections. Prior to sampling, each well will be purged of at least three well volumes, until water quality readings stabilize, or until the well is dry. The collected groundwater samples will be analyzed for volatile organic compounds VOCs via EPA 8260 Full List and SVOCs via EPA 8270 Full List parameters.

FIGURES



NOTE:
BASE MAP ADAPTED FROM U.S.G.S. TOPOGRAPHIC MAPS DOWNLOADED FROM TERRASERVER.MICROSOFT.COM



DRAWN BY: DEW
DATE: AUGUST 2007

GZA GeoEnvironmental of New York

SCALE IN FEET
0 500 1000 2000

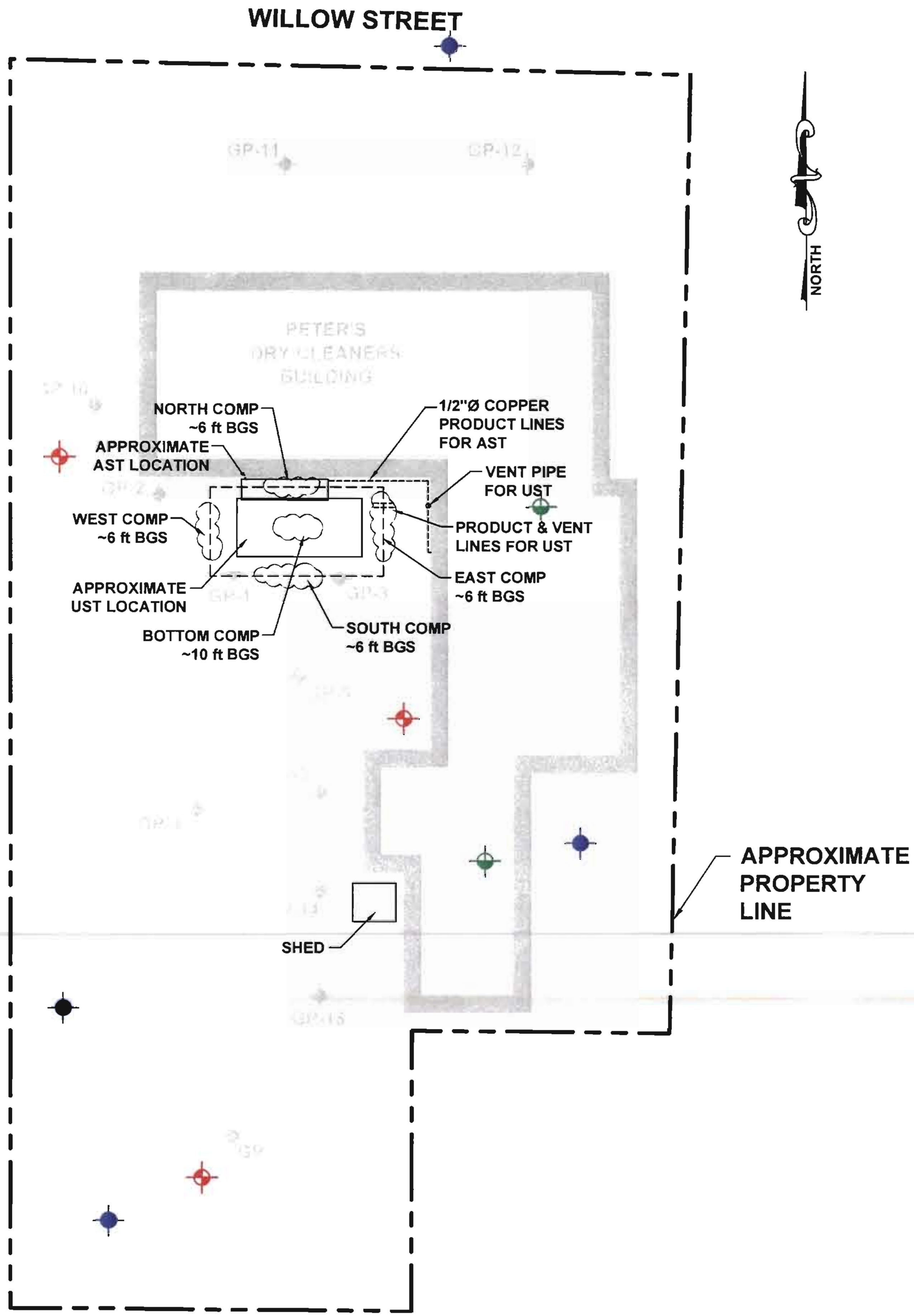
PETER'S DRY CLEANERING
316 WILLOW STREET
LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

1/2 MILE RADIUS PLAN

PROJECT No.
21.0056017.10

FIGURE No.
1



LEGEND:

- APPROXIMATE LOCATION OF PROPOSED BEDROCK MONITORING WELL
- APPROXIMATE LOCATION OF PROPOSED SUB-SLAB AIR SAMPLE
- APPROXIMATE LOCATION OF PROPOSED SOIL PROBE WITH GROUNDWATER SAMPLE
- BOTTOM COMP ~10 ft BGS — APPROXIMATE LOCATION AND DESIGNATION OF CONFIRMATORY SOIL SAMPLES COLLECTED BY GZA GEOENVIRONMENTAL OF NEW YORK
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004 WITH MICROWELL INSTALLED

NOTES:

1. BASE MAP ADAPTED FROM A 2002 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

0 10 20 40

PETERS DRY CLEANING

316 WILLOW STREET

LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

SITE PLAN

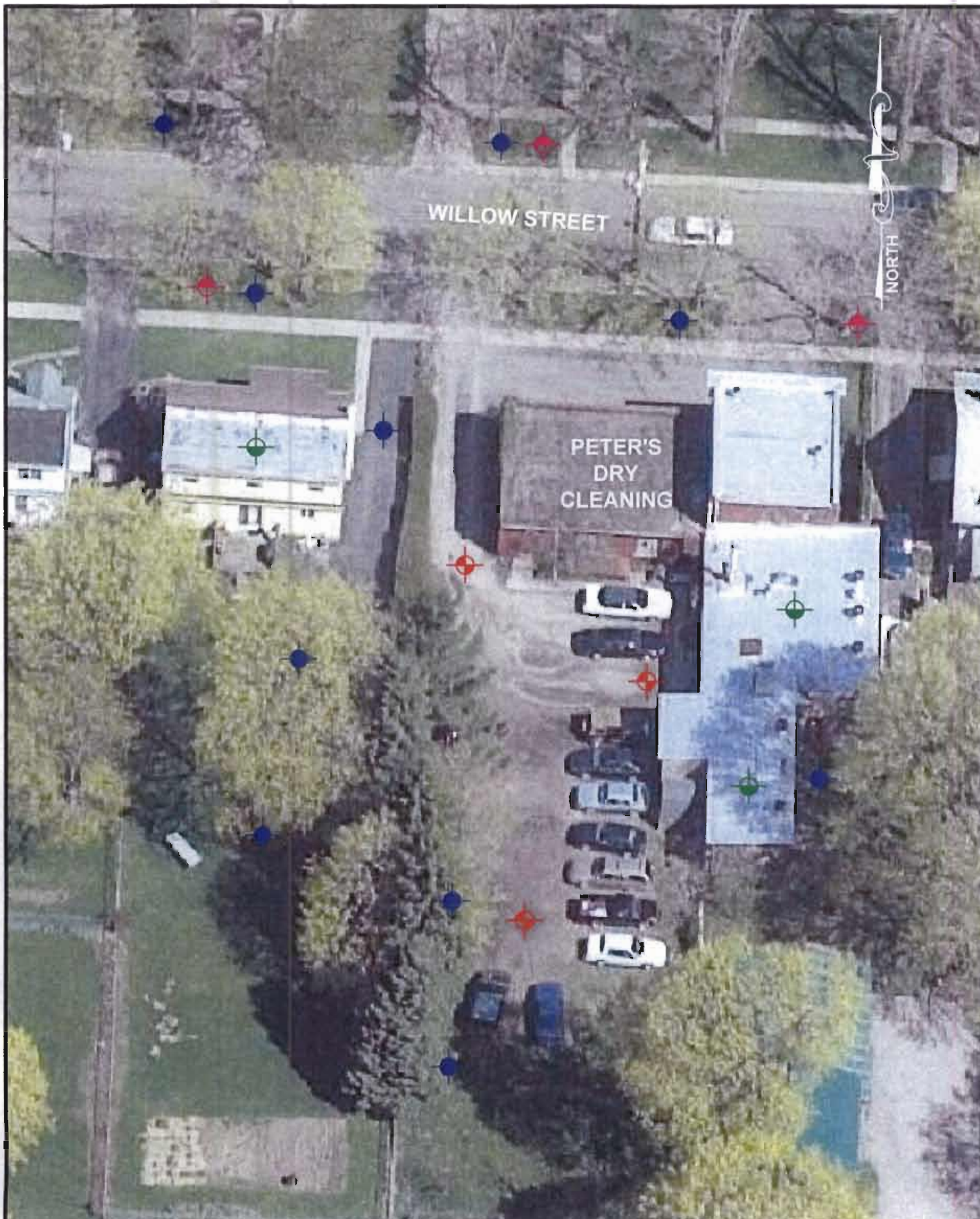
PROJECT No. **21.0056017.10**

FIGURE No. **2**

NOTES:

1. BASE MAP ADAPTED FROM A 2005 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND FIELD OBSERVATIONS.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

FIGURE No. 3 PROJECT No. 21.0056017.10	PETER'S DRY CLEANERING 316 WILLOW STREET LOCKPORT, NEW YORK SITE INVESTIGATION WORK PLAN SURROUNDING AREA RESIDENCES MAP (1/4 MILE RADIUS)	APPROXIMATE SCALE IN FEET 0 150 300 600	DRAWN BY: DEW DATE: AUGUST 2007 GZA GeoEnvironmental of New York



NOTES:

1. BASE MAP ADAPTED FROM AN AERIAL PHOTOGRAPH DOWNLOADED FROM local.live.com AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

LEGEND:

- APPROXIMATE LOCATION OF PROPOSED BEDROCK MONITORING WELL
- APPROXIMATE LOCATION OF PROPOSED SUB-SLAB AIR SAMPLE
- APPROXIMATE LOCATION OF PROPOSED SOIL PROBE WITH GROUNDWATER SAMPLE
- ~~APPROXIMATE LOCATION OF PROPOSED SOIL VAPOR MONITORING POINT~~ Deleted

DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

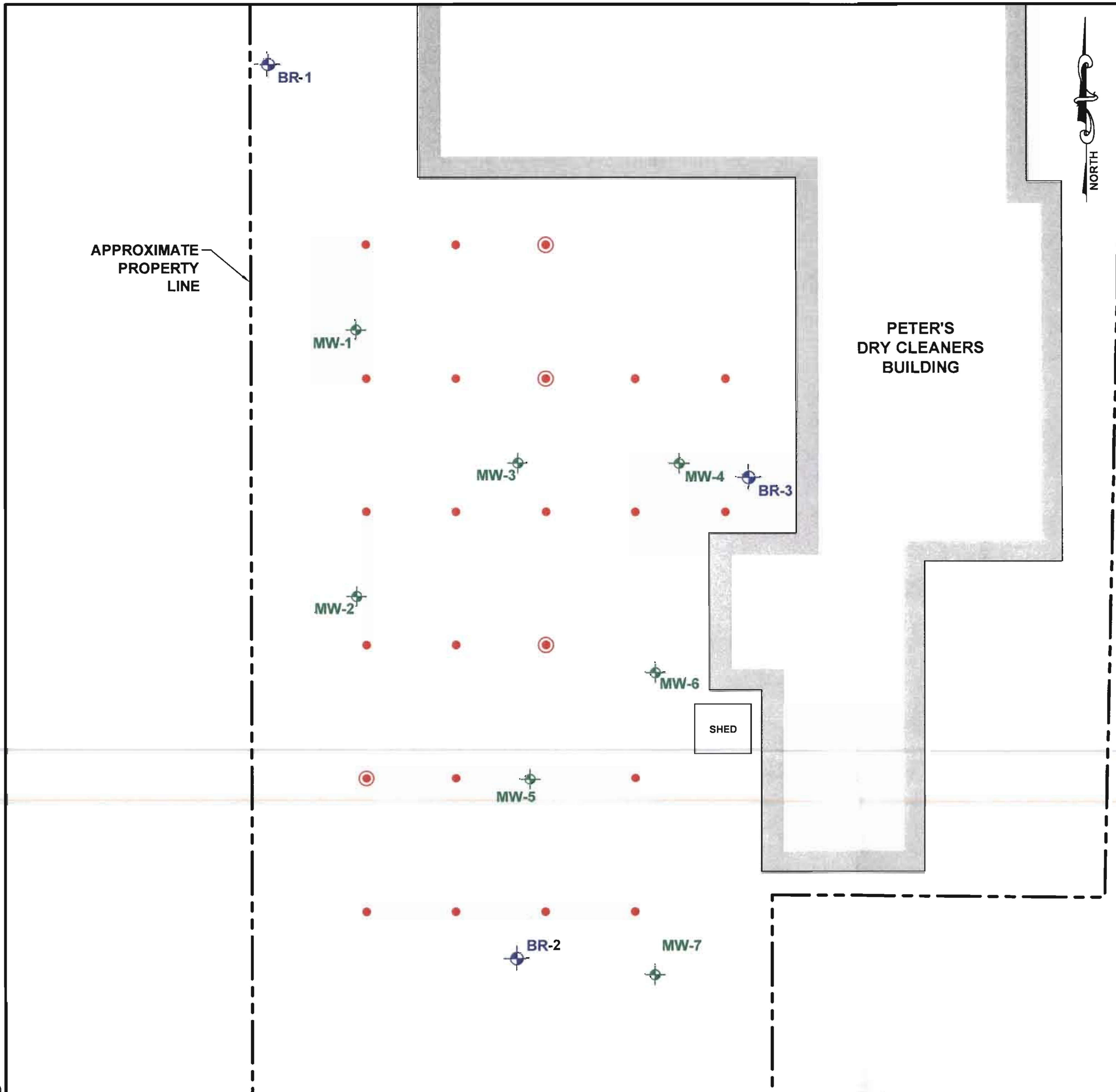
0 15 30 60

PETERS DRY CLEANING
316 WILLOW STREET
LOCKPORT, NEW YORK
SITE INVESTIGATION WORK PLAN

OFF-SITE GEOPROBE & SOIL VAPOR MONITORING PLAN

PROJECT No.
21.0056017.10

FIGURE No.
4



LEGEND:

- ● APPROXIMATE LOCATION OF PROPOSED DIRECT PUSH EDC INJECTION POINT
- ◉ APPROXIMATE LOCATION OF PROPOSED DIRECT PUSH EDC/ORC INJECTION POINT WITH 1-INCH Ø MONITORING WELL INSTALLED
- BR-1 APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED BEDROCK MONITORING WELL
- MW-1 APPROXIMATE LOCATION AND DESIGNATION OF INJECTION/MONITORING WELL INSTALLED BY SJB SERVICES, INC. ON OCTOBER 17 & 18, 2005

NOTES:

1. BASE MAP ADAPTED FROM A 2002 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND FIELD OBSERVATIONS.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW
DATE: AUGUST 2007

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET
0 6 12 24

PETER'S DRY CLEANERING
316 WILLOW STREET
LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

SITE PLAN

PROJECT No.
21.0056017.10

FIGURE No.
5

TABLES

Table 1
Brownfields Cleanup Program
Proposed Analytical Testing Program Summary
Peter's Dry Cleaners
Lockport, New York

Location	Matrix	TCL VOCs 8260	SVOCs FULL LIST 8270	PRIORITY POLLUTANT METALS 6010/7470	PCBS 8082	PESTICIDES 8081	VOCs TO-15
Subsurface Soil Samples							
Various[1]	Soil	10	10	10	10	10	-
Duplicate	Soil	1	1	1	1	1	-
MS/MSD	Soil	2	2	2	2	2	-
Rinsate	Water	1	1	1	1	1	-
Total		14	14	14	14	14	-
Overburden Groundwater Samples							
Various[1]	Groundwater	42	42	42	42	42	-
Duplicate	Groundwater	3	3	3	3	3	-
MS/MSD	Groundwater	6	6	6	6	6	-
Rinsate	Water	1	1	1	1	1	-
Trip Blank	Water	1	0	0	0	0	-
Total		53	52	52	52	52	-
Bedrock Groundwater Samples							
New Monitoring Wells	Groundwater	9	9	9	9	9	-
Duplicate	Groundwater	0	0	0	0	0	-
MS/MSD	Groundwater	0	0	0	0	0	-
Rinsate Blank	Water	0	0	0	0	0	-
Trip Blank	Water	0	0	0	0	0	-
Total		9	9	9	9	9	-
Soil Vapor Samples							
Soil Vapor Probes	Air	-	-	-	-	-	8
Duplicate	Air	-	-	-	-	-	1
Trip Blank	Air	-	-	-	-	-	1
Total		-	-	-	-	-	10
	TOTAL	76	75	75	75	75	10

Notes:

1) Actual sample location to be selected based on field observation.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
TCL VOCs - Target Compound List Volatile Organic Compounds.
SVOCs FULL LIST - Semi-Volatile Orgaic Compounds
PCBs - Polychlorinated Biphenyls

2) MS/MSD, Duplicate, Trip Blank & Rinsate Samples for Bedrock groundwater included with Overburden groundwater.
Sampling methodologies will be the same and sampling will occur concurrently.
Groundwater sample numbers assume 3 sampling rounds.

Table 2

BCP Soil Clean-up Objectives (ppm)

Contaminant	Unrestricted	Residential	Restricted Residential	Commercial	Protection of Groundwater	Soil Levels GP-5:2004
Volatiles						
1,1 – Dichloroethene	0.33	100	100	500	0.33	0.03
cis – 1,2 Dichloroethene	0.25	59	100	500	0.25	22.0
trans-1,2 – Dichloroethene	0.19	100	100	500	0.19	0.3
Ethylbenzene	1.0	30	41	390	1.0	1.4
n-Propylbenzene	3.9	100	100	500	3.9	18.0
sec – Butylbenzene	11.0	100	100	500	11.0	7.1
Tetrachloroethene	1.3	5.5	19	150	1.3	0.2
Toluene	0.7	100	100	500	0.7	< 0.1
Trichloroethene	0.47	10	21	200	0.47	0.071
1,2,4-Trimethylbenzene	3.6	47	52	190	3.6	150
1,3,5 – Trimethylbenzene	8.4	47	52	190	8.4	50
Vinyl Chloride	0.02	0.21	0.90	13	0.02	< 0.1
Xylenes	0.26	100	100	500	1.6	6.6
Semi-Volatiles						
Acenapthylene	100	100	100	500	107	1.4
Anthracene	100	100	100	500	1,000	1.9
Benz(a)anthracene	1.0	1.0	1.0	5.6	1.0	1.2
Benzo(a)pyrene	1.0	1.0	1.0	1.0	22.0	0.97
Benzo(b)fluoranthene	1.0	1.0	1.0	5.6	1.7	0.58
Benzo(g,h,i)perylene	100	100	100	500	1,000	< 0.3
Benzo(k)fluoranthene	0.8	1.0	3.9	56	1.7	0.68
Chrysene	1.0	1.0	3.9	56	1.0	1.3
Fluoranthene	100	100	100	500	1,000	2.2
Fluorene	30	100	100	500	386	1.0
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	8.2	< 0.3
Naphthalene	12	100	100	500	12.0	4.8
Phenanthrene	100	100	100	500	1,000	4.9
Pyrene	100	100	100	500	1,000	2.7

EXHIBIT 1

PURPOSE

The purpose of this soil vapor investigation is to determine if contaminant vapors from the original source area at the Site could potentially impact indoor air quality in adjacent residential properties. Soil vapor samples will be collected from five locations associated with the Site and abutting property (See Figure 4).

GZA will collect subsurface soil vapor samples at three locations along the right-of-way associated with the western adjacent property, the property immediately across Willow Street from the Site and the northeast corner of the Site along with three three sub-slab soil vapor samples (See Figure 4). An approximate 2 foot by 2 foot piece of poly sheeting will be placed on the ground in the area of the soil probes. Galvanized steel probes with a removable tip will be driven through the poly sheeting into the ground to the desired depth (approximately 4 to 5 feet below ground surface at sample locations) with a slide hammer. The probes will then be pulled back slightly to free the removable tips and a bentonite paste will be placed between the ground surface, poly sheeting and probe to avoid the collection of ambient air into the sampling system. New HDPE tubing will be inserted to the bottom of the probes. The tubing will be purged of approximately 3 volumes of air prior to sampling. During the purge event, a tracer gas (e.g., helium) will be released under an enclosure placed over the top of the soil vapor probe to check for surface infiltration into the subsurface sampling probe system. A helium detector (i.e., Mark Model 9822 Helium Detector or equivalent) will be used to determine if helium from the ground surface is being drawn into the subsurface soil vapor probe. Once it is determined that the sampling system is sealed, a soil vapor sample will be collected from the HDPE tubing into the appropriate sampling container (i.e., 1 liter minican or equivalent) during a one hour sampling period. The soil vapor sampling procedures will be done in general accordance with Section 2.7 of the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Public Comment – Draft", issued February 2005.

Analytical Testing

Seven soil vapor samples will be submitted to Centek Laboratories, LLC for chemical analysis. The three samples will be tested for the following compounds of concern; tetrachloroethylene, trichloroethylene, 1,2-dichloroethene and vinyl chloride via analytical test method TO-15. The sample methodologies used will utilize detection limits of 1 microgram per cubic meter (ug/m^3) or lower. The results of the soil vapor samples will also be reported in ug/m^3.

APPENDIX B

SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

QUALITY ASSURANCE PROJECT PLAN
PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

The purpose of this Site-specific Quality Assurance Project Plan (QAPP) is to document planned investigative activities and establish the criteria for performing these activities at a pre-determined quality, and to review and summarize such work performed by others at or for the Peters Dry Cleaning (Site) located at 316 Willow Street in Lockport, New York (See Figure 1). The work will be completed by GZA GeoEnvironmental of New York (GZA) in accordance with the Draft DER-10 Technical Guidance for Site Investigation and Remediation document set forth by the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER).

1.2 PROJECT BACKGROUND

Peters Dry Cleaning (Site), located at 316 Willow Street, in the City of Lockport, New York has been operated as a dry cleaning facility since the late 1930s/early 1940s. A Phase II Environmental Site Assessment (ESA)[1] performed by GZA identified petroleum and chlorinated solvent contamination in the soil and groundwater at the Site. Two storage tanks were also identified during the ESA. Based on the findings of the Phase II ESA, the New York State Department of Environmental Conservation (NYSDEC) assigned Spill No. 0475193 to the Site.

Two tanks identified at the Site, a 1,000-gallon aboveground storage tank (AST) and an abandoned 6,000-gallon underground storage tank (UST), were used to store heating oil prior to the facility being connected with natural gas. In April 2005, GZA removed the AST and UST in accordance with a NYSDEC approved February 2005 Work Plan. These activities are documented in GZA's June 2005 Closure Report[2].

During the abandoned UST removal, approximately 2 cubic yards of petroleum contaminated material was removed from the Site (i.e. sand) that had previously been placed into the UST unit as part of its interim or temporary closure. Some minimal petroleum contamination was also identified around the area of the UST. There was also approximately 30 tons of chlorinated solvent contaminated soil removed as part of an additional excavation activity done at the Site. The 30-tons of soil contaminated with chlorinated solvent were disposed of as hazardous waste at Chemical Waste Management in Model City, New York.

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1 Phase II Environmental Site Assessment, Peter's Dry Cleaners, 316 Willow Street, Lockport, New York; completed for Earle, Delange, May, Seaman, Jones, Hogan & Brooks, LLP; by GZA GeoEnvironmental of New York; August 2004.

2 "Aboveground and Underground Storage Tank Closure Report, Peters Dry Cleaners, 316 Willow Street, Lockport, New York" prepared by GZA GeoEnvironmental of New York, dated June 2005.

The facility has been in use as a dry cleaning facility since the late 1930s/early 1940s. Prior to its use as a dry cleaner, the facility was used as a clothing tailor shop. A blend of petroleum hydrocarbons known as Stoddard solvent was used for dry cleaning at the Site prior to tetrachloroethene (PCE) being used. Therefore, the petroleum contamination present at the Site may be a result of both the fuel oil previously stored and the historical use of Stoddard solvent. The chlorinated solvent contamination is likely due to the use of PCE. Since the Site was acquired by Peters Dry Cleaning in the early 1970's, Peters Dry Cleaning never operated either the fuel oil AST or the fuel oil UST. The use of PCE by Peters Dry Cleaning, since the acquisition of the property, has always involved the use of the "new generation" closed loop recycling dry cleaning equipment. PCE is no longer being used for dry cleaning at the Site.

Soil and groundwater samples were collected and analyzed during the ESA and tank closure work conducted by GZA. After review of the analytical data generated it appears that reductive dehalogenation in the form of natural attenuation or in-situ bioremediation is occurring at the Site.

1.3 PROJECT DESCRIPTION

This QAPP is the quality control basis for the scope of work, which is further described in the Field Activity Plan. The major tasks involved at the Site are:

- Remedial Investigation Work Plan Development (Field Activity Plan, Health and Safety Plan, and Quality Assurance Project Plan).
- Bedrock Groundwater Site Characterization
- Remedial Alternatives and Methods

1.4 PROJECT MANAGEMENT AND ORGANIZATION

1.4.1 Personnel

The general responsibilities of key project personnel are listed below.

Project Advisor — Ernest R. Hanna, P.E., Program Manager will have responsibility for overall program management and coordination of subcontractors to complete the work.

Project Manager — Mr. Christopher Boron, Project Manager, will have responsibility for overall project management and coordination with NYSDEC, New York State Department of Health (NYSDOH) and the City of

	Lockport. Mr. Boron will implement and coordinate the Site Characterization and Remedial Alternative project activities.
Field Team	Mr. Christopher Boron or Mr. John Beninati will have overall responsibility for on-Site implementation of the Site Investigation project activities.
QA Officer	Mr. Randolph W. Rakoczynski, P.E., will serve as Quality Assurance Officer, and will be responsible for laboratory and data validation subcontractor procurement and assignment, as well as data usability reports.
H & S Officer	Mr. John Beninati will be responsible for the preparation of the project health and safety plan. Mr. Chris Boron or Mr. John Beninati will be responsible for tracking its implementation during field activities.

1.4.2 Specific Tasks and Services

GZA has obtained subcontractor specialists for services relating to drilling and monitoring well installation, laboratory/analytical services and data validation services. The planned subcontractors for utilization for the Peters Dry Cleaning Site in Lockport, New York are:

Laboratory Analysis -	To Be Determined.
Data Validation -	To Be Determined
Exploration Services -	To Be Determined.

2.0 SITE CHARACTERIZATION PROCEDURES AND RATIONALE

The Peter's Dry Cleaning Site has residual chlorinated solvent and petroleum hydrocarbon contamination in the overburden soil and groundwater. The fieldwork proposed by GZA is focused on obtaining an understanding of Site-specific bedrock groundwater conditions and to collect additional background samples from previously installed overburden monitoring wells. Environmental sampling and other field activities will be performed in general accordance with the appropriate techniques presented in the following guidance document.

- DRAFT DER-10: Technical Guidance for Site Investigations and Remediation; NYSDEC Division of Environmental Remediation, December 2002.

Field activities are described in the following sections and in the Peters Dry Cleaning Field Activities Plan. Table 1 contains a list of the various media to be sampled and the expected number of samples for each matrix.

2.1 AIR SURVEILLANCE AND MONITORING

Air surveillance screening of volatile compounds for health and safety concerns will be performed with a portable organic vapor meter (OVM) equipped with a photoionization detector (PID) that is using a 10.2 electron volt (eV) bulb. Monitoring will be done during invasive activities such as monitoring well installation, well development and sampling.

On-Site personnel will be outfitted in modified Level D personnel protection (hardhat, safety glasses, coveralls, work boots and gloves). Work zone air monitoring will be done using an OVM and particulate monitor. Detections above background during air monitoring will require that the work be stopped until air monitoring levels decrease to background levels or until health and safety protocol are upgraded and approved by NYSDEC.

Additional details are presented in the Site-specific Health and Safety Plan.

2.2 BACKGROUND SAMPLING

Overburden groundwater background samples will be collected from previously installed monitoring wells during the installation of bedrock monitoring wells. The analytical results of the samples collected in conjunction with previous background sample data will be evaluated to establish background levels/criteria for comparative purposes. It is planned that three to four background overburden groundwater samples will be collected.

2.3 SOIL SAMPLING

During bedrock monitoring well installation, test boring soil will be sampled by opening the split spoon sampler, slicing the core (if intact) vertically down the middle with a sharp knife or similar blade, and scooping sufficient sample from the long axis of the split core with a decontaminated stainless steel spoon or spatula. If the core is not intact, then upon opening the barrel the contents can be scooped directly with the spoon or spatula. Samples will be collected and transferred to sample containers as soon as possible after opening and slicing the split spoon sample. If the core is not homogeneous, representative portions of each type of material within the sampler will be collected. There may also be situations where it will be appropriate to grab-sample specific zones due to textural variations, the presence of apparent staining, or "hot spot" preliminary screening results.

Soil screening will be performed in two ways: by holding the probe of the OVM directly over the sample and, by headspace screening with the OVM.

The OVM will be calibrated daily, in accordance to manufacturer's requirements using a standard gas. Prior to screening, the soil samples will be allowed to equilibrate to ambient temperature. For headspace screening, a hole will be made in the lid of the sample jar or baggie and 30 ml of sample air will be withdrawn from the headspace using a gas tight syringe. The test sample will be immediately injected into the OVM and the peak response will be recorded. A response of less than 1 part per million (ppm) using this method is not considered significant and will be reported as not detected. A syringe blank will be run between test samples to check that extraneous contamination was not carried over.

2.4 TEST BORINGS

The drill rig, tools, augers, etc. will be decontaminated by the subcontractor prior to arrival on-Site. To reduce the need for on-Site decontamination, bedrock monitoring well installation will begin in areas of least contamination and proceed to the greatest areas of concentration based on the evaluation of analytical data. Should a "hotspot" be detected during these operations in an area previously deemed as having low concentrations, decontamination will be accomplished using steam cleaning or high pressure wash equipment prior to moving to the next location. Split spoon sampling devices will be cleaned manually with non-phosphate detergent (i.e., alconox) wash and potable water followed by a potable water rinse or a second steam cleaning followed by a distilled/deionized water rinse. All equipment will be cleaned prior to leaving the Site.

Test borings will be advanced into the overburden using a rotary drill rig and 4-1/4 inch inside diameter (ID) hollow stem augers (HSA). Samples from ahead of the HSA will be obtained by driving a 1-3/8 inch I.D. by 24 inch long split spoon sampler 24 inches with a 140 pound hammer falling 30 inches to bedrock refusal, in general accordance with ASTM D1586 (Standard Penetration Test).

GZA will attempt to keep soil cuttings generated as part of monitoring well installation to a minimum. Cuttings that do make it to the surface, including remnants from split spoon sampling, will be field screened for VOCs using visual and olfactory observations and with the use of an organic vapor meter (OVM) equipped with a photo ionization detector. Cuttings with non-detect readings will be disposed of at a designated area on-site. Cuttings with sustained OVM readings exceeding 2 parts per million (ppm) will be containerized and sampled for proper disposal.

Soil samples will be classified by GZA in the field by visual examination in accordance with the Burmister Soil Classification System. A log of each boring will be prepared with appropriate stratification lines, blow counts, sample identification, sample depth interval, recovery and date.

2.5 BEDROCK CORE SAMPLING

Upon bedrock auger refusal, a 3 7/8 inch diameter roller bit will be used to form a socket hole in the top of bedrock. A 3-inch PVC casing will then be grouted approximately one foot into bedrock and allowed approximately 12-24 hours to set prior to coring. Once the grout has sufficiently cured, bedrock at each monitoring well location will be cored approximately 10 feet or until competent rock is encountered using NX coring equipment. The volume of drilling fluid (water) used at each rock core location will be recorded. Should the drilling fluids return to the surface during rock coring, GZA will attempt to containerize and recycle the liquid at each respective core location until the rock core is complete to minimize the volume introduced to the borehole. Excess drilling fluid that is returned to the surface upon completion of each rock core will be contained in 55-gallon drums and sampled to determine the proper disposal method.

Each bedrock core sample will be placed in its own respective core box supplied by the drilling subcontractor, labeled, photographed, and logged accordingly.

2.6 MONITORING WELL INSTALLATION

Monitoring wells will be constructed of 2-inch ID flush coupled Schedule 40, polyvinyl chloride (PVC) riser and screen. The actual installation depth of the screen will be selected based upon the intended purpose of the well (the zone to be monitored), observation of subsurface materials and headspace screening test results. The screen will consist of a maximum 5-foot long section. The actual length of the well screen may vary depending upon bedrock conditions encountered. Attempts will be made to limit the well screen to the zone being monitored. A schematic of the well construction detail is provided as Figure 4.

Well materials will have the following specifications:

- Well screens shall be 0.01-inch factory slotted.
- Filter material shall have a D-30 (i.e., the soil particle size at which 30 percent of the soil particles are finer) of about 0.2 mm.

Following determination of the monitoring zone and placement of the assembled screen and riser, the borehole will be backfilled. Generally, this will include the placement of a sand filter around the well screen such that the sand extends a minimum of 1-foot above the top of the screen. A minimum 3-foot layer of bentonite pellets will be placed above the sand filter and allowed to hydrate. A mixture of cement/bentonite water extending to about 3-feet below ground surface (bgs) will be placed above the bentonite seal. The monitoring well will be completed by placing a locking steel casing over the riser. Concrete will be then placed in the borehole around the protective casing and sloped away from the casing.

All materials used in well installation brought to the Site must be clean and in like-new condition. Well materials will not be accepted if they are not observed in such condition or if their respective packaging is torn or imperfect.

2.7 GROUNDWATER SAMPLING

Groundwater sampling of monitoring wells includes initial recording of data, purging of the well, and collection of the sample. The text below addresses these items. Installation of monitoring wells is discussed in the previous section.

2.7.1 Initial Data Recording

Groundwater sampling begins by locating the well to be sampled and recording the appropriate field data, as summarized below:

- Observations of the well (conditions of cap, collar, casing, etc.) and the ambient conditions (weather; surrounding area; date and time; sampling crew members and observers if any. See also Section 5.1 for information to be recorded in the field notebook.).
- Unlocking the well cover, surveying ambient air, upwind air, and air directly at the top of the well.
- Taking a water level measurement, noting the reference point from which the measurement is made (typically a notch on the inner casing).
- Sounding the bottom of the well and agitating/loosening accumulated silt/sediment (this assumes sounding indicates minimal sediment accumulation and no need for additional well development).
- Record the standing volume of water within the monitoring well.

2.7.2 Well Purging/Evacuation

After the initial observations are recorded, the well is then purged of at least three volumes of standing water. Purging will be accomplished by using a variable speed peristaltic pump to remove water from the wells. Prior to removal of the first volume of water, and after each subsequent volume of water removed, field parameters (pH, turbidity, temperature and specific conductance) will be measured and recorded to document the presence of representative water in the well (i.e., equilibration to steady readings), or as an indicator that conditions have not reached a steady state. Prior to sample collection, the variability of field testing results between successive well volumes should not vary by more than 10% for turbidity and specific conductance, ± 0.2 units for pH, and ± 0.5 °C for temperature, with a minimum of three well volumes purged, and an upper limit of five volumes. The turbidity objective is less than 50 nephelometric turbidity units (NTU); if other parameters are stable but turbidity is still greater than 50 NTU, purging will continue until 50 NTU is achieved, or five well volumes are evacuated , or the well is purged to dry-like conditions (whichever comes first).

After the water level has returned to its pre-purge level (or within a maximum of two hours, if the well has recharged sufficiently to allow sampling), samples will be collected from the middle of the screened portion of the well for overburden wells. If the water level is slow to recharge and does not reach to its pre-purge level within two hours, then samples can be collected after sufficient water has recharged, and the degree of recharge indicated in field notes with time and depth to water noted.

2.7.3 Groundwater Sample Collection

Low-flow sampling techniques will be used for sample collection. A peristaltic pump and new disposable high density polyethylene (HDPE) tubing will be used at each location. Tubing and sampling equipment will be clean upon arrival at the Site. Low-flow sampling will be used to minimize drawdown of the water column within the well and ensure the samples are collected from groundwater within the formation within the well.

The first sample collected will be for volatile organics. Semi-volatile organics will follow.

Two or three (depending on laboratory-specific requirements) 40-ml glass vials (with Teflon septa) will be used to collect samples for volatile organic analysis (VOA). The vials will be filled by slowing pump to achieve a steady flow of water from the tubing into the vial until overflowing and a convex meniscus is formed. The vial will then be capped, inverted and inspected for air pockets/bubbles that may be present on the inside surfaces of the vial. If any bubbles or aggregate of bubbles are observed, then a new sample will be obtained either using a new vial or the same vial.

Sample bottles are discussed in more detail in Section 3.2.

2.8 HYDRAULIC ASSESSMENT

Hydraulic assessment includes the completion of hydraulic conductivity tests and measurement of water levels in monitoring wells.

Hydraulic conductivity testing will be done using either rising or falling head methods utilizing a down-hole electronic pressure transducer. Variable head tests will be completed using a slug to displace water within the well or by removing water from the well with a bailer and/or pump. The recovery of the initial water level is measured with respect to time. Hydraulic conductivity data obtained will be evaluated using procedures presented in "The Bouwer and Rice Slug Test - An Update", Bouwer, H., Groundwater Journal, Vol. 27, No. 3, May-June 1989.

Water level measurements will include measuring the depth of water within the wells/well points from a monitoring point of known elevation established at the top of the well riser. The depth to water will be measured relative to the monitoring point. The water elevations will then be calculated based on the known elevation and measured depth to water. Wells will be allowed to equilibrate a minimum of 24 hours after purging or testing prior to measuring the water level.

2.9 EDC/ORC INJECTION

Bulk dry electron donor material will be brought to the Site and mixed with water in a polyethylene tank to form a slurry-phase mixture. Direct push injections will introduce the slurry-phase EDC/ORC material to the subsurface soil at a series of locations in a grid-like pattern (see Figure 2). Injection flow rate depends on the estimated volume of the bulk injection, thickness of the saturated zone and distance of the injection point to the nearest monitoring well. Four of the direct push locations will be converted into monitoring locations (1-inch diameter PVC microwells) as shown on Figure 2. Additional slurry-phase EDC will be introduced to the overburden groundwater at each subsurface monitoring well location through gravity fed delivery via dedicated 55-gallon drum containers.

Direct push injections will be advanced into the overburden to bedrock refusal using a truck or track mounted probe unit equipped with a two inch outer diameter (OD) by 4 foot long sampler. The soil probe unit will include a hydraulic push/hammer that will be used to advance the macrocore sampler. Drilling fluids will not be used during EDC/ORC applications.

GZA personnel will be on-site during EDC/ORC injections to monitor progress. The injection locations, depths and estimated volume of EDC/ORC material used per location will be recorded.

2.10 EQUIPMENT DECONTAMINATION

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the following procedures outlined below.

2.10.1 Non-Dedicated Reusable Equipment

Non-dedicated reusable equipment such as split spoons, stainless steel mixing bowls; pumps used for groundwater evacuation (and sampling, if applicable) etc. will require field decontamination. Acids and solvents will not be used in the field decontamination of such equipment. Decontamination typically involves scrubbing/washing with a laboratory grade detergent (e.g. alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute. Equipment should be allowed to dry prior to use. Steam cleaning or high pressure hot water cleaning may be used in the initial removal of gross, visible contamination. Tubing will not be re-used (new tubing will be used for each well).

2.10.2 Disposable Sampling Equipment

Disposable sampling equipment includes disposable bailers; tubing associated with groundwater sampling/purging pumps; etc. Such equipment will not be field-decontaminated; equipment other than bailers may be rinsed with laboratory-provided analyte-free water prior to use. Disposable spoons or spatulas purchased from non-environmental equipment vendors (such as restaurant supply houses) will be decontaminated by scrubbing/washing with a laboratory grade detergent followed by potable water and Analyte-free water rinse; or by using steam or high pressure hot water rinse, followed by analyte free water rinse. The equipment will be allowed to air dry prior to use.

2.10.3 Heavy Equipment

Certain heavy equipment such as drilling augers, split spoon samplers etc. may be used to obtain samples. Such equipment will be subject to high pressure hot water or steam cleaning between uses. A member of the sampling team will visually inspect the equipment to check that visible contamination has been removed by this procedure prior to sampling. The drilling augers, and split spoon samplers will be cleaned between boring locations. Decontamination between boring samples at a single location will be done using alconox and water to clean the samplers. Samples submitted for analysis will not include material, which has been in contact with the drilling augers.

2.11 STORAGE AND DISPOSAL OF INVESTIGATION-DERIVED WASTE

The sampling methods and equipment have been selected to limit both the need for decontamination and the volume of waste material to be generated. Investigation-derived material (e.g., drill cuttings and purge water) generated during this project shall be presumed to be non-hazardous waste and will be disposed at the boring or well from which the material was derived. Excess auger cuttings will be drummed and stored on-Site for future disposal unless the OVM readings are less than 1 ppm above the soil. If less than 1 ppm, the material will be placed at ground surface at the location it was generated. If the water is grossly contaminated (e.g., presence of strong vapors or product), it will be drummed. The volume of material to be disposed from drums is unknown, and is not included in our budget for the Site Investigation. Subsequent to generation of drummed waste materials and analytical testing, GZA will discuss disposition of drummed materials.

Personal protective equipment and disposable sampling equipment will be placed in plastic garbage bags for disposal as a non-hazardous waste.

Decontamination Fluids

Wash water and rinse water, including detergent, may be generated during Site work. Tap and analyte-free water used for rinsing will be allowed to percolate back into the ground, or will be disposed into a sanitary system. Non-phosphate detergent and water rinse will be disposed into a sanitary system.

3.0 SAMPLE HANDLING

3.1 SAMPLE IDENTIFICATION/LABELING

Samples will be assigned a unique identification using the sample location or other sample-specific identifier. Sample identification will be limited to seven alphanumeric characters to be consistent with the limitations of the laboratory tracking/reporting software. The general sample identification format follows.

SL - XX - Y-Y

Where:

SL	=	Type of sample (i.e., soil probe, test pit, monitoring well)
XX	=	Numeric character indicating the number from which the sample was obtained.
Y-Y	=	Depth of the sample.

Quality control (QC) field duplicate samples will be submitted blind to the laboratory; a fictitious sample identification will be created using the same system as the original. The sample identifications (of the original sample and its field duplicate) will be marked in the project specific field book and on the copy of the chain-of-custody kept by the sampler and copied to the project manager. Sample containers will be labeled in the field prior to the collection of samples. Affixed to each sampling container will be a non-removable label on which the following information will be recorded with permanent water-proof ink:

- Site name, location, and job number;
- Sample identification code;
- Date and time;
- Sampler's name;
- Preservative;
- Type of sample (e.g., water, soil, air); and,
- Requested analyses.

3.2 SAMPLE, BOTTLES, PRESERVATION, AND HOLDING TIME

Table 2 specifies the analytical method, matrix, holding time, containers, and preservatives for the various analysis to be completed as part of the Site characterization. Sample bottle requirements, preservation, and holding times are discussed further below.

3.2.1 Sample Bottles

The selection of sample containers used to collect samples is based on the criteria of sample matrix, analytical method, potential contaminants of concern, reactivity of container material with the sample, QA/QC requirements and regulatory protocol requirements. Sample bottles will be provided by the analytical laboratory and will conform to the requirements of USEPA's Specifications and Guidance for Contaminant-Free sample Containers.

3.2.2 Sample Preservation

Samples will be preserved as indicated below and summarized on Table 2.

Soil Samples
Analytical (all analysis) - cooled to 4 °C; no chemical preservatives added.
Geotechnical - no preservation required .

Aqueous Samples:

Volatile Organics (VOCs) - cooled to 4 °C; no chemical preservatives added.
Semi-volatile organics - cooled to 4 °C; no chemical preservatives added.

Sample preservation is checked upon sample receipt by the laboratory; this information is reported to GZA's Quality Assurance Officer (QAO) within two business days of sample receipt.

3.2.3 Holding Times

Holding times are judged from the verified time of sample receipt (VTSR) by the laboratory; samples will be shipped from the field to arrive at the lab no later than 48 hours from the time of sample collection. Holding time requirements will be those specified in the NYSDEC ASP; it should be noted that for some analyses, these holding times are more stringent than the holding time for the corresponding USEPA method.

Although trip blanks are prepared in the analytical laboratory and shipped to the Site prior to the collection of environmental samples, for the purposes of determining holding time conformance, trip blanks will be considered to have been generated on the same day as the environmental samples with which they are shipped and delivered. Procurement of bottles and blanks will be scheduled to prevent trip blanks from being stored for excessive periods prior to their return to the laboratory; the goal is that trip blanks should be held for no longer than one week prior to use.

3.3 CHAIN OF CUSTODY AND SHIPPING

A chain-of-custody form will trace the path of sample containers from the project site to the laboratory. A sample Chain of Custody is included in Attachment 1. Field Forms. Sample/bottle tracking sheets or the chain-of-custody will be used to track the containers from the laboratory to the containers' destination. The project manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples, and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. All sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

Once the sample containers are filled, they will be immediately placed in the cooler with ice (in plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at 4 °C. The field sampler will indicate the sample designation/location number in the space provided on the chain-of-custody form for each sample. The chain of custody forms will be signed and placed in a sealed plastic Ziploc bag in the cooler. The completed shipping container will be closed for transport with nylon strapping, or a similar shipping tape, and two paper seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. The cooler will be shipped by an overnight delivery service to the laboratory. When the laboratory receives the coolers, the custody seals will be checked and lab personnel will sign the chain-of-custody form.

4.0 DATA QUALITY REQUIREMENTS

4.1 ANALYTICAL METHODS

Analyses for volatile and semi-volatile organic compounds will utilize NYSDEC Analytical Services Protocol (ASP) Superfund Contract Laboratory Program (CLP) methods:

CLP Volatile Organics	NYSDEC Method 95-1
CLP Semi-volatile Organics	NYSDEC Method 95-2

Analytical methods used during this project are presented in the NYSDEC Analytical Services Protocol (ASP), October, 1995. Specific methods and references for each parameter are shown above. It is the laboratory's responsibility to be familiar with this document and procedures and deliverables within it pertaining to ERP work.

4.2 QUALITY ASSURANCE OBJECTIVES

Data quality objectives (DQOs) for measurement data in terms of sensitivity and the PARCC parameters (precision, accuracy, representativeness, comparability, and completeness) are established so that the data collected are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP will be used in assessing the uncertainty associated with decisions related to this Site.

4.2.1 Sensitivity

The sensitivity or detection limit desired for each analysis or compound is established by NYSDEC as part of the Analytical Services Protocol (ASP) Contract Laboratory Program (CLP). It is understood that such limits are dependent upon matrix interferences.

Volatile Organics (ASP method 95-1). The Contract Required Quantitation Limits (CRQLs) for all analytes is 10 μg/L (10 μg/kg for soil). The reporting limit for non-detected analytes is the CRQL. Based on laboratory method detection limit (MDL) studies, detected analytes will be reported down to 1 ug/L; analytes reported at concentrations below the CRQL will be flagged "J" (estimated) by the laboratory.

Semi-volatile Organics (ASP method 95-2). The CRQLs for semi-volatile organic analytes is 10 μg/L (330 μg/kg for soil) for most analytes. (The CRQLs are 25 μg/L [aqueous] and 800 μg/kg [soil] for a few semi-volatiles.) The reporting limit for non-detected analytes is the CRQL. Detected semi-volatile analytes will be reported down to about one-tenth of the CRQL; analytes reported at concentrations below the CRQL will be flagged "J" (estimated) by the laboratory.

4.2.2 Precision

The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory and field duplicates. Laboratory duplicate analyses will be performed once for every twenty samples for metals as specified in the NYSDEC ASP-CLP.

Relative Percent Difference (RPD) criteria, prescribed by the NYSDEC, and those determined from laboratory performance data, are used to evaluate precision between duplicates. A matrix spike duplicate will be performed once for every twenty samples for volatile organics.

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation but other estimates such as the coefficient of variation, relative standard deviation, range (maximum value minus minimum value), and relative range are common, and may be used pending review of the data.

The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easier to control and quantify than sampling precision; there are more historical data related to individual method performance and the "universe" is not limited to the samples received in the laboratory. In contrast, sampling precision is unique to each site or project.

Overall system (sampling plus analytical) precision will be determined by analysis of field duplicate samples. Analytical results from laboratory duplicate samples will provide data on measurement (analytical) precision.

Precision will be determined from field duplicates, as well as laboratory matrix duplicate samples for metals analyses, and matrix spikes and matrix spike duplicates for organic analyses; it will be expressed as the relative percent difference (% RPD):

$$\% \text{ RPD} = 100 \times 2(X_1 - X_2) / (X_1 + X_2)$$

Where;

X_1 and X_2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values.

Criteria for evaluation of laboratory duplicates are specified in the applicable methods. The objective for field duplicate precision is $\leq$ 50% RPD for all matrices.

4.2.3 Accuracy

The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical method on similar samples. Percent recovery criteria, published by the NYSDEC as part of the ASP, and those determined from laboratory performance data, are used to evaluate accuracy in matrix (sample) spike and blank spike quality control samples. A matrix spike and blank spike will be performed once for every sample delivery group (SDG) as specified in the ASP-CLP. This will apply to inorganics and volatile and semi-volatile organics analyses. Other method-specific laboratory QC samples (such as laboratory control samples for metals, and continuing calibration standards) may also be used in the assessment of analytical accuracy. Sample (matrix) spike recovery is calculated as:

$$\%R = (SSR - SR)/SA \times 100,$$

where

SSR = Spiked Sample Result
SR = Sample Result, and
SA = Spike Added

Accuracy measures the bias in a measurement system. It is difficult to measure accuracy for the entire data collection activity. Accuracy will be assessed through use of known QC samples.

Accuracy values can be presented in a variety of ways. Accuracy is most commonly presented as percent bias or percent recovery. Percent bias is a standardized average error, that is, the average error divided by the actual or spiked concentration and converted to a percentage. Percent bias is unitless and allows accuracy of analytical procedures to be compared.

Percent recovery provides the same information as percent bias. Routine organic analytical protocol requires a surrogate spike in each sample. Surrogate recovery will be defined as:

% Recovery = (R/S) x 100

where;

S = surrogate spike concentration
R = reported surrogate concentration

Recovery criteria for laboratory spikes and other laboratory QC samples through which accuracy may be evaluated are established in the applicable analytical method.

4.2.4 Representativeness

The representativeness of data is only as good as the representativeness of the samples collected. Sampling and handling procedures, and laboratory practices are designed to provide a standard set of performance-driven criteria to provide data of the same quality as other analyses of similar matrices using the same methods under similar conditions. Representativeness will be determined by a comparison of the quality controls for these samples against data from similar samples analyzed at the same time.

4.2.5 Comparability

Comparability of analytical data among laboratories becomes more accurate and reliable when all labs follow the same procedure and share information for program enhancement. Some of these procedures include:

- Instrument standards traceable to National Institute of Standards and Technology (NIST), the U.S. Environmental Protection Agency (EPA), or the New York State Departments of Health or Environmental Conservation;
- Using standard methodologies;
- Reporting results for similar matrices in consistent units;
- Applying appropriate levels of quality control within the context of the laboratory quality assurance program; and,
- Participation in inter-laboratory studies to document laboratory performance.

By using traceable standards and standard methods, the analytical results can be compared to other labs operating similarly. The QA Program documents internal performance. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

4.2.6 Completeness

The goal of completeness is to generate the maximum amount possible of valid data. The highest degree of completeness would be to find all deliverables flawless, valid and acceptable. The lowest level of completeness is excessive failure to meet established acceptance criteria and consequent rejection of data. Due to the relatively large number of data points to be generated during the SI/RAR process, the completeness goal is 95% useable data. It is acknowledged that this goal may not be fully achievable; for example, individual analytes (e.g., 2-hexanone) may be rejected within an otherwise acceptable analysis. The impact of rejected or unusable data will be made on a case-by-case basis. If the SI/RAR can be completed without the missing datum or data, no further action would be necessary. However, loss of critical data may require resampling or reanalysis.

4.3 FIELD QUALITY ASSURANCE

Blank water generated for use during this project must be "demonstrated analyte-free". The criteria for analyte-free water is based on the EPA assigned values for the Contract Required Detection Limits (CRDLs) and CRQLs. If the levels of detection needed on a specific site are lower than the CLP CRDLs/CRQLs, then those levels are used to define the criteria for analyte-free water.

Volatile organics	< 10 µg/l
Semi-volatile organics	< 10 µg/l or 25 µg/l (analyte specific)

However, specifically for the common laboratory contaminants (acetone and 2-butanone) the allowable limits are five times the respective CRQLs. For methylene chloride, the limit is 2.5 times the CRQL.

The analytical testing required for the water to be demonstrated as analyte free must be performed prior to the start of sample collection; thus, blank water will be supplied by the laboratory.

4.3.1 Equipment (Rinsate) Blanks

Equipment blanks consist of demonstrated, analyte-free water that show if sampling equipment has the potential for contaminant carryover to give a false impression of contamination in an environmental sample. When blank water is used to rinse a piece of sampling equipment (before it is used to sample), the rinsate is collected and analyzed to see if sampling could be biased by contamination from the equipment.

Field Equipment (Rinsate) blanks for HDPE tubing: For initial sampling, as well as at subsequent rounds of sampling when tubing is used, at least one piece of tubing will be used to generate equipment (rinsate) blanks during groundwater sampling. Disposable tubing will be obtained from a single vendor for this project. One rinsate blank will be collected per groundwater sampling event.

One rinsate blank will be collected for every 20 samples collected. The rinsate blanks will be collected from the bailer or polyethylene tubing used to collect the samples.

4.3.2 Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. For soil samples, these samples are separate aliquots of the same sample; prior to dividing the sample into "sample" and "duplicate" aliquots, the samples are homogenized (except for the VOC aliquots, which are not homogenized). Aqueous field duplicate samples are second samples collected from the same location, at the same time, in the same manner as the first, and placed into a separate container (technically, these are co-located samples). Each duplicate sample will be analyzed for the same parameters as the original sample collected that day. The blind field duplicate Relative Percent Difference (RPD) objective will be ±50% percent RPD for all matrices. Field duplicates will be collected at a frequency of 1 per 20 environmental samples for both matrices (aqueous and non-aqueous) and test parameters.

4.3.3 Split Samples

Split samples are used for performance audits or inter-laboratory comparability of data. A split sample will be defined as at least two separate sub-samples taken from a single original sample, which has been thoroughly mixed or homogenized prior to the formation of the split samples. The exception to this is samples for volatile organics analysis, which will not be homogenized. Collection of split samples is not planned.

4.3.4 Trip Blanks

The purpose of a VOC trip blank (using demonstrated analyte-free water) is to place a mechanism of control on sample bottle preparation and blank water quality, and sample handling. The trip blank travels from the lab to the site with the empty sample bottles and back from the site with the collected samples. There will be a minimum of one trip blank per shipment containing aqueous samples for volatile organic compounds (VOCs) analysis. Trip blanks will be collected only when aqueous volatile organics are being sampled and shipped; except that a trip blank is not required when the only aqueous samples in a shipment are QC samples (rinsate blanks).

4.4 FIELD TESTING QC

Field testing of groundwater will be performed during purging of wells prior to sampling for laboratory samples. Field QC checks of control limits for pH, specific conductance (conductivity) and turbidity are detailed below. The calibration frequencies discussed below are the minimum. Field personnel can and should check calibration more frequently in adverse conditions, if anomalous readings are obtained, or subjective observations of instrument performance suggest the possibility of erroneous readings.

4.4.1 pH

The pH meter is calibrated twice daily (prior to initial use and midday), using two standards bracketing the range of interest (generally 4.0 and 7.0). If the pH QC control sample (a pH buffer, which may be the same or different than those used to initially calibrate the instrument) exceeds $\pm$ 0.1 pH units from the true value, the source of the error will be determined and the instrument recalibrated. If a continuing calibration check with pH 7.0 buffer is off by $\pm$ 0.1 pH units, the instrument will be recalibrated. Expired buffer solutions will not be used. A field pH Calibration Form is included in Attachment 1.

Note that gel-type probes take longer to equilibrate (up to 15 minutes at near-freezing temperatures); this must be taken into account in calibrating the instrument and reading samples and standards.

4.4.2 Specific Conductivity

A vendor-provided conductivity standard will be used to check the calibration of the conductivity meter twice daily (prior to initial use and midday). Specific conductance QC samples will be on the order of 0.01 or 0.1 molar potassium chloride solutions in accordance with manufacturer's recommendations. A Field Specific Conductance Calibration Form is included in Attachment 1.

4.4.3 Turbidity

The turbidity meter should be calibrated using a standard as close as possible to 50 NTU (the critical value for determining effectiveness of well development and evacuation). The turbidimeter will be calibrated/checked twice daily. The turbidity QC sample will be a commercially prepared polymer standard (Advanced Polymer System, Inc., or similar). A Field Turbidity Calibration Form is included in Attachment 1.

4.4.4 Temperature

Temperature probes associated with instruments are not subject to field calibration, but the calibration should be checked to monitor instrument performance. It is recommended that the instrument's temperature reading be checked against a NBS-traceable thermometer concurrently with checking the conductivity calibration. The instrument manual will be referenced for corrective actions if accurate readings cannot be obtained. A Temperature Calibration Form is included in Attachment 1.

4.5 LABORATORY QUALITY ASSURANCE

4.5.1 Method Blanks

A method blank is laboratory water on which every step of the method is performed and analyzed along with the samples. They are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instruments as the sample is prepared and analyzed in the laboratory. Method blanks will be analyzed at a frequency of one for every 20 samples analyzed or as otherwise specified in the analytical protocol.

4.5.2 Laboratory Duplicates

Laboratory duplicates are sub-samples taken from a single aliquot of sample after the sample has been thoroughly mixed or homogenized (with the exception of volatile organics), to assess the precision or reproducibility of the analytical method on a sample of a particular matrix. Laboratory duplicates will be performed on spiked samples as a Matrix Spike and a Matrix Spike Duplicate (MS/MSD) for volatile and semi-volatile organics.

4.5.3 Spiked Samples

Two types of spiked samples will be prepared and analyzed as quality controls: Matrix Spikes and Matrix Spike Duplicates (MS/MSD) are analyzed to evaluate instrument and method performance and performance on samples of similar matrix. MS/MSD will be analyzed at a frequency of one (pair) for every 20 samples. In addition, matrix spike blanks (MSBs) will also be run by the lab as part of its NYSDEC CLP.

5.0 DATA DOCUMENTATION

5.1 FIELD NOTEBOOK

Field notebooks will be initiated at the start of on-Site work. Each subcontractor in the field will have a notebook dedicated to record pertinent activities. In addition to any forms that will be filled out summarizing field work (and become part of the project file), legible photocopies of pertinent notebook pages will be submitted by the contractors with their finished written report or product. The field notebook will include the following daily information for Site activities:

- Date;
- Meteorological conditions (temperature, wind, precipitation);
- Site conditions (e.g., dry, damp, dusty, etc.);
- Identification of crew members (GZA and subcontractor present) and other personnel (e.g., agency or site owner) present;
- Description of field activities;
- Location(s) where work is performed;

- Problems encountered and corrective actions taken;
- Records of field measurements or descriptions recorded; and,
- Notice of modifications to the scope of work.

During drilling operations, the supervising field engineer/geologist will add the following information:

- Rig type;
- Documentation of materials used;
- Downtime;
- Time work is performed at an elevated or lowered level of respiratory protection;
- Description of soil or rock strata; and,
- Diagram of well or piezometer construction.

During sampling of surface water and monitoring wells, field samplers will add the following:

- Sampling point locations and test results such as pH, conductance, etc.
- Information about sample collection
- Chain of custody information, and
- Field equipment calibration.

5.2 FIELD REPORTING FORMS

Field reporting forms (or their equivalent) to be utilized in this investigation are presented in Attachment 1. These include:

- Soil probe Boring & Piezometer Installation Log;
- Monitoring Well Field Measurements Log;
- Hydraulic Conductivity Test Form;
- Sample Collection Log;
- Chain of Custody Form;
- pH Calibration Log;
- Specific Conductance Calibration Log;
- Turbidity Calibration Log; and,

- Temperature Calibration Log.

These forms, when completed, will become part of the project file.

6.0 EQUIPMENT CALIBRATION AND MAINTENANCE

6.1 STANDARD WATER AND AIR QUALITY FIELD EQUIPMENT

Field equipment used during the collection of environmental samples includes:

- Water quality meter with a flow through cell. The water quality meter will read, at a minimum, turbidy, pH, conductivity, and temperature.
- Organic vapor meter with a photoionization detector.

Calibration and standardization for the field water quality tests will be in conformance with the manufacturers recommendations. The water quality meter will be fully calibrated at the start of the groundwater sampling event. The pH calibration check will be done at least two times daily and it will be checked with pH 7.0 buffer every five samples, two hours, or every time it has been turned off for more than two hours and then turned on, whichever occurs first. The calibration of the specific conductance meter will be checked twice daily (at the beginning and in the middle of the work day).

The OVM used for soil screening and health and safety air monitoring will be calibrated following the manufacturer's instructions, at the beginning of the day, whenever the instrument is shut off for more than two hours, and at the field technician's discretion.

6.2 LABORATORY EQUIPMENT

Laboratory equipment will be calibrated according to the requirements of the 1995 Revised NYSDEC ASP, Superfund Contract Laboratory Program for each parameter or group of similar parameters, and maintained following professional judgment and the manufacturer's specifications.

7.0 CORRECTIVE ACTIONS

If instrument performance or data fall outside acceptable limits, then corrective actions will be taken. These actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work. Subcontractors providing analytical services should perform their own internal laboratory audits and calibration procedures with data review conducted at a frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work.

Situations related to this project requiring corrective action will be documented and made part of the project file. For each measurement system identified requiring corrective action, the responsible individual for initiating the corrective action and also the individual responsible for approving the corrective action, if necessary, will be identified. As part of its total quality management program, GZA makes the results of laboratory audits and data validation reports available to the analytical laboratories. The laboratories are therefore made aware of non-critical items and areas where improvement may be made in subsequent NYSDEC ASP work.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

The guidance followed to perform quality data validation, and the methods and procedures outlined herein pertain to initiating and performing data validation, as well as reviewing data validation performed by others (if applicable). An outline of the data validation process is presented here, followed by a description of data validation review summaries.

8.1 LABORATORY DATA REPORTING AND REDUCTION

The laboratory will meet the applicable documentation, data reduction, and reporting protocols as specified in the 2005 revision of the NYSDEC ASP CLP. Laboratory data reports for non-CLP data will conform to NYSDEC Category B deliverable requirements. With full CLP documentation, deliverables will include, but not be limited to:

Organics	**Inorganics**
Chains of Custody	Chains of Custody
Blanks	Holding Times
Holding Times	Blanks
Internal Standards	Furnace AA QC
Laboratory Duplicates	CRDL Standards
Tentatively Identified Compounds	ICP Serial Dilutions
GC/MS Instrument Performance Check	Laboratory Control Samples
System Monitoring Compound Recovery	Laboratory Duplicates
Matrix Spike & Matrix Spike Duplicates	ICP Interference Check
GC/MS Tuning	Spiked Sample
Surrogate Recoveries	Recovery

Copies of the laboratory's generic Quality Assurance Plan (QAP) will be on file at GZA. The laboratory's QAP will indicate the standard methods and practices for obtaining and assessing data, and how data are reduced from the analytical instruments to a finished report, indicating levels of review along the way.

In addition to the hard copy of the data report, the laboratory will be asked to provide the sample data in spreadsheet form on compact disc (CD). The CD will be generated to the extent possible directly from the laboratory's electronic files or information management system to minimize possible transcription errors resulting from the manual transcription of data.

8.2 DATA VALIDATION DATA USABILITY SUMMARY REPORT

CLP data will be validated by a data validation subcontractor. Data validation will be performed by following guidelines established in the US EPA Region 2 SOP No. HW-6, "CLP Organics Data Review" (Revision No. 8, January 1992); and SOP No. HW-2, "Evaluation of Metals Data for the Contract Laboratory Program (CLP)" (based on SOW 3/90; January 1992). These documents are check lists which are designed to formally and rigorously assess the quality and completeness of CLP data packages. The use of these USEPA SOPs will be adapted to conform to the specific requirements of the NYSDEC ASP (e.g., NYSDEC/ASP holding times; matrix spike blank requirements). Where necessary and appropriate, supplemental validation criteria may be derived from the EPA Functional Guidelines (USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, Publication 9240.1-05, EPA-540/R-94/012, February, 1993; and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Publication 9240.1-05-01; EPA-540/R-94/013, PB94-963502, February, 1994).

Validation reports will consist of text results of the review and marked up copies of Form I (results with qualifiers applied by the validator). Validation will consist of target and non-target compounds with corresponding method blank data, spike and surrogate recoveries, sample data, and a final note of validation decision or qualification, along with any pertinent footnote references. Qualifiers applied to the data will be documented in the report text.

There may be some analyses for which there is no established USEPA or NYSDEC data validation protocol. In such cases, validation will be based on the EPA Region II SOPs and EPA Functional Guidelines as much as possible, as well as the laboratory's adherence to the technical requirements of the method, and the professional judgment of the validator. The degree of rigor in such validation will correspond to the nature of the data and the significance of the data and its intended use. Unless otherwise requested, non-CLP data (e.g., total organic carbon) is not subject to validation.

8.3 DATA USABILITY

Subsequent to review of the items evaluated in the subcontractor data validator reports and accompanying tables, GZA's QA staff then prepares a brief data usability summary. The data usability summary, which will be provided as part of the SI/RAR report, encompasses both quantitative and qualitative aspects, although the qualitative element is the most significant.

The quantitative aspect is a summary of the data quality as expressed by qualifiers applied to the data; the percent rejected, qualified (i.e., estimated), missing, and fully acceptable data are reported. As appropriate, this quantitative summary is broken down by matrix, laboratory, or analytical fraction or method.

The qualitative element of the data usability summary is the QA officer's translation and summary of the validation reports into a discussion useful to data users. The qualitative aspect will discuss the significance of the qualifications applied to the data, especially in terms of those most relevant to the intended use of the data. The usability report will also indicate whether there is a suspected bias (high or low) in qualified data, and will also provide a subjective overall assessment of the data quality. If similar analyses are performed by more than one method, a discussion of the extent of agreement among the various methods will be included, as well as discussion of any discrepancies among the data sets. The QAO will also indicate if there is a technical basis for selecting one data type over another for multiple measurements which are not in agreement.

Non-CLP data which has not been validated and field data used for the SI will be discussed in the data usability summary.

8.4 FIELD DATA

Field chemistry data collected during air monitoring, soil screening (e.g., OVM readings), and water monitoring (i.e., pH, turbidity, specific conductance, and temperature) will be presented in tabular form with any necessary supporting text. Unless activities resulted in significant unexpected results, field data comments can be added as footnotes to the tables.

9.0 PERFORMANCE AND SYSTEM AUDITS

An audit of the laboratory(s) during the Site characterization will not be performed unless warranted by a problem(s) that cannot be resolved by any other means, or at the discretion of GZA or NYSDEC.

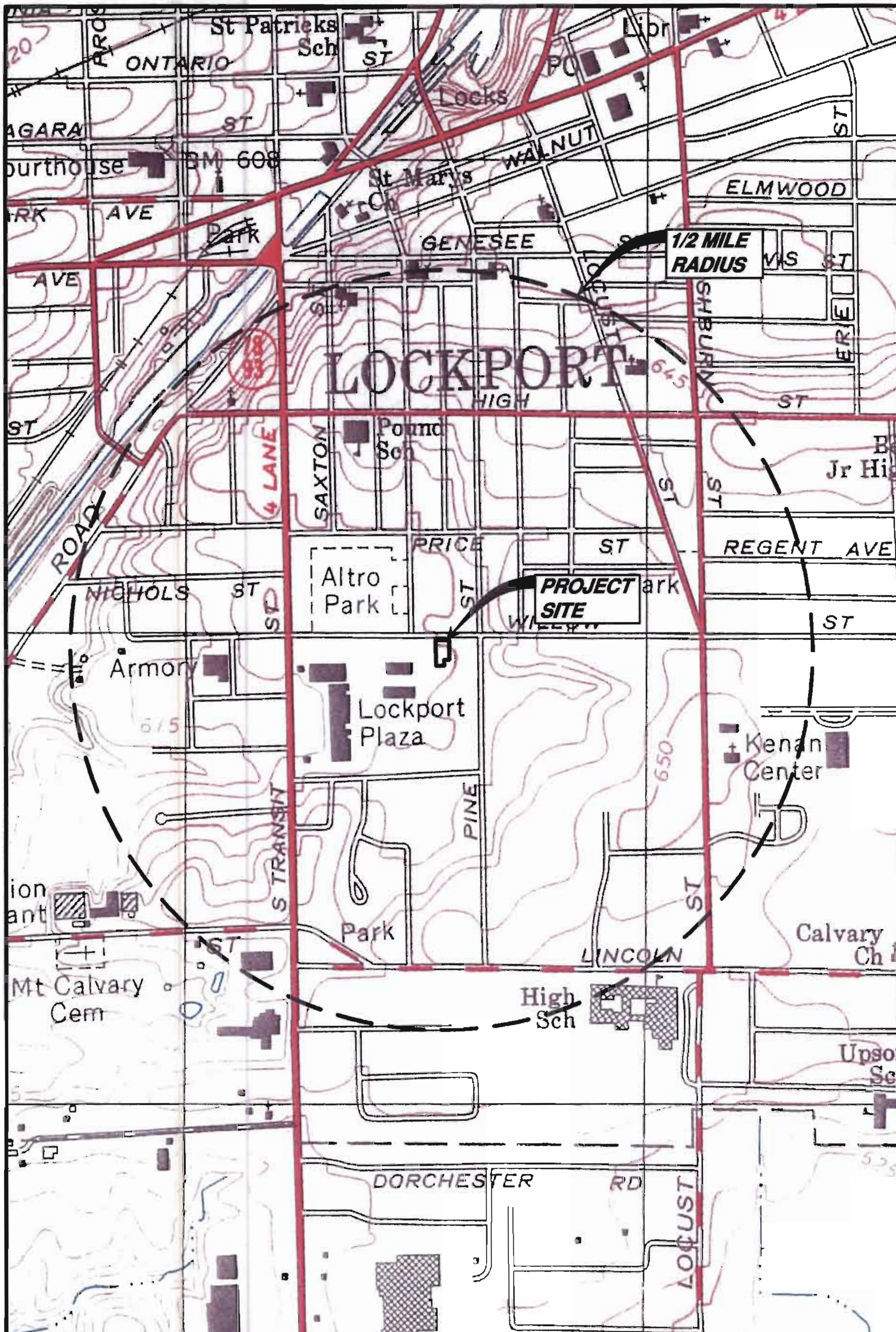
10.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Monthly project status reporting to the NYSDEC will include aspects of quality control that were pertinent during the month's activities. Problems revealed during review of the month's activities will be documented and addressed. These reports will include a description of completed and on-going activities, and an indication how each task is progressing relative to the project schedule.

The project manager, through task managers, will be responsible for verifying that records and files related to this project are stored appropriately and are retrievable.

The laboratory will submit memoranda or correspondence related to quality control of this project's samples as part of its deliverables package.

FIGURES



DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

0 500 1000 2000

PETER'S DRY CLEANERING

316 WILLOW STREET

LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

1/2 MILE RADIUS PLAN

NOTE:

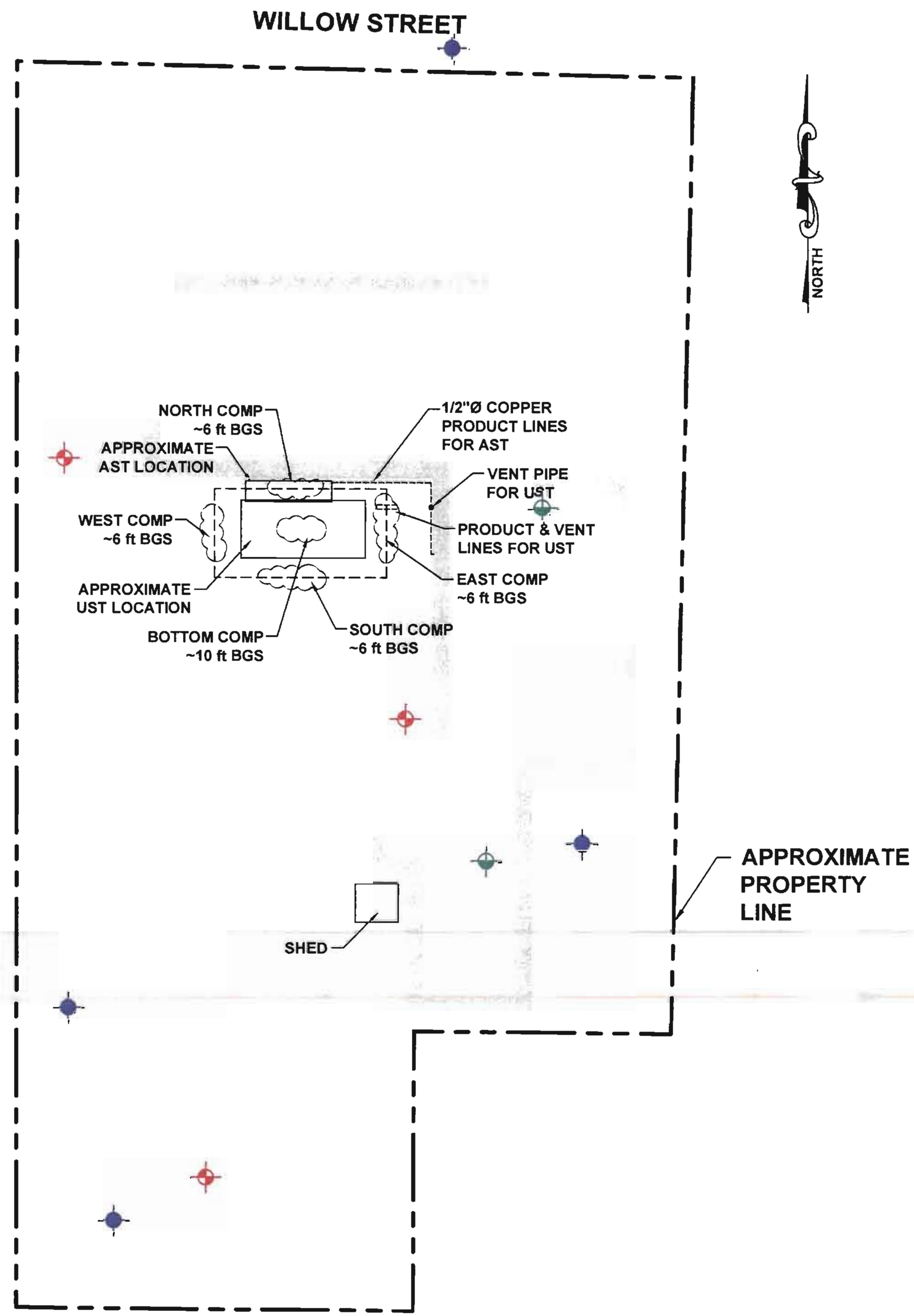
BASE MAP ADAPTED FROM U.S.G.S. TOPOGRAPHIC MAPS DOWNLOADED FROM TERRASERVER.MICROSOFT.COM

PROJECT No.

21.0056017.10

FIGURE No.

1



LEGEND:

- APPROXIMATE LOCATION OF PROPOSED BEDROCK MONITORING WELL
- APPROXIMATE LOCATION OF PROPOSED SUB-SLAB AIR SAMPLE
- APPROXIMATE LOCATION OF PROPOSED SOIL PROBE WITH GROUNDWATER SAMPLE
- BOTTOM COMP ~10 ft BGS — APPROXIMATE LOCATION AND DESIGNATION OF CONFIRMATORY SOIL SAMPLES COLLECTED BY GZA GEOENVIRONMENTAL OF NEW YORK
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004 WITH MICROWELL INSTALLED

NOTES:

1. BASE MAP ADAPTED FROM A 2002 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

0 10 20 40

PETERS DRY CLEANING

316 WILLOW STREET

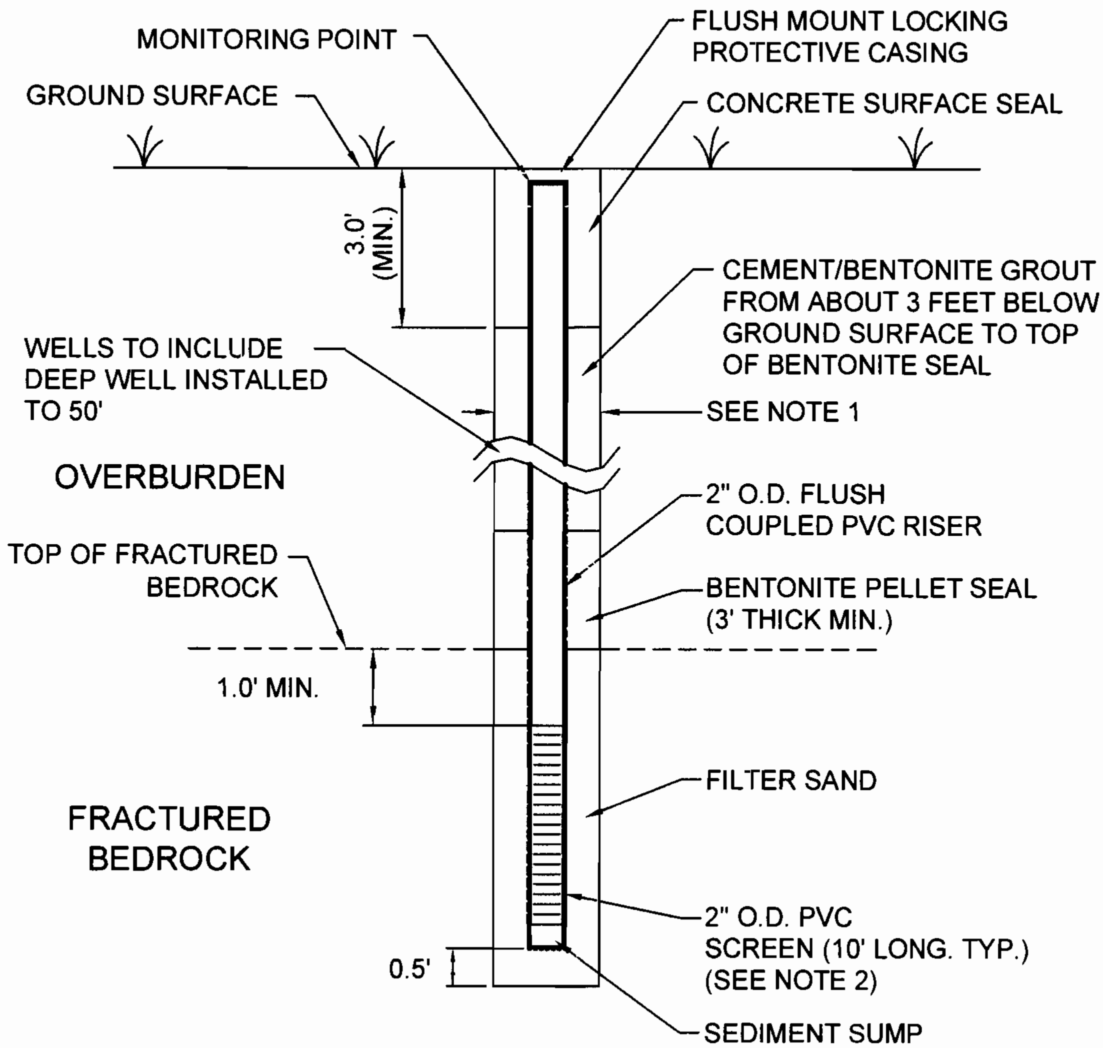
LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

SITE PLAN

PROJECT No. **21.0056017.10**

FIGURE No. **2**



NOTES:

1. OVERBURDEN DRILLED WITH 4-1/4 INCH HOLLOW STEM AUGERS ON A ROTARY RIG.
2. WELL SCREEN SHALL BE 0.01 INCH FACTORY SLOTTED.

DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

NOT TO SCALE

PETER'S DRY CLEANERING
316 WILLOW STREET
LOCKPORT, NEW YORK

BROWNFIELD CLEAN-UP WORK PLAN
PROPOSED BEDROCK MONITORING WELL INSTALLATION DIAGRAM

PROJECT No.
21.0056017.10

FIGURE No.
4

TABLES

Table 1
Brownfields Cleanup Program
Proposed Analytical Testing Program Summary
Peter's Dry Cleaners
Lockport, New York

Location	Matrix	TCL VOCs 8260	SVOCs FULL LIST 8270	PRIORITY POLLUTANT METALS 6010/7470	PCBS 8082	PESTICIDES 8081	VOCs TO-15
Subsurface Soil Samples							
Various[1]	Soil	10	10	10	10	10	-
Duplicate	Soil	1	1	1	1	1	-
MS/MSD	Soil	2	2	2	2	2	-
Rinsate	Water	1	1	1	1	1	-
Total		14	14	14	14	14	-
Overburden Groundwater Samples							
Various[1]	Groundwater	42	42	42	42	42	-
Duplicate	Groundwater	3	3	3	3	3	-
MS/MSD	Groundwater	6	6	6	6	6	-
Rinsate	Water	1	1	1	1	1	-
Trip Blank	Water	1	0	0	0	0	-
Total		53	52	52	52	52	-
Bedrock Groundwater Samples							
New Monitoring Wells	Groundwater	9	9	9	9	9	-
Duplicate	Groundwater	0	0	0	0	0	-
MS/MSD	Groundwater	0	0	0	0	0	-
Rinsate Blank	Water	0	0	0	0	0	-
Trip Blank	Water	0	0	0	0	0	-
Total		9	9	9	9	9	-
Soil Vapor Samples							
Soil Vapor Probes	Air	-	-	-	-	-	8
Duplicate	Air	-	-	-	-	-	1
Trip Blank	Air	-	-	-	-	-	1
Total		-	-	-	-	-	10
	TOTAL	76	75	75	75	75	10

Notes:
1) Actual sample location to be selected based on field observation.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
TCL VOCs - Target Compound List Volatile Organic Compounds.
SVOCs FULL LIST - Semi-Volatile Orgaic Compounds
PCBs - Polychlorinated Biphenyls
2) MS/MSD, Duplicate, Trip Blank & Rinsate Samples for Bedrock groundwater included with Overburden groundwater.
Sampling methodologies will be the same and sampling will occur concurrently.
Groundwater sample numbers assume 3 sampling rounds.

Table 2
Summary of Container, Preservation and Holding Time Requirements
Quality Assurance Project Plan
Peter's Dry Cleaners
Lockport, New York

Analysis	Method	Holding Time (days)		Containers		Preservative
		To Extraction	To Analyze	Number	Type	
Soil Samples						
TCL Volatiles	NYSDEC Method 95-1 (a)		7	2	L	Cool
TCL Semivolatiles	NYSDEC 95-2 (a)	5	40	1	J[1]	Cool
PCBs/Pesticides	NYSDEC 95-3 (a)	5	40	1	J[1]	Cool
Prioroty Pollutant Metals	NYSDEC Metals Methods (a)		26/6 mo {c}	1	J[1]	Cool
Aqueous Samples						
TCL Volatiles	NYSDEC Method 95-1 (a)		7	2	G	Cool
TCL Semivolatiles	NYSDEC 95-2 (a)	5	40	2	H	Cool
Priority Pollutant Metals	NYSDEC Metals Methods (a)		26/6 mo {c}	1	I	HNO3
PCBs/Pesticides	NYSDEC 95-3 (a)	5	40	2	H	Cool

Notes:

Analytical Methods
(a) NYSDEC Analytical Services Protocol (ASP), July 2005.
(b) Test Methods for Evaluating Solid Waste, November, 1986, SW-846, Third Edition.

Holding Times
{a} Holding Times presented in calendar days unless otherwise specified. Holding times are calculated from verified time of receipt at the laboratory. Samples must be received by the laboratory within 48 hours of sampling.
{b} Where two holding times are presented, separated by "/", the shorter holding time applies only to certain analytes included on the list.
{c} Holding time for mercury is 26 days; all other inorganics, 6 months.

Container Types
G - 40 ml glass, Teflon septum cap liner
H - 1000 ml glass, Teflon cap liner
I - 500 ml, polyethylene, Teflon cap liner
J - 8 oz. wide mouth glass, Teflon cap liner
K - 32 oz. wide mouth glass, plastic or metal cap
L - 4 oz. amber, Teflon cap liner

Preservatives
Cool - Cool to 4 degrees Celsius
HNO3 - Nitric Acid to <2 pH
NaOH - Sodium Hydroxide to >12pH
HCl - Hydrochloric acid to pH<2

1) Only two containers are required when collecting samples for all of the indicated analytes.

ATTACHMENT 1

FIELD FORMS

CHAIN-OF-CUSTODY RECORD

Station Number	Time (24 hr.)	Container ID	Sampler ID	Location Description	Sample Type	ANALYSES REQUIRED	Total # of Cont.	Note #

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

NOTES:

ANALYTICAL LABORATORY: ______

LABORATORY CONTACT: ______

GZA CONTACT: ______

GZA GEOENVIRONMENTAL OF NEW YORK
364 Nagel Drive
BUFFALO, NY 14225
(716) 685-2300

GZA FILE NO. ______ P.O. NO. ______

PROJECT ______

LOCATION ______

COLLECTOR ______

DATE OF COLLECTION ______ SHEET ______ OF ______

DAILY FIELD SUMMARY

DATE ______________ FILE No. ______________

REPORT No. __________ SHEET _____ of _____

PROJECT ______________________________ LOCATION ______________________________

OWNER ______________________________ CONTRACTOR ______________________________

WEATHER CONDITIONS ______________________________

REMARKS ______________________________

REPORT

Field Time ______

Travel Time ______

Office Time ______

Total Time ______

PREPARED BY ______________

GZA GEOENVIRONMENTAL OF NEW YORK
364 NAGEL DRIVE, BUFFALO, NEW YORK

ENGINEERS AND SCIENTISTS

PROJECT
[Site]
[Location]

BORING No.
SHEET 1 OF 1
FILE No.
CHECKED BY :

CONTRACTOR	BORING LOCATION
DRILLER	GROUND SURFACE ELEVATION DATUM
START DATE END DATE	GZA GEOENVIRONMENTAL REPRESENTATIVE

WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES

TYPE OF DRILL RIG
CASING SIZE AND DIAMETER
OVERBURDEN SAMPLING METHOD
ROCK DRILLING METHOD

DEPTH	SAMPLE					SAMPLE DESCRIPTION	EQUIPMENT DESCRIPTION		OVM
	BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)				
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									

S - Split Spoon Sample
C - Rock Core Sample

NOTES:

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

File: 55191

Page: ______

Summary of Field Groundwater Quality Measurements

Well Identification	Well Elevation	Well Construction
Monitoring Well : ______	Ground Surface Elevation: ______	Riser/Screen Material: ______
Installation Date: ______	Protective Casing Elevation: ______	Top of Intake Depth: ______
Installed By: ______	Monitoring Point Elevation: ______	Bottom of Intake Depth: ______
	Elevation Datum:	

Date	Time	Depth to Water	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Notes

Existing Well Assessment - ____

Historic Information

Boring Log Available (yes/no/attached):

Installation Log Available (yes/no/attached)

Summary

Monitoring Well : ____	Ground Surface Elevation: ____	Riser/Screen Material: ____
Installation Date: ____	Protective Casing Elevation: ____	Top of Intake Depth: ____
Installed By: ____	Monitoring Point Elevation: ____	Bottom of Intake Depth: ____
	Elevation Datum:	

Previous Field measurement Information Available (yes/no/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Exterior Observations: ____

Interior Observations ____

Signs of Damage/Tampering:

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Development

Date	Time	Depth to Water	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Notes

File: 55191 Page:

Hydraulic Conductivity Test - ________

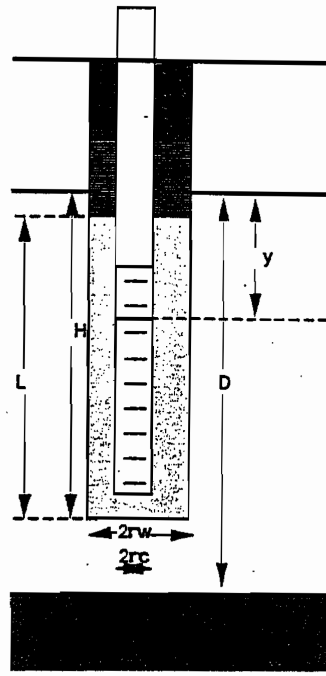
Well Identification		Test Information		Well Construction	
Monitoring Well :		GZA Representative:		Top of Intake Depth:	
Installation Date:		Test Date:		Bottom of Intake Depth:	
Installed By:		Weather Conditions:		Screened Zone:	
				Confined/Unconfined	

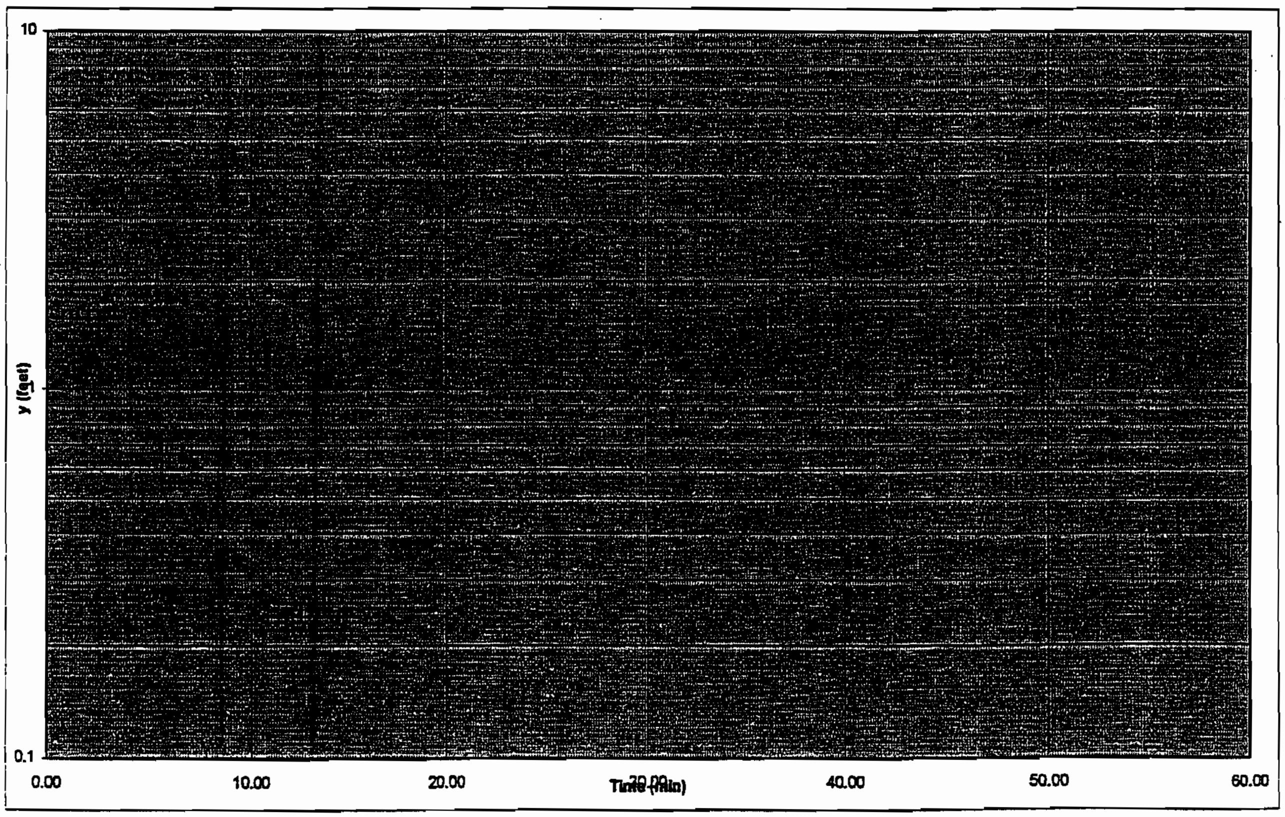
Test Data

Time (hr/min/sec)			Time (min)	Water Level (feet)	Drawdown = y (feet)

Well Configuration

L (ft) =	
H (ft) =	
D (ft) =	
rw (ft) =	
rc (ft) =	





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Page

Sample Collection Log

Sample Identification		Miscellaneous	
Sample Location		Weather Conditions	
Sample Type		Chain-of-Custody Completed (yes/no)	
Sample Code		Sample Containers Labeled (yes/no)	
Date		Shipping Containers Sealed (yes/no)	
Time		Trip Blank Identification	
GZA Representatives:		Field Blank Identification	

General

Sample Collection Equipment

Decontamination Procedure

Sample Collection Procedure

Field Measurement Equipment Used and Calibration Information

pH

Specific Conductance

Temperature

Turbidity

Other Equipment

Requested Testing

Container	Preservative	TCL VOCs	TCL Semi-VOCs	TCL PCBs	TCL Pesticides	8 RCRA Metals	Hardness	TOC											

Summary of Field Measurements

Depth to Water	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Other

Notes

Turbidity Meter Calibration Worksheet

Project:	**GZA File :**
Location:	**Sample Collection Date:**

Turbidity Meter Model:

Calibration (1)

Date	Target Value (2) (ŭMhos/cm)	Actual Reading (uMhos/cm)	Analyst's Initials	Remarks

Notes:

1) Calbration done in accordance with manufacturers recommendations.
2) Target value of standards provided by manufacturer.

APPENDIX C

SITE-SPECIFIC HEALTH AND SAFETY PLAN

PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

HEALTH AND SAFETY PLAN
PETERS DRY CLEANING
LOCKPORT, NEW YORK

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 OVERVIEW

This Site-Specific Health and Safety Plan (HASP) has been developed by GZA GeoEnvironmental of New York (GZA) to establish the health and safety procedures required to protect on-site personnel, and off-site receptors from potential hazards resulting from activities within the specified scope of work at Peter's Dry Cleaners (Site) located at 316 Willow Street in Lockport, New York (See Figure 1). The provisions of this plan apply to GZA personnel who may be exposed to safety and/or health hazards related to activities described in Section 3.0 of this document. The procedures in this plan have been developed based on current knowledge regarding the hazards, which are known or anticipated for the operations to be conducted at this Site.

The following sections (1.1.1 to 1.2) present a brief summary of information from the body of this HASP. This information is intended as a guide to assist the reader and is not intended to be all-inclusive.

1.1.1 Project Scope

This project involves Site characterization and remedial efforts consisting of the following field activities: soil probe borings; monitoring well and micro-well installation; soil groundwater sampling; and direct push injections/gravity-fed introduction of electron donor compound (EDC) and oxygen releasing compounds (ORC) to the soil and groundwater.

1.1.2 Site Hazards

The primary hazards anticipated at the Site are the physical hazards associated with operation of mechanical equipment (e.g., drill rig), including noise exposure. GZA personnel will not be involved with the actual operation of large mechanical equipment (i.e., drill rig) but rather will provide oversight/supervision during rock core drilling and soil boring activities. Exposure to these hazards by GZA personnel can be controlled by keeping a safe distance from heavy equipment during operation.

Potential Inhalation hazards may result from the presence of a variety of compounds including volatile organic compounds and semi-volatile organic compounds (i.e., chlorinated solvents and petroleum hydrocarbons) that are present on-Site.

1.1.3 Levels of Protection

Non-intrusive activities described within the scope of this HASP will require Level D protection. Soil probes, monitoring well installation and environmental sampling will require Level D protection with potential upgrade to Level C based on air monitoring and observed Site conditions.

1.2 PROJECT TEAM

The personnel responsible for the completion of this project and monitoring compliance with this HASP are:

Name	Project Title/Assigned Role	Office Phone Numbers	Cellular Phone Numbers
Ernest R. Hanna	Principal-in-Charge	(716) 685-2300 ext 3301	(716) 289-6610
Christopher Boron	Project Manager	(716) 685-2300 ext 3309	(716) 570-5990
John Beninati or Christopher Boron	Field Team Leader/Site Safety Officer (SSO)	(716) 685-2300 ext 3311 Or (716) 685-2300 ext 3309	(716) 570-5737 (716) 570-5990
Mark Malchik	Corporate Health and Safety Director	(781) 278-5747	

Activities covered in this HASP must be conducted in compliance with this HASP and with applicable federal, state and local health and safety regulations, including 29 CFR 1910.120. Each GZA employee must sign a copy of the HASP Orientation Verification Form (included in Attachment 1) verifying that he or she has read it and understands its requirements. Personnel covered by this HASP who cannot or will not comply must be excluded from Site activities.

This HASP may be used by GZA subcontractors for informational purposes when developing their own HASP. However, subcontractors are responsible for determining their HASPs adequacy and applicability to their on-site activities. Subcontractors must deliver their HASP in clear written form to GZA prior to the initiation of on-site activities. GZA will not review or approve subcontractors HASPs.

2.0 SITE DESCRIPTION AND HISTORY

Peters Dry Cleaning, located at 316 Willow Street, in the City of Lockport, New York (Site) has been operated as a dry cleaning facility since the late 1930s/early 1940s. Prior to its use as a dry cleaner, the facility was used as a clothing tailor shop. A Phase II Environmental Site Assessment (ESA)[1] by GZA GeoEnvironmental of New York (GZA) identified petroleum and chlorinated solvent contamination in the soil and groundwater at the Site. Two storage tanks were also identified during the ESA. Based on the findings of the Phase II ESA, the New York State Department of Environmental Conservation (NYSDEC) assigned Spill No. 0475193 to the Site.

The tanks identified at the Site, a 1,000-gallon aboveground storage tank (AST) and an abandoned 6,000-gallon underground storage tank (UST), were used to store heating oil prior to the facility being connected with natural gas. In April 2005, GZA removed the AST and UST in accordance with a NYSDEC approved February 2005 Work Plan. These activities are documented in GZA's June 2005 Closure Report[2].

During the abandoned UST removal, approximately 2 cubic yards of petroleum contaminated material (sand) were removed from the Site that had previously been placed into the UST unit as part of its interim or temporary closure. Some minimal petroleum contamination was also identified around the area of the UST. There was also approximately 30 tons of chlorinated solvent contaminated soil removed as part of an additional excavation activity done at the Site. The 30-tons of soil contaminated with chlorinated solvent were disposed of as hazardous waste at Chemical Waste Management in Model City, New York.

A blend of petroleum hydrocarbons known as Stoddard solvent was used for dry cleaning at the Site prior to tetrachloroethene (PCE) being used. Therefore, the petroleum contamination present at the Site may be a result of both the fuel oil previously stored and the historical use of Stoddard solvent. The chlorinated solvent contamination is likely due to the use of PCE. Since the Site was acquired by Peters Dry Cleaning in the early 1970's, Peters Dry Cleaning did not

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[1] Phase II Environmental Site Assessment, Peter's Dry Cleaners, 316 Willow Street, Lockport, New York; completed for Earle, Delange, May, Seaman, Jones, Hogan & Brooks, LLP; by GZA GeoEnvironmental of New York; August 2004.

[2] "Aboveground and Underground Storage Tank Closure Report, Peters Dry Cleaners, 316 Willow Street, Lockport, New York" prepared by GZA GeoEnvironmental of New York, dated June 2005.

operate either the fuel oil AST or UST. The use of PCE by Peters Dry Cleaning since the acquisition of the property has involved the use of the "new generation" closed loop recycling dry cleaning equipment. PCE is presently not being used for dry cleaning activities at the site.

3.0 SCOPE OF WORK

Field activities during this investigation shall be comprised of intrusive activities and non-intrusive activities. Non-intrusive activities are survey type activities and are not expected to result in significant exposure to contamination. Intrusive activities are those activities, which may result in the handling of potentially contaminated materials (i.e., rock core drilling, soil probes). The field activities planned are briefly described below; additional details are included in the Site-specific Field Activities Plan (FAP).

3.1 NON-INTRUSIVE ACTIVITIES

3.1.2 Survey

GZA personnel will measure the vertical and horizontal locations of bedrock monitoring wells and direct push soil injections.

3.2 Intrusive Activities

3.2.1 Test Borings and Bedrock Monitoring Well Installation

Three test borings will be done utilizing a rotary drill rig to collect soil samples and install bedrock monitoring wells. Borings will be advanced through the overburden soil material using hollow stem augers and rotary drilling methods. Soil samples will be collected using split spoon methods. Rock core samples will be collected using rotary methods via an NX-sized core barrel. The drill rig will be operated by a drilling subcontractor. GZA personnel will not be involved with the actual operation of drilling equipment.

The drilling crew will collect soil and rock samples from each borehole. GZA will log the soil and bedrock samples. Soil samples will be retained in jars. Rock cores will be placed in wooden boxes supplied by the subcontractor. GZA personnel will stand away from the drilling equipment and will only approach to receive the sample once directed by the driller. The soil samples will be screened during sampling by GZA personnel with an OVM. A bedrock monitoring well will be installed by a drilling subcontractor within each of the three boreholes drilled into bedrock to permit the collection of bedrock groundwater samples.

3.2.2 Soil and Groundwater Sampling

During installation, GZA will collect soil samples from the three bedrock monitoring well locations. In addition, GZA will collect groundwater samples from the three or four overburden and ten soil and groundwater monitoring well locations. Samples collected will be screened for the presence of organic vapors using an OVM during each sampling event.

It is planned that two to four background overburden soil samples will be collected during bedrock monitoring well installation. Background samples will be confirmed with NYSDEC before sampling.

3.2.3 Direct Push Soil Injections

EDC and ORC will be introduced into the overburden soil material through a series of direct push injections using a truck or track mounted soil probe unit equipped with a two-inch outer diameter (OD) by four foot long sampler. The probe unit will include a hydraulic push/hammer that will be used to advance the sampler. Direct push injections will be advanced to bedrock refusal.

4.0 HAZARD ASSESSMENT

The following chemical, physical, and biological hazard assessment applies to the activities within the specified scope of this HASP.

4.1 CHEMICAL HAZARDS

The potential chemical hazards at the Site are VOCS and SVOCs (i.e., chlorinated solvents and petroleum products).

4.1.1 Volatile Organic Compounds

Exposure to the vapors of many VOCs above their respective permissible exposure limits (PELs), as defined by the Occupational Safety and Health Administration (OSHA), may produce irritation of the mucous membranes of the upper respiratory tract, nose and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue and drunken-like behavior. Some VOCs are considered to be potential human carcinogens.

The vapor pressures of many of these compounds are high enough to generate significant quantities of airborne vapor. On sites where high concentrations of these compounds are present, this can result in a potential inhalation hazard to the field team during subsurface investigations.

To reduce the potential for exposure to the vapors of organic compounds, respiratory protection may be required. Because this Site is open and the concentrations of contamination are relatively low, the potential for overexposure is expected to be small.

Ingestion of quantities likely to result in any harmful effects are unlikely to occur within the scope of activities covered in this HASP. Incidental ingestion of minor amounts through hand-to-mouth contact can be avoided with good personal hygiene habits.

4.1.2 Chlorinated Organic Compounds

Exposure to vapors of many chlorinated organic compounds such as vinyl chloride, tetrachloroethene, 1,1,1-trichloroethane, trichloroethene and 1,2 dichloroethene above their respective PELs will result in similar symptoms. Exposure to chlorinated compounds can cause symptoms such as irritation of the eyes, nose and throat. Over exposure may also result in symptoms such as drowsiness, dizziness, headache, etc. Skin contact with the liquid may cause dermatitis. If splashed in the eyes, the liquid may cause burning, irritation and damage. Vinyl chloride is a known carcinogen.

Ingestion of quantities likely to result in any harmful effects are unlikely to occur within the scope of activities covered in this HASP. Incidental ingestion of minor amounts through hand-to-mouth contact can be avoided with good personal hygiene habits.

4.1.3 Petroleum Hydrocarbons

Petroleum hydrocarbons (PHCs) such as fuel oil are generally considered to be of low toxicity. Recommended airborne exposure limits have not been established for these vapors. However, inhalation of low concentrations of the vapor may cause mucous membrane irritation. Inhalation of high concentrations of the vapors may cause pulmonary edema. Repeated or prolonged direct skin contact with the oil may produce skin irritation as a result of defatting. Protective measures, such as wearing chemically resistant gloves, to minimize contact are addressed elsewhere in this plan. Because of relatively low vapor pressures associated with PHCs, an inhalation hazard in outdoor an environment is not likely.

Ingestion of quantities likely to result in any harmful effects are unlikely to occur within the scope of activities covered in this HASP. Incidental ingestion of minor amounts through hand-to-mouth contact can be avoided with good personal hygiene habits.

4.2 PHYSICAL HAZARDS

Personnel on-Site should be provided with the information and training necessary to avoid accidental injury. Basic personal protective equipment must be available and its use enforced.

4.2.1 Drill Rig Hazards

The use of a drill rig represents potentially serious construction hazards. Whenever such equipment is used, personnel in the vicinity should be limited to those who must be there to complete their assigned duties. Job sites must be kept as clean, orderly and sanitary as possible. When water is used, care must be taken to avoid creating muddy or slippery conditions. If slippery conditions are unavoidable, barriers and warning signs must be used to warn of these dangers.

Procedures that will be implemented to limit physical hazard impacts include the following. Never turn your back to operating machinery when in the machines operational area. Never wear loose clothing, jewelry, hair or other personal items around rotating equipment or other equipment that could catch or ensnare loose items. Always stand far enough away from operating machinery to prevent accidental contact which may result from mechanical or human error.

Safety switches on the drill rig shall be tested before beginning work.

Additionally, the following basic personal protective measures must be observed: Hard Hats must be worn to protect against bumps or falling objects. Safety glasses must be worn by all workers in the vicinity of drill rigs or other sources of flying objects. Goggles, face shields or other forms of eye protection must be worn when necessary to protect against chemicals or other hazards. Steel toed safety shoes or boots are also required. The shoes must be chemically resistant or protected with appropriately selected boots/coverings where necessary. Unless otherwise specified, normal work clothes must be worn. Gloves are also required whenever necessary to protect against hazardous contact, cuts, abrasions or other possible skin hazards.

4.2.2 Fire and Explosion

The possibility of flammable materials being encountered during field activities must be recognized. Therefore, the appropriate steps necessary to minimize fire and explosion must be observed. This includes situations where excessive organic vapors or free product are encountered. When this occurs, monitoring with a combustible gas indicator (CGI) and OVM, is required.

Excessive organic vapors can cause an explosion hazard. Therefore, whenever excessive organic vapors are detected using an OVM, monitoring should be done for the presence of explosive gases.

Fire, explosion and hazardous chemical release should be regarded as one of, if not the, most significant hazard associated with drilling operations and other intrusive work conducted at sites where possible reactive and/or toxic waste may be encountered. Accordingly, all sources of ignition must be fully controlled. Failure to control ignition sources could result in fire, explosion and pose a serious threat to life and health. Fire extinguishers will be located near each intrusive activity.

4.2.3 Noise

Noise exposure can be affected by many factors including the number and types of noise sources (continuous vs intermittent or impact), and the proximity to noise intensifying structures such as walls or building which cause noise to bounce back or echo. The single most important factor affecting total noise exposure is distance from the source. The closer one is to the source the louder the noise. The operation of a drill rig, excavator or other mechanical equipment can be sources of significant noise exposure. In order to reduce the exposure to this noise, personnel working in areas of excessive noise must use hearing protectors (ear plugs or ear muffs) in accordance with the GZA Hearing Conservation Program contained in the Health and Safety Program Manual. GZA will maintain a copy of this program component on-Site. If hearing protection is worn, hand signals will be implemented as needed.

4.2.4 Heat and Cold Stress

Overexposure to temperature extremes can represent significant risks to personnel if simple precautions are not observed. Typical control measures designed to prevent heat stress include dressing properly, drinking plenty of the right fluids, and establishing an appropriate work/break regimen. Typical control measures designed to prevent cold stress also include dressing properly, and establishing an appropriate work/break regimen. The project manager must assure that the appropriate provisions of GZA's Heat and Cold Stress Control Program contained in the Health & Safety Program Manual are observed. GZA will maintain a copy of this program component on-Site.

4.2.5 Electrical

OSHA regulations require that employees who may be exposed to electrical equipment be trained to recognize the associated hazards and the appropriate control methods. All extension cords used for portable tools or other equipment must be designed for hard or extra usage and be (three wire) grounded. All 120 volt, single-phase 15 and 20 ampere receptacle outlets on construction sites and other locations where moisture/water contact may occur must be equipped with ground-fault circuit interrupters (GFCI) units. GFCI units must be attached directly to or as close as possible to the receptacle. GFCI units located away from the receptacle will not protect any wiring between the receptacle and the GFCI unit. Only the wiring plugged into the GFCI unit and outward will be protected by the GFCI. All (temporary lighting) lamps for general illumination must be protected from accidental breakage. Metal case sockets must be grounded. Portable lighting in wet or conductive locations should be 12 volt or less. GZA does not anticipate the need for temporary lighting for this project. GZA assumes that all the work will be completed during the daylight hours.

4.2.6 Moving Vehicles, Traffic Safety

All vehicular traffic routes which could impact worker safety must be identified and communicated. Whenever necessary, barriers or other methods must be established to prevent injury from moving vehicles. This is particularly important when field activities are conducted in parking lots, driveways, or roadways.

The uncontrolled presence of pedestrians on a drilling or excavation site can be hazardous to both pedestrians and site workers. Prior to the initiation of Site activities, the Site should be surveyed to determine if, when and where pedestrians may gain access. This includes walkways, parking lots, gates and doorways. Barriers or caution tape should be used to exclude all pedestrians. Exclusion of pedestrian traffic is intended to prevent injury to the pedestrian and eliminate distractions which could cause injury to GZA personnel or other site workers.

4.2.7 Overhead Utilities and Hazards

Overhead hazards can include low hanging structures which can cause injury due to bumping into them. Other overhead hazards include falling objects, suspended loads, swinging loads and rotating equipment. Hard-hats must be worn by personnel in areas were these types of physical hazards may be encountered. Barriers or other methods must also be used to exclude personnel from these areas were appropriate. Electrical wires are another significant overhead hazard. According to OSHA (29 CFR 1926.550), the minimum clearance which must be maintained from overhead electrical wires is 10 feet from an electrical source rated $\leq$ 50 kV. Sources rated > 50 kV require a minimum clearance of 10 feet plus 0.4 inches per kV above 50 kV.

4.2.8 Underground Utilities and Hazards

The identification of underground storage tanks, pipes, utilities and other underground hazards is critically important prior to all drilling, excavating and other intrusive activities. In accordance with OSHA 29 CFR 1926.650, the estimated location of utility installations, such as sewer, telephone, electric, water lines and other underground installations that may reasonably be expected to be encountered during excavation work, must be determined prior to opening an excavation. In New York State, the "Dig Safe" notification phone number is 1-800-962-7962. The same requirements apply to drilling operations. Where public utilities may exist, the utility agencies or operators must be contacted directly or through utility clearing services and the appropriate agencies. Where other underground hazards may exist, reasonable attempts must be made to identify their locations as well. Failure to identify underground hazards can lead to fire, explosion, flooding, electrocution or other life threatening accidents.

4.3 BIOLOGICAL HAZARDS

All personnel on site should be provided with the information and training necessary to avoid accidental injury or illness which can result from exposure to biological hazards. This includes assuring that the Ste is carefully assessed so that the hazards associated with poisonous plants, insects or other sources of biological contamination (i.e., septic systems) are recognized and eliminated or controlled. In most cases this can be done by using proper PPE. Biological waste is typically contained/disposed of in red bags. If red bags or other potential biological waste (i.e. syringes) are encounter during Site work the work task should be stopped and a trained person contacted to evaluate the potential presence of biological waste.

5.0 AIR MONITORING

Real time monitoring for VOCs will be conducted within the work zone. Volatile organic compounds shall be monitored at the downwind perimeter of the work area at a minimum of once per hour. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings shall be recorded and will be available for State (NYSDEC & NYSDOH) personnel to review.

5.1 REAL TIME MONITORING

An OVM with a PID, equipped with a 10.2 ev lamp calibrated to a standard referenced to benzene in air, will be used to monitor the breathing zone of workers performing investigative activities to assess the potential presence of organic vapors.

Equipment calibration must be performed in accordance with the manufacturers instructions. Field checks using the appropriate reference standards must be made on-Site at the minimum frequency of twice per day (pre- and post-sampling). A daily log of all instrument readings, as well as all field reference checks and calibration information, and corrective actions must be maintained.

5.1.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater the 5 ppm over background but less then 25 ppm over background at the perimeter of the work area, activities can resume provided that the organic vapor level 200 ft.

downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented.

5.1.2 Major Vapor Emissions

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, work activities must be halted.

If, following the cessation of the work activities, or as a result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and levels above 5 ppm above background persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

5.1.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken.

1. All Emergency Response Contacts as listed in the Health and Safety Plan will go into effect.

2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

6.0 PERSONAL PROTECTIVE EQUIPMENT

PPE will be donned as described below for the activities covered by this HASP. Non-intrusive activities within the scope of this HASP will require Level D protection. All intrusive activities will be initiated in Level D with the potential for upgrade based on air monitoring and site conditions. Work at Level B protection is outside the scope of this HASP.

6.1 NON-INTRUSIVE ACTIVITIES

Non-intrusive activities will require Level D protective equipment. This equipment is defined as:

- Hard hat;
- Steel-toed work boots;
- Work clothes;
- Hearing protection (if necessary); and,
- Eye protection - contact lenses may not be worn on site.
- Disposable latex gloves (as needed).

6.2 INTRUSIVE ACTIVITIES

Intrusive activities, which include direct push injections, test borings and bedrock monitoring well installation, and soil and groundwater sampling will require Level D protective equipment. This equipment is defined as:

- Hard hat;
- Steel steel-toed work boots;
- Disposable latex gloves;
- Eye protection (if full-face respiratory protection is not worn); and,
- Hearing protection.

If required (based on air monitoring results or visual observation), Level C respiratory protection will be worn, consisting of MSA brand or equivalent full-face air purifying respirator with combination dust and organic vapor cartridges.

All personnel who will be required to don air purifying respirators must have been qualitatively or quantitatively fit-tested for the particular brand and size respirator he/she will be wearing on Site within the last year.

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the face seal. For workers requiring corrective face piece lenses, special spectacles designed for use with respirators must be available.

7.0 DECONTAMINATION

To the extent possible, the sampling methods and equipment have been selected to minimize both the need for decontamination and the volume of waste material to be generated. Decontamination procedures specific to each of the field activities are described in the QAPjP. Used PPE will be disposed as a solid waste.

8.0 MEDICAL MONITORING AND TRAINING REQUIREMENTS

8.1 MEDICAL

All personnel covered by this HASP must be active participants in GZA's Medical Monitoring Program or in a similar program which complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on this site covered by this HASP. Documentation of the examination must include a physicians statement indicating the employee is fit and capable of performing their duties.

8.2 TRAINING

All personnel covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120 Hazard Communication and 29 CFR 1910.120(e). Each individual must have completed an annual 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any work on this Site covered by this HASP. Also, at least one GZA employee must be on-Site during all GZA activities to act as the site manager and SSO. This individual must have documentation of completion of the specified 8-hour training course for managers and supervisors.

8.3 SUBCONTRACTORS

Subcontractors to GZA will be required to provide to the GZA Project (Site) Manager specific written documentation that each individual assigned to this project has completed the medical monitoring and training requirements specified above. This information must be provided prior to their performing any work on site.

8.4 Site Safety Meetings

Prior to the commencement of on-Site investigative activities, a Site safety meeting will be held to review the specific requirements of this HASP. In addition, the SSO will ensure that Site visitors have had the required training in accordance with 29 CFR 1910.120 and will provide pre-entry safety briefings.

9.0 HEALTH AND SAFETY AUDIT

The activities described in this HASP may be subject to audit by a representative of GZA's Corporate Health and Safety Department. The appropriate schedule for any such audit will be determined at a later date.

In addition to the possible need for a formal audit, daily safety and health inspections shall be conducted by the SSO to determine if operations are being performed in accordance with the HASP, applicable OSHA regulations and contract requirements.

10.0 EMERGENCY ACTION PLAN

10.1 GENERAL REQUIREMENTS

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." GZA personnel covered by this HASP may not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). GZA response actions will be limited to evacuation and medical/first aid as described within this section below.

The basic elements of an emergency evacuation plan include employee training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures, and methods to account for all employees after evacuation.

10.1.1 Employee Information

General training regarding emergency evacuation procedures are included in the GZA initial and refresher training courses as described above in Section 8.2 of this HASP. Also as described above in Section 8.4, employees must be instructed in the specific aspects of emergency evacuation applicable to the Site as part of the site safety meeting prior to the commencement of all on-Site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

10.1.2 Emergency Signal and Alarm Systems

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment, drilling rigs, etc.) and anytime a clear line-of-sight can not be easily maintained amongst all GZA personnel because of distance, terrain or other obstructions.

When verbal communications must be supplemented, emergency signals (using hand-held portable airhorns) must be implemented in accordance with GZA's Emergency Response and Site Evacuation procedures contained in the Health and Safety Program Manual. GZA will maintain a copy of this program component on-Site.

10.2 EMERGENCY CONTACTS

Prior to the initiation of Site activities, the SSO must contact the (appropriate) Fire Department and ambulance service to inform them of GZA's intent to solicit their services in the event of an emergency on-Site. In the event of an emergency, assistance may be requested using the following telephone numbers:

Police	911
Fire	911
Ambulance	911
Hospital	(716) 514-5700

Hospital Location

The hospital is Lockport Memorial Hospital located at 521 East Avenue, Lockport, NY 14094.

Other Emergency Contact Information

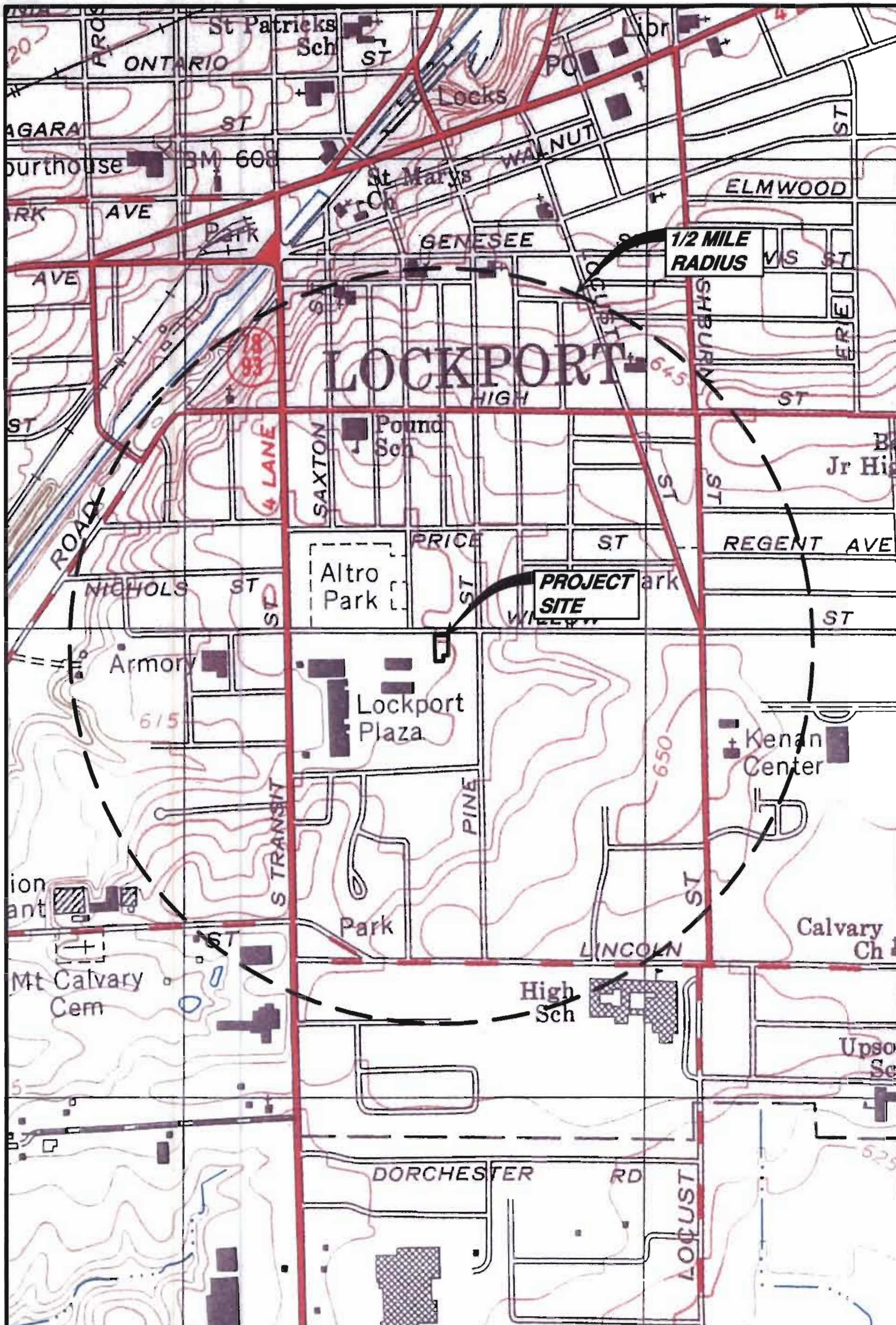
GZA GeoEnvironmental – Chris Boron	(716) 685-2300 ext. 3309; (cell) (716) 570-5990

NYSDEC – Jeff Konsella (716) 851-7220

10.3 INCIDENT REPORTING PROCEDURES

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. A copy of GZA's Incident Investigation Form is included in Attachment 1.

The investigation should begin while details are still fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency and quality of work, as well as safety and health concerns.



NOTE:
BASE MAP ADAPTED FROM U.S.G.S. TOPOGRAPHIC MAPS DOWNLOADED FROM TERRASERVER.MICROSOFT.COM

DRAWN BY: DEW

DATE: AUGUST 2007

GZA GeoEnvironmental of New York

SCALE IN FEET

0 500 1000 2000

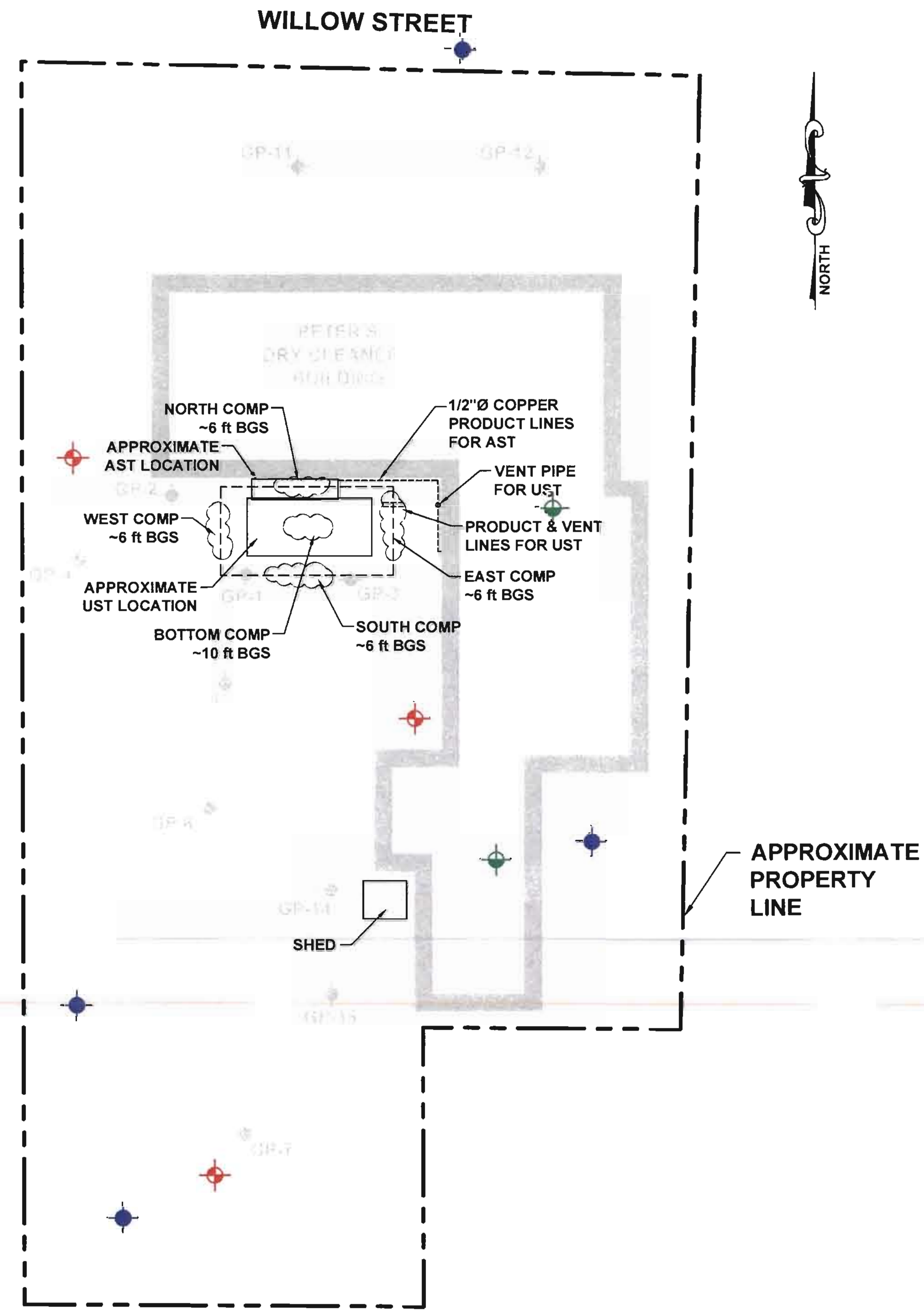
PETER'S DRY CLEANERING
316 WILLOW STREET
LOCKPORT, NEW YORK

SITE INVESTIGATION WORK PLAN

1/2 MILE RADIUS PLAN

PROJECT No. 21.0056017.10

FIGURE No. 1



LEGEND:

- APPROXIMATE LOCATION OF PROPOSED BEDROCK MONITORING WELL
- APPROXIMATE LOCATION OF PROPOSED SUB-SLAB AIR SAMPLE
- APPROXIMATE LOCATION OF PROPOSED SOIL PROBE WITH GROUNDWATER SAMPLE
- BOTTOM COMP ~10 ft BGS — APPROXIMATE LOCATION AND DESIGNATION OF CONFIRMATORY SOIL SAMPLES COLLECTED BY GZA GEOENVIRONMENTAL OF NEW YORK
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004
- APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE DONE BY SLC ENVIRONMENTAL SERVICES, INC. ON JULY 13, 2004 WITH MICROWELL INSTALLED

NOTES:

1. BASE MAP ADAPTED FROM A 2002 AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.nysgis.state.ny.us/gateway/mg/interactive_main.html AND FIELD OBSERVATIONS.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: DEW
DATE: AUGUST 2007

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET
0 10 20 40

PETERS DRY CLEANING
316 WILLOW STREET
LOCKPORT, NEW YORK
SITE INVESTIGATION WORK PLAN
SITE PLAN

PROJECT No. **21.0056017.10**
FIGURE No. **2**

ATTACHMENT 1

HEALTH AND SAFETY BRIEFING/SITE ORIENTATION RECORD
SITE SIGN-IN SHEET
GZA INCIDENT INVESTIGATION FORM

GZA Health and Safety Briefing /Site Orientation Record

Peters Dry Cleaning Site
Lockport, New York

This is to verify that I, the undersigned, have been provided with a site (orientation) briefing regarding the safety and health considerations at the Peters Dry Cleaning Site. I agree to abide by my employer's site-specific safety and health plan and other safety or health requirements applicable to the site.

Name (Print)	Signature	Company	Date

Site (orientation) briefing conducted by: ______________________ Date:__________

GZA INCIDENT INVESTIGATION FORM

Employee's Name GZA Company Name

Project Name Project Location

Project Number

Building Room Other

Time Incident Occurred Date

Supervisor's Name

Type of Case:

First Aid Medical Treatment

Lost Time Fatality Property Damage

Occupational Illness

Describe the incident (What happened):

Describe the type of first aid or medical treatment provided:

Describe employee activity at time of incident:

Describe any tools or machinery involved:

Describe any personal protective equipment used by employee:

In your opinion, what the probable causes of the incident are:

In your opinion, how this incident could have been prevented:

Changes in process, procedure, or equipment that you would recommend:

How you would classify the apparent causes of this incident:

Human error	Equipment
Material	Personal Protective Equipment
Real Time	Other

Name and signature of person preparing this form:

Distribution:

Branch/Regional Office Manager:
Regional Health and Safety Coordinator:
Corporate Director of Health and Safety:
Other:

Note: If the space provided on this form is insufficient, provide additional information on separate paper and attach. The completed investigation report must be submitted to the Corporate Director of Health and Safety in Newton within five days.

APPENDIX D

CITIZEN PARTICIPATION PLAN

PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

Peters Dry Cleaning

316 Willow Street
City of Lockport
Niagara County, New York
Site #C932128

July 31, 2007

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: **Earl William Peters "Applicant"**
Site Name: **Peters Dry Cleaning "Site"**
Site Address: **316 Willow Street, Lockport, New York**
Site County: **Niagara County**
Site Number: **C932128**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: **www.dec.state.ny.us/website/der/bcp** .

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the Site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the Site.

Project Contacts

Appendix B identifies NYSDEC project contact(s) to whom the public should address questions or request information about the Site's remedial program. The public's suggestions about this CP Plan and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

[1] "Remedial activities", "remedial action", and "remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield Site contact list. This list has been developed to keep the community informed about, and involved in, the Site's investigation and remediation process. The brownfield Site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming remedial activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield Site contact list includes, at a minimum:

- chief executive officer and official(s) principally involved with relevant zoning and planning matters of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the Site and properties adjacent to the Site;
- the public water supplier which services the area in which the Site is located;
- any person who has requested to be placed on the Site contact list;
- the administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility; and
- document repositories.

Where the Site or adjacent real property contains multiple dwelling units, the Applicant will work with NYSDEC to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the Site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The brownfield Site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the Site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the brownfield Site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the Site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the Site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the Site's remedial process.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation.

The public is encouraged to contact project staff at any time during the Site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 6 or due to changes in the nature and/or scope of remedial activities. Modifications may include additions to the brownfield Site contact list and changes in planned citizen participation activities.

3. Site Information

Site Description

Peters Dry Cleaning, located at 316 Willow Street, in the City of Lockport, Niagara County, New York (Site, see Appendix A for a Locus Plan) is an approximate 0.35 acre parcel of land located within a mainly residential area in the City of Lockport. Residential dwellings are adjacent to the Site to the east, west, south and across Willow Street to the north. Altro Park (playground and ball fields) is located approximately 200 feet east of the Site on the north side of Willow Street. Lockport Plaza, a retail plaza, is located approximately 500 southwest of the Site. The area surrounding the Site is highly developed. No industrial, urban or agricultural land is located within ½ mile of the Site.

Site History

The Site has been operated as a dry cleaning facility since the late 1930s/early 1940s. Mr. E. William Peters purchased the property and the dry cleaning facility in the early 1970's. The previous owner (Rollin T. Grant) occupied and operated the Site as dry cleaning facility as well. Dry cleaning has been conducted at the Site since the late 1930's/early 1940's, prior to which a clothing tailor shop operated at the Site.

As further discussed in the next section, petroleum and chlorinated solvent contamination has been identified in the soil and groundwater at the Site.

Environmental History

A Phase II Environmental Site Assessment (ESA)[1] by GZA GeoEnvironmental of New York (GZA) identified petroleum and chlorinated solvent contamination in the soil and groundwater at the Site. Two storage tanks were also identified during the ESA. Based on the findings of the Phase II ESA, the New York State Department of Environmental Conservation (NYSDEC) assigned Spill No. 0475193 to the Site.

Two tanks were identified at the Site, a 1,000-gallon aboveground storage tank (AST) and an abandoned 6,000-gallon underground storage tank (UST). Both tanks were used to store heating oil prior to the Site being connected with natural gas. In April 2005, GZA removed the AST and UST in accordance with a NYSDEC approved February 2005 Work Plan. These activities are documented in GZA's June 2005 Closure Report[2].

During the excavation to remove the abandoned UST, approximately 2 cubic yards of petroleum contaminated material was removed inside the UST (i.e. sand) that had previously been placed into the UST unit as part of its interim or temporary closure. Some minimal petroleum contamination was also identified around the area of the UST. There was also approximately 30 tons of chlorinated solvent contaminated soil removed as part of an additional excavation activity done at the Site. The 30-tons were disposed of as hazardous waste at Chemical Waste Management in Model City, New York.

The facility has been in use as a dry cleaning facility since the late 1930s/early 1940s. Prior to its use as a dry cleaner, the facility was used as a clothing tailor shop. A blend of petroleum hydrocarbons known as Stoddard solvent was used for dry cleaning at the Site prior to tetrachloroethlyene (PCE) being used. Therefore, the petroleum contamination present at the Site may be a result of both the fuel oil previously stored and the historical use of Stoddard solvent. The chlorinated solvent contamination is likely due to the use of PCE. Since the Site was acquired by Peters Dry Cleaning in the early 1970's, Peters Dry Cleaning never operated either the fuel oil AST or the fuel oil UST. The use of percholorethylene (PCE) by Peters Dry Cleaning since the acquisition of the property has always involved the use of the "new generation" closed loop recycling dry cleaning equipment. Presently, there is no PCE used at the facility for dry cleaning.

Soil and groundwater samples were collected and analyzed during the ESA and tank closure work conducted by GZA. After review of the analytical data generated it appears that reductive dehalogenation in the form of natural attenuation or in-situ bioremediation is occurring at the Site.

Reductive dehalogenation is a defined as the biologically driven removal and replacement of chlorine (as chloride, similar to the anion in common table salt, sodium chloride) on a

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[1] Phase II Environmental Site Assessment, Peters Dry Cleaners, 316 Willow Street, Lockport, New York; completed for Earle, Delange, May, Seaman, Jones, Hogan & Brooks, LLP; by GZA GeoEnvironmental of New York; August 2004.

[2] "Aboveground and Underground Storage Tank Closure Report, Peters Dry Cleaners, 316 Willow Street, Lockport, New York" prepared by GZA GeoEnvironmental of New York, dated June 2005.

chlorinated organic compound PCE with elemental hydrogen in the presence of a suitable electron donor causing a transformation of the chemical reactant to a less chlorinated product. An electron donor is defined as a compound capable of supplying electrons during oxidation-reduction reactions. Microorganisms obtain energy by transferring electrons from electron donors such as organic compounds or by the reduction of inorganic compounds to a terminal electron acceptor (TEA). Electron donors are chemically reduced materials such as fuel hydrocarbons or naturally occurring organic carbon, which become chemically oxidized during transformation.

For example, reductive dehalogenation of chlorinated aliphatic hydrocarbons (CAHs) typically occurs sequentially from PCE to trichloroethylene (TCE), TCE to 1,2-dichloroethene (1,2-DCE), 1,2-DCE to vinyl chloride (VC), and VC to ethene and chloride, and ultimately ethene to carbon dioxide and water.

The reductive dehalogenation process can be shown to be occurring by comparing the concentrations of the "parent" or source compounds, PCE and TCE, to the concentration of "daughter" compounds or breakdown by-products such as; 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and VC. This process can be seen occurring at the Site by comparing the relatively high ratios of "daughter" breakdown by-products versus "parent" chlorinated compounds present thus indicating that the reductive dehalogenation degradation process is taking place.

GZA is proposing a remedial strategy which involves the injection of electron donor material to further enhance the reductive dehalogenation process occurring and monitoring its progress with analytical testing and water quality parameters using a suggested network of existing and proposed monitoring wells.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Participant. This means that the Applicant was the owner of the site at the time of the disposal or discharge of contaminants or was otherwise liable for the disposal or discharge of the contaminants. The Participant must fully characterize the nature and extent of contamination onsite, as well as the nature and extent of contamination that has migrated from the site. The Participant also must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted commercial purposes.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the

Applicant sets forth the responsibilities of each party in conducting a remedial program at the site.

Investigation

If the Applicant conducts a remedial investigation (RI) of the site, it will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment as noted in Appendix D. The goals of the investigation are as follows:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;

2) Identify the source(s) of the contamination;

3) Assess the impact of the contamination on public health and/or the environment; and

4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant will prepare an RI Report after it completes the RI. This report will summarize the results of the RI and will include the Applicant's recommendation of whether remediation is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. Before the RI Report is approved, a fact sheet that describes the RI Report will be sent to the site's contact list.

NYSDEC will determine if the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the eligible site.

For more information about the TAG Program and the availability of TAGs, go online at: **www.dec.state.ny.us/website/der/guidance/tag/** .

Remedy Selection

After NYSDEC approves the RI Report, the Applicant will be able to develop a Remedial Work Plan if remediation is required. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.

The public will have the opportunity to review and comment on the draft Remedial Work Plan. The site contact list will be sent a fact sheet that describes the draft Remedial Work Plan and announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that, in order to request a public meeting, the health, economic well-being or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the site. The site contact list will receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a final engineering report that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the final engineering report.

Certificate of Completion and Site Management

Once NYSDEC approves the final engineering report, it will issue the Applicant a Certificate of Completion. This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the remedial action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the brownfield site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Remedial Work Plan.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval of, NYSDEC.

6. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

No major issues of concern have been identified with the Site.

Appendix B – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Jeffery Konsella
Project Manager
NYSDEC Region 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220

Megan Gollwitzer
Citizen Participation Specialist
NYSDEC Region 9
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220

New York State Department of Health (NYSDOH):

Matthew Forcucci
Project Manager
NYSDOH
584 Delaware Avenue
Buffalo, New York 14202
(716) 847-4385
Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Lockport Public Library
23 East Avenue
Lockport, New York 14094
See Reference Desk
Phone: (716) 433-5935
Hours: Monday-Thursday 10am to 9pm
Friday-Saturday 10am to 5pm

NYSDEC Region 9
270 Michigan Avenue
Buffalo, New York
Attn: Jeffery Konsella
Phone: (716)851-7220
Hours: Monday-Friday 9am-4pm
(call for appointment)

Appendix C – Brownfield Site Contact List

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Gregory Sutton, P.E.
270 Michigan Avenue
Buffalo, NY 14203

Jeffery Konsella, P.E.
270 Michigan Avenue
Buffalo, NY 14203

Ms. Abby Snyder, Regional Director
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Daniel David
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Larry Ennist
NYSDEC
625 Broadway
Albany, NY 12233

Community Outreach File
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Ms. Megan Gollwitzer
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Ms. Meaghan Boice-Green
NYSDEC – Region 9
270 Michigan Avenue
Buffalo, NY 14203

NEW YORK STATE DEPARTMENT OF HEALTH

Matthew Forcucci
584 Delaware Avenue
Buffalo, NY 14202

Mr. Richard Fedigan
NYSDOH, Room 205
547 River Street
Troy, NY 12180

NIAGARA COUNTY

Greg Lewis, County Manager
Niagara County
59 Park Avenue
Lockport, NY 14094

Clyde Burmaster, Chairman
Niagara County Legislature – 16th
2512 Parker Road
Ransomville, NY 14131

Legislator Keith McNall
Niagara County Legislature – 16th
739 Willow Street
Lockport, NY 14094

Legislator Kyle Andrews
Niagara County Legislature – 14th
4810 Wilson-Burt Road
Wilson, NY 14172

Legislator Richard Updegrove
Niagara County Legislature – 17th
4688 Day Road
Lockport, NY 14094

Legislator Gerald Farnham
Niagara County Legislature –7th
5460 Hinman Road
Lockport, NY 14094

Mr. James Devald, P.E.
Niagara County Health Dept.
5467 Upper Mountain Road
Lockport, NY 14094

Mr. Paul Dicky
Niagara County Health Dept.
5467 Upper Mountain Road
Lockport, NY 14094

Clerk Michael Carney
Niagara County Legislature
175 Hawley Street
Lockport, NY 14097

Mr. Wayne Jagow
Niagara County Clerk
Courthouse, P.O. Box 461
Lockport, NY 14094

Beverly Snell
Niagara County Municipal Clerk
8942 Ridge Road
Gasport, NY 14067

Ms. Amy Fisk
Niagara County Economic Planning Dept.
Vantage Center, Suite 1
6311 Inducon Corp. Drive
Sanborn, NY 14132

James Hoffman
Co-Chair
Niagara County EMC
8737 Lake Road
Baker, NY 14102

James E. Volkosh, Director
Niagara County Emergency Services
5526 Niagara Street Ext., Box 496
Lockport, NY 14095

William Ross
Niagara County Legislative Chairman
175 Hawley Street
Lockport, NY 14094

County Manager
59 Park Avenue
Lockport, NY 14094

CITY OF LOCKPORT

Michael Tucker
Mayor
One Locks Plaza
Lockport, NY 14094

Richard Blackey
Zoning Board Chairperson
49 Gaffney Road
Lockport, NY 14094

Michael Diel
Director of Public Utilities
611 West Jackson Street
Lockport, NY 14094

Richard Mullaney
City of Lockport Clerk
Lockport Municipal Building
1 Locks Plaza
Lockport, NY 14094

Norm Allen
City of Lockport, Engineering
1 Locks Plaza
Lockport, NY 14094

Alderman Joseph Kibler, At Large
City of Lockport
16 Cleveland Place
Lockport, NY 14094

Alderman Thomas Grzebinski, II
City of Lockport, 1st Ward
33 Howard Avenue
Lockport, NY 14094

Alderman Phyllis Green
City of Lockport, 2nd Ward
110 Grant Street
Lockport, NY 14094

Alderman Flora McKenzie
City of Lockport, 3rd Ward
199 West Avenue
Lockport, NY 14094

Alderman Patrick Schrader
City of Lockport, 4th Ward
32 Gaffney Road
Lockport, NY 14094

Alderman John Lombardi, III
City of Lockport, 5th Ward
329 Chestnut Street
Lockport, NY 14094

ADJACENT PROPERTIES

Names and addresses of adjoining property owners have been removed from the CP Plan list, but are on file with NYSDEC.

ELECTED OFFICIALS

NYS Senator George Maziarz
62nd District
2578 Niagara Falls Boulevard
Suite 600
Wheatfield, NY 14034

Senator Hillary Rodham-Clinton
U.S. Senate, 203 Guaranty Bldg.
28 Church Street
Buffalo, NY 14202

Senator Charles Schumer
U.S. Senate, Room 620
111 West Huron Street
Buffalo, NY 14202

Assemblyman Mike Cole
5763 Seneca Street
Elma, NY 14059

<u>LOCAL NEWS MEDIA</u>

Buffalo News
One News Plaza
PO Box 100
Buffalo, NY 14240

LCTV
293 Niagara Street
Lockport, NY 14094

Lockport Union Sun & Journal
170 East Avenue
Lockport, NY 14094

WLVL 1340 AM
320 Michigan Street
Lockport, NY 14094

ATTN: Environmental News Desk
WKBW News Channel 7
7 Broadcast Plaza
Buffalo, NY 14202

ATTN: Environmental News Desk
WBEN Radio 930 & WMJQ
500 Corporate Parkway
Buffalo, NY 14226

ATTN: Environmental News Desk
WGRZ TV - CH. 2
259 Delaware Avenue
Buffalo, NY 14202

ATTN: Environmental News Desk
WIVB - CH. 4
2077 Elmwood Avenue
Buffalo, NY 14207

ATTN: Michael Desmond
WNED, ENVIRONMENTAL NEWS DESK
P.O. Box 1263, Horizons Plaza
Buffalo, NY 14240

ATTN: Anne Marie Franczyk
Business First
465 Main Street
Buffalo, NY 14203-1793

ATTN: Jay Bonfatti
Buffalo News
1 News Plaza
Buffalo, NY 14240

ATTN: Aaron Besecker
The Niagara Gazette
310 Niagara Street
Niagara Falls, NY 14302

Mike Hudson, Editor
Niagara Falls Reporter
1625 Buffalo Avenue
Niagara Falls, NY 14303

News Director
WLVL 1340
P.O. Box 477
Lockport, NY 14095-0477

ATTN: ENVIRONMENTAL NEWS DESK
WJYE
1700 Rand Building
Buffalo, NY 14203

PUBLIC WATER SUPPLY

Michael Diel
Director of Public Utilities
611 West Jackson Street
Lockport, NY 14094

SCHOOLS & DAY CARES

Attn: Principal
John E. Pound Elementary School
51 High Street
Lockport, NY 14094

Attn: Principal
Lockport High School
250 Lincoln Avenue
Lockport, NY 14094

OTHER POTENTIALLY INTERESTED PARTIES

Mr. Michael Basile
USEPA – Public Info. Office
186 Exchange Street
Buffalo, NY 14204

WNY Director
Citizens' Env. Coalition
543 Franklin Street, Room 2
Buffalo, NY 14202-1109

Chairwoman Jane Jontz
Sierra Club, Niagara Group
62 Lincoln Road
Snyder, NY 14226

Attn: Director
Citizens Campaign for the Environment
227 McConkey Drive
Tonawanda, NY 14223

Mr. Michael Podd
4827 Rogers Road
Hamburg, NY 14075

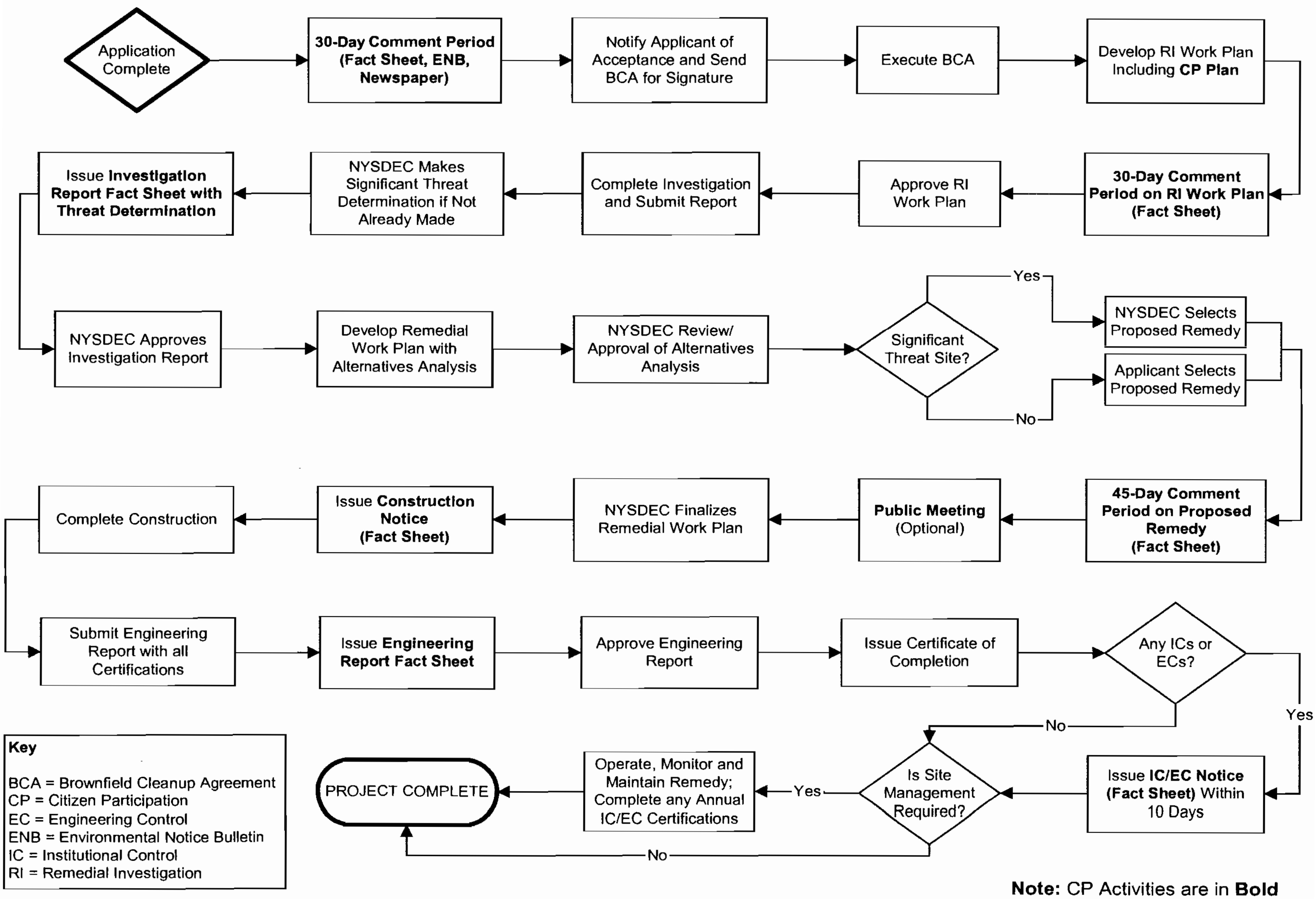
DOCUMENT REPOSITORY

Lockport Public Library
23 East Avenue
Lockport, NY 14094
"See Reference Desk"

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities	CP Activities Occur at this Point
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories	At time of preparation of application to participate in BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare citizen participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution.
After Remedial Investigation (RI) Work Plan Received:	
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.
After RI Completion:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report.
After Remedial Work Plan (RWP) Received:	
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
After Approval of RWP:	
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction.
After Remedial Action Completed:	
• Mail fact sheet to BSCL announcing that remedial construction has been completed • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of the COC.

Appendix E – Brownfield Cleanup Program Process



APPENDIX E

ALTERNATIVES ANALYSIS REPORT

PETERS DRY CLEANING
BROWNFIELD CLEANUP PROGRAM
LOCKPORT, NEW YORK
Site #C932128

Alternatives Analysis

The evaluation of potential remedial action clean-up alternatives will focus on those technologies and/or options that were potentially feasible to be implemented at the site following the abandoned UST removal and contaminated soil source removal and site investigation activities. Among the remedial action clean-up alternatives to be considered for the site will include, but not be limited, to the following:

- Excavation and removal of additional contaminated soils
- Soil vapor extraction (SVE)
- Groundwater extraction
- In-situ bioremediation (initial anaerobic reductive dehalogenation followed by final aerobic biological polish treatment)

Technology Description

The following is a brief summary of the various remedial action clean-up alternatives considered for the site.

- **Soil Excavation Removal and Off-site Disposal:** The excavation and removal of contaminated soils and disposal at a permitted hazardous waste and/or non-hazardous waste facility, pending proper waste characterization.

- **Soil Vapor Extraction (SVE):** The installation of well extraction points at the facility to which a vacuum would be applied to remove volatile contaminants in the vapor phase form from the soil and groundwater. The vapor phase contaminants would be treated, if necessary, prior to release to the atmosphere.

- **Groundwater Extraction:** The installation of additional overburden and bedrock groundwater wells (if necessary) that would be used to extract groundwater and introduce the contaminated groundwater to an on-site groundwater treatment system. Once treated, the groundwater would be either re-injected back into the subsurface or allowed to drain to the publically-owned treatment works (POTW) pending that approval.

- **In-Situ Bioremediation:** The injection of electron donor compound (EDC) materials into the subsurface to enhance a more rapid and complete anaerobic breakdown of chlorinated hydrocarbon contamination via reductive dehalogenation followed by aerobic biodegradation to destroy chlorinated breakdown by-products and petroleum hydrocarbon contamination.

Soil and Groundwater Clean-up Performance

The following is a brief discussion of how each of the remedial action clean-up alternatives would achieve the BCP Track 2 requirements for the generic soil clean-up standards for a restricted commercial use of the property.

- **Soil Excavation Removal and Off-site Disposal:** The excavation, removal and proper disposal of contaminated soils would eliminate this source of future contamination and reduce the further impact to the groundwater.

- **Soil Vapor Extraction (SVE):** The volatilization of chlorinated hydrocarbon and petroleum hydrocarbon contamination from the overburden soils and overburden groundwater which will reduce and/or limit the source of contamination that potentially may migrate from the property.

- **Groundwater Extraction:** The removal of overburden and/or bedrock groundwater will enhance the natural flushing to cleanse the overburden soil contamination and remove or substantially reduce contamination from migrating from the property via either the overburden groundwater flow and/or the bedrock groundwater flow.

- **In-Situ Bioremediation:** Initially, the TCE/PCE contamination present will be degraded into other "daughter" breakdown products via reductive halogenation. When the TCE/PCE contamination has been significantly reduced in the overburden soils and groundwater, the in-situ bioremediation will be converted to an aerobic system to destroy the chlorinated "daughter" breakdown by-products and the petroleum hydrocarbon contamination present in the overburden soil and groundwater.

Comparative Analysis

The table which follows will be completed to compare each remedial action clean-up alternative with the factors associated with the selection of an appropriate remedy as per 6NYCRR Part 375, Subpart 375-3, § 375-3 (f) (2) (iii). This comparative analysis will be further assessed following the additional investigation phase.

Alternatives Comparison

	Soil Excavation	SVE	GW Extraction	In-Situ Bioremediation
Overall Effectiveness				
Standards, Criteria & Guidance				
Long Term Effectiveness				
Toxicity, Mobility, Volume Reduction				
Short-Term Impacts				
Implementability				
Cost Effectiveness				
Community Acceptance				
Land Use				

Reliability/Viability

The reliability and technical viability of each remedial action alternative considered will be evaluated.

Groundwater Plume Stabilization

All remedial action clean-up alternatives have the technical ability to establish a stabilization of the groundwater contamination plume.

Preferred Alternative

The preferred alternative chosen will be the remedial action alternative which presents the likelihood of the greatest overall technical effectiveness and which presents the most cost-effective solution when combined with possible institutional controls for the site.

Schedule

The alternatives analysis report will be compiled and submitted to NYSDEC following final IRM data collection and analysis after the injection of EDC and ORC materials at the Site.