312 Maple Street
Broome County
Endicott, New York

SITE MANAGEMENT PLAN

NYSDEC Site Number: B00168

Prepared for:

Broome County Department of Planning and Economic Development
Broome County Office Building
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Binghamton, New York 13902

Prepared by:

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

JANUARY 2016

CERTIFICATION STATEMENT

I, DANIEL J. TROY certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

DANIEL TROY P.E. # 081139-1

JANUARY 15, 2016 DATE

312 MAPLE STREET
BROOME COUNTY
ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN

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List of Acronyms

CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
COC	Certificate of Completion
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
EPA	United States Environmental Protection Agency
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GZA	GZA GeoEnvironmental of New York
HASP	Health and Safety Plan
IC	Institutional Control
IRM	Interim Remedial Measure
NSR	Norfolk Southern Railway
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PRR	Periodic Review Report
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RI/RAR	Remedial Investigation/Remedial Alternatives Report
ROD	Record of Decision
RP	Remedial Party
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Soil Management Plan
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCE	Trichloroethylene

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: B00168 312 Maple Street, Endicott, New York

Institutional Controls:	1. The property may be used for restricted residential use;	
	2. Institutional Controls defined in the Environmental Easement include: • Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns; • All Engineering Controls must be operated and maintained as specified in this SMP; • All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP. • Groundwater monitoring must be performed as defined in this SMP; • Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP;	
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.	
Engineering Controls:	1. Sub-Slab Depressurization Systems within the three Site Buildings	
Inspections:		Frequency
1. SSD Systems		Annually

Monitoring:	
1. On-Site Groundwater Wells MW-1, MW-2, MW-5 and Off-Site MW-8	Every Three Years
Maintenance:	
1. SSD Systems	As Needed
2. Groundwater Monitoring Wells	As Needed
Reporting:	
1. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 312 Maple Street located in Endicott, New York (hereinafter referred to as the "Site"). See Figure 1-1 (Site Location Map). The Site is currently in the New York State (NYS) Environmental Restoration Program (ERP) Site No. B00168 which is administered by New York State Department of Environmental Conservation (NYSDEC).

Broome County entered into a State Assistance Contract (SAC) on June 6, 2005 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 1-2 (Site Plan). The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix D.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Broome County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the SAC Index C302753; Site # B00168 for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix A of this SMP.

This SMP was prepared by GZA GeoEnvironmental of New York (GZA), on behalf of Broome County in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the SAC, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the State Assistance Contract (SAC) and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1-1 on the following page includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

Table 1-1: Notifications*

Name	**Contact Information**
Mr. Gary Priscott, NYSDEC Project Manager	(607) 775-2545 gary.priscott@dec.ny.gov
Mr. Harry Warner, NYSDEC Regional HW Engineer	(315) 426-7400 harry.warner@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control	(518) 402-9569 kelly.lewandowski@dec.ny.gov
Mr. Frank Evangelisti, Broome Co.	607 778-2414 FEvangelisti@co.broome.ny.us

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in Endicott, Broome County, New York and is identified as tax map ID Numbers 156.12-4-11 and 156.12-4-12 on the Village of Endicott Tax Map (see Figure 1-2). The site is an approximate 0.93-acre area and is bounded by Maple Street to the north, railroad tracks belonging to Norfolk Southern Railroad to the south, North Duane Avenue to the east, and Evans Mechanical Inc. to the west. The boundaries of the site are more fully described in Appendix D – Environmental Easement. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

- County of Broome
  PO Box 1766
  Binghamton, New York 13902

2.2 Physical Setting

2.2.1 Land Use

Three interconnected buildings and two asphalt paved parking areas cover most of the site. A small vegetated area is located on the southwestern portion of the Site in an area formerly occupied by a railroad spur. Currently, two of the three buildings are single story slab on grade structures used for wood cabinet manufacturing and office space. The third building is a two story structure with basement that is used primarily for storage or is vacant.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include a mixture of residential and commercial properties. The properties immediately south of the Site include a railroad track owned by Norfolk Southern Railroad beyond with are residential properties; the properties immediately north of the Site beyond Maple Street include a VFW post and a residential property; the properties immediately east of the Site beyond North Duane Avenue; and the properties to the west of the Site including a commercial property. A former Canada Dry

Bottling Facility listed as an inactive hazardous waste disposal site (Site No. 704050) is located approximately 275 feet southeast of the Site (north end of Badger Avenue).

2.2.2 Geology

Overburden encountered at the site generally consists of fill material (e.g. sands and gravels intermixed with ash, coal, and slag components) ranging from about two to seven feet thick overlying assumed proglacial fluvial deposited granular sand and gravel soil with lesser amounts of silt. Investigations at the site were focused on overburden soils within 20 feet of the ground surface. Depth to bedrock at the Site was not determined.

Site specific boring logs are provided in Appendix E.

2.2.3 Hydrogeology

The average depth to groundwater measured in the groundwater monitoring wells at the site is approximately 14 to 15 feet below ground surface (bgs). Annual fluctuations in observed groundwater levels have ranged by less than 1 foot between 2012 and 2015. The groundwater flow direction at the site is generally to the northwest or west-northwest. A groundwater flow figure is shown in Figure 2-1. Groundwater monitoring well component elevation data is shown in Table 2-1 and groundwater elevation data for the years 2012 through 2015 is provided in Table 2-2, both shown below. Groundwater monitoring well construction logs for the Site are provided in Appendix E.

TABLE 2-1 Groundwater Monitoring Well Component Elevation Data

Monitoring Location	Top of Riser and Monitoring Point Elevation (feet)	Depth of Well (feet)	Length of Well Screen (feet)	Top of Well Screen Elevation (feet)	Bottom of Well Screen Elevation (feet)
MW-1	102.41	25.0	15.00	90.0	75.0
MW-2	100.02	25.0	15.00	90.5	75.5
MW-3R	97.46	22.5	10.00	87.6	77.6
MW-4	100.00	23.0	15.00	89.5	74.5
MW-5	97.21	20.0	10.00	87.2	77.2
MW-6	96.43	20.0	10.00	86.5	76.5
MW-7	97.47	20.0	10.00	88.0	78.0
MW-8	96.40	20.0	10.00	86.5	76.5

1. Elevations shown were calculated based on measurements made by GZA on 7-11-08 using rod and level techniques.
2. Monitoring elevations based on the relative elevation of 100.00 feet assigned to the top of the MW-4 PVC well riser.
3. Elevation/construction data for MW-9 was not available.

TABLE 2-2 Groundwater Elevation Data

Date	Groundwater Monitoring Well Location								
	MW-1	MW-2	MW-3R	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9
2012	83.9	84.0	84.0	84.0	83.9	84.1	84.0	83.8	83.7
2013	83.6	83.7	83.7	83.7	83.6	83.8	83.7	83.5	83.5
2014	84.2	84.2	84.2	84.2	84.1	84.3	84.2	84.0	83.9
2015	83.6	83.5	83.4	83.5	83.4	83.7	83.4	83.3	83.4

*Elevations shown are relative elevations based on an assumed elevation datum of 100.00 feet referenced to top of MW-4 PVC monitoring point.

The topography for the Site is generally flat and typical pavement grades have been constructed to shed precipitation away from the buildings and towards either North Duane Street or Maple Street into the nearest storm water catch basins. The nearest surface water bodies to the site are Nanticoke Creek and the Susquehanna River, approximately one-half mile to the north and south, respectively.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

A Remedial Investigation and Remedial Alternative Report (RI/RAR) was performed to characterize the nature and extent of contamination resulting from historical activities at the site. The RI was conducted by GZA between May 2006 and October 2009. The results of the RI are described in detail in the following report:

- "Remedial Investigation & Remedial Alternative Report, 312 Maple Street, Endicott, New York, NYSDEC Site # B-00168-7", prepared by GZA GeoEnvironmental of New York, dated October 2009.

Generally, the RI/RAR determined that contaminant concentrations within on-site soils near ground surface to an approximate depth of 4 feet bgs and in shallow groundwater exceeded regulatory standards, criteria and guidance values (SCGs) for VOCs and/or heavy metal compounds (metals) as a result of historic manufacturing operations. An assumed trichloroethylene (TCE) source area in the vicinity of on-site monitoring well MW-1 was identified within shallow subsurface fill soils. It was estimated that approximately 250 cubic yards (cy) of contaminated fill material would require excavation and disposal. A portion of this source area was also identified adjacently south of the site on the Norfolk Southern Railway (NSR) property (off-Site). Additionally, TCE and select metals contamination in soil was also identified as isolated to an area beneath an on-site drywell located in Building 2 and results of soil vapor testing at the site interiors identified Buildings 1 and 2 with TCE at concentrations that would recommend sub-slab mitigation.

Below is a summary of site conditions when the RI/RAR was performed by GZA between May 2006 and October 2009:

2.3.1 Soil

Subsurface soil samples were collected at the site during the RI field investigation work. Soil samples were collected both on and off-site to assess direct human exposure and soil

contamination impacts to groundwater. Soil samples were collected from varying locations between ground surface and to a depth of approximately 16 feet bgs. The results indicate that some on-site fill soils exceed the unrestricted use SCGs for select VOCs and metals although only a few metals exceed the respective unrestricted residential SCGs. Table 2-3 below includes all contaminants that exceeded the unrestricted use SCGs prior to completion of remedial activities.

Table 2-3 Remaining Soil Sample Exceedances

On-Site Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Volatile Organic Compounds					
TCE	0.005 – 0.620	0.47	3 of 22	21	0 of 22
Metals					
Cadmium	0.82-7.7	2.5	1 of 8	4.3	1 of 8
Copper	9.9 - 321	50	2 of 8	270	1 of 8
Off-Site Soil[(d)]					
Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Volatile Organic Compounds					
TCE	0.0034 - 110	0.47	9 of 18	21	6 of 18

a – ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil.

b – SCG: Part 375-6.8(a), Unrestricted Use Soil Cleanup Objectives.

c – SCG: Part 375-6.8(b), Restricted Residential Soil Cleanup Objectives.

d – Off-Site Soil area adjacent to the Site on the southern property line within property owned by Norfolk Southern Railroad.

The TCE contamination in soil was assumed to be associated with the former on-site electronics manufacturing and was typically present in the soil from near ground surface to a depth of approximately four feet in the area southeast of Building 2. Remaining soil contamination appeared isolated within former drywell and at isolated areas beneath concrete slab-on-grade concrete flooring. Additionally, an off-site area immediately adjacent to where the on-site soil excavation Interim Remedial Measure (IRM) was performed. The general areas of on-Site and off-Site IRM excavations as well as concentrations and distribution of remaining TCE soil contamination are shown on Figure 2-2. It should be noted that remedial actions performed during the on-Site IRM (in 2006) and off-site IRM (in 2011) that remediated remaining TCE and metal exceedances in subsurface soil are further discussed in Section 2.4.

The metals contamination in soil was isolated to an area beneath one of the on-site drywells which was filled in place with concrete as part of the 2006 IRM and described further in Section 1.4.

Based on the findings of the RI/RAR, historic disposal of hazardous waste materials has resulted in the contamination of soil. The site contaminant identified in soil, which is considered to be the primary contaminant of concern, was TCE.

2.3.2 Site-Related Groundwater

Groundwater samples were collected from overburden monitoring wells. The samples were collected to assess groundwater conditions on and off-site. The results indicate that contamination in the shallow groundwater at the site exceeds the SCGs for VOCs and metals. Table 2-4 below includes all contaminants that exceed the groundwater and drinking water SCGs prior to remedial activities.

Table 2-4 – Remaining Groundwater Sample Exceedances			
Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Volatile Organic Compounds			
Trichloroethene	2.3 – 1,600	5	12 of 15
Metals			
Hexavalent Chromium	48 – 1,200	50	3 of 5
Iron	44.5 - 590	300	1 of 5
Sodium	33,600 – 434,000	20,000	2 of 5
Thallium	1.7 – 2.0	0.5	2 of 5

a – ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b – SCG: Standards, Criteria and Guidance – Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface Water and Groundwater Quality Standards and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

The primary groundwater contaminants of concern at the site were TCE (assumed associated with the previous site manufacturing activities and hexavalent chromium (assumed associated with historic Site shoe manufacturing). The concentrations and distribution of the contaminants of concern between 2012 and 2015 (prior to and following remedial activities) are shown on Figure 2-1. Metals exceeding SCGs listed in Table 2-4 are assumed to be more isolated in extent likely naturally occurring, associated with historic fill and/or from impacts from adjacent and/or up-gradient sites (e.g., railroad tracks).

Groundwater contamination migrating off-site to the north and northwest might combine with contamination associated with the former Canada Dry Plant inactive hazardous waste disposal site (located southeast of the Site) depending on area groundwater flow directions (which can vary depending on seasonal fluctuations and/or impacts associated with heavy rain events).

Based on the findings of the RI/RAR, the disposal of waste materials at the site has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern are TCE and hexavalent chromium.

2.3.3 Site-Related Soil Vapor Intrusion

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of sub-slab soil vapor under structures, and indoor air inside structures. At the site, due to the presence of buildings in the impacted area, a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring. Soil vapor samples (a combined sample set including sub-slab, indoor, and outside air) were collected from on-site locations. Sampling was performed in 2006, 2007 and 2008. Based on the air sampling results, sub-slab depressurization (SSD) systems were installed at the three on-site buildings (see Figure 2-3). The primary soil vapor contaminant is TCE, which is assumed to be associated with the former on-site electronics manufacturing.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Record of Decision dated January 21, 2011 are as follows:

Public Health Protection

Groundwater

- Prevent people from drinking groundwater with contaminate levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.
- Prevent inhalation of contaminates from groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of contaminants volatilizing from the soil.

Soil Vapor

- Mitigate impacts to public health resulting from existing from exposure, or the potential for, soil vapor intrusion into the indoor air of buildings at or near the Site.

Environmental Protection

Groundwater

- *Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.*

Soil

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

TCE and metals contaminated Site Soil was remediated in accordance with the NYSDEC-approved work plans prepared by GZA including an on-Site IRM Work Plan Revisions letter (dated March 31, 2006), Revised Supplemental Off-Site IRM Work Plan letter (dated September 23, 2010) and Remedial Action Work Plan letter (dated April 10, 2012).

The following is a summary of the Remedial Actions performed at the site:

1. Excavation and disposal of on-Site and off-Site soil/fill exceeding restricted residential SCOs to depths ranging from about 9 feet bgs for on-Site soil and about 4 to 5 feet bgs for select adjacent off-Site soil. Excavations were backfilled with clean imported soil (e.g., bank run stone). Additionally, on-Site dry wells had impacted soil removed and structures were filled with concrete and sealed to grade level.
2. Completion of in-situ groundwater remediation using enhanced anaerobic bioremediation application via injection points at select locations of the Site.
3. Installation of four (4) SSDS suction fans inside on-Site buildings to reduce potential exposure to sub slab soil vapors.
4. Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the site in 2015.

5. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting in 2015.

On-Site and off-Site IRM activities were competed at the Site on May 2006 and October 2011, respectively, on-Site SSD systems were installed in March 2009. Groundwater remedial activities (via in-situ chemical injections) were completed at the site in May 2012 with subsequent annual groundwater monitoring and sampling completed in April 2013 through April 2015.

2.5 Remaining Contamination

Upon completion of the on-Site and off-Site soil excavation IRMs, SSD system installation, and the groundwater remedial effort via enhanced anaerobic bioremediation application and groundwater monitoring, five contaminants (i.e., TCE, Cr+6, copper, chromium and thallium) exceeding their respective SCOs are anticipated to remain at select/sporadic locations of the Site resulting in slight impact to soil, groundwater and/or soil vapor at the Site. Based on the minimal remaining contaminants, continued operation of the SSD system, a limited groundwater monitoring and sampling program, and imposition of land use and groundwater use restrictions will be implemented to protect public health and the environment.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Although a limited volume of residual contaminated soil, groundwater and soil vapor exists beneath the site, Institutional Controls and Engineering Controls (IC/ECs) will be required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all EC/ICs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by NYSDEC.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix B) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of Institutional Controls are required by the ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to restricted residential uses (land use subject to local zoning laws). Adherence to these Institutional Controls on the site is required by the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement and this SMP by the Grantor and the Grantor's successors and assigns;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Groundwater monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP;

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The site has a series of Institutional Controls in the form of site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- Imposition of an institutional control in the form of an environmental easement for the controlled property that:
    - Requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
    - Allows the use and development of the controlled property for restricted residential use (land use is subject to local zoning laws);
    - Restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;
    - Prohibits agriculture or vegetable gardens in the controlled property;
    - Requires compliance with the Department approved Site Management Plan.

3.2.1 Excavation Work Plan

The site soils have been remediated for restricted residential, use (land use is subject to local zoning laws). Any future intrusive work that will encounter or disturb the remaining contamination will be performed in compliance with the Excavation Work Plan (EWP) that is attached as Appendix B to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the site. An example of a previously approved HASP (that includes community air monitoring work) that is in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations is attached as Appendix G. This HASP was utilized for completion of the RI/RAR for the Site that was approved by the NYSDEC. It should be noted that the specifics of this HASP may require modification to cover the specific excavation or other intrusive work requirements. Based on future changes to State and Federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports.

The site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The site owner will ensure that site development activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

3.2.2 Soil Vapor Intrusion Evaluation

Prior to the construction of any enclosed structures at the Site, an SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the proposed structure. Alternatively, an SVI mitigation system may be installed as an element of the building foundation without first conducting an investigation. This

mitigation system will include a vapor barrier and passive SSD system that is capable of being converted to an active system.

Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH "Guidance for Evaluating Vapor Intrusion in the State of New York". Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary (unvalidated) SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as mitigation. SVI sampling results, evaluations, and follow-up actions will also be summarized in the next Periodic Review Report.

3.3 Engineering Controls

3.3.1 Sub-Slab Depressurization System

Sub slab depressurizations systems (SSDs) were installed by Enviro Testing of Binghamton, New York at the three on-Site buildings in 2009. The installed SSDS generally included sealing of identifiable and accessible preferential pathways (including floor joints, cracks and installation of Drainjer floor drains) and installation of suction points beneath the basement flooring. The suction points were typically constructed by removal of a small portion of concrete flooring and approximately 1 cubic foot of soils below the slab. A 4-inch diameter PVC pipe was installed into the suction point and the voids between the pipe and concrete floor were sealed with a caulk/grout material. The piping was fastened to accessible columns, wall areas and ceiling joists and connected to either a typical depressurization fan (i.e., Fantech HP22) or a high suction fan (i.e., RadonAway HS3000).

The high suction fans were utilized in locations where tighter, possibly wetter soils tended to reduce the radius of influence of the Fantech fans. The depressurization fans were either mounted with protective covers at exterior locations or within attic/crawlspace areas and the vent stacks extended to a point above the respective roof line. Vacuum readings were collected from locations below the sub-slab flooring typically at the far corners from each suction point to verify a sufficient radius of influence was met for each building. Vacuum readings were to be greater than -0.004 inches of water column.

The locations of the depressurization fans, associated piping and suction points installed for the on-Site buildings as well as verification vacuum readings showing extent of coverage underneath the respective sub-slab flooring are shown on Figure 2-3.

- *Building 1-* One depressurization fan was installed on the southwestern side of the building and was connected to one interior suction point located in the northeast corner of the adhesive/glue room (approximate central portion of the Building 1).

- *Building 2* – Two depressurization fans were installed on the southern exterior portion of the building. Each fan was connected to two separate suction points located in the interior portion of the building. The locations of the sumps were generally along the perimeter walls of the building as interior columns were not available to accommodate PVC piping to the respective fans.

- *Building 3* – Due to good sub-slab soil air communication, only one fan and one associated sump was constructed for the Building 3 basement. Interior columns located in the basement allowed for the placement of the sump and associated piping in an approximate central location of the building to provide suitable vacuum coverage. However, no sump was able to be installed in the lower subbasement area due to the presence of water (either perched or top of water table) directly below the concrete slab.

Procedures for operating and maintaining the SSD system are documented in the Operation and Maintenance Plan (Section 5 of this SMP). Procedures for monitoring the system are included

in the Monitoring Plan (Section 4 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the site, occurs.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH. An assessment of soil vapor by means of collecting sub-slab soil vapor samples (likely multiple rounds of samples) would be required in addition to groundwater analysis to assess the potential for discontinuing the Site SSD systems.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the SSD system and groundwater remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in Appendix F.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (i.e., groundwater);
- Monitoring requirements of SSD systems;
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for groundwater monitoring wells and SSDs systems;
- Monitoring well decommissioning procedures; and

- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. During these inspections, an inspection form will be completed that will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components or ECs installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date; and

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 SSD System Monitoring

Monitoring of the Site SSD system will be performed on an annual basis, as identified in Table 4-1 SSD System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSD system components to be monitored include, but are not limited to, the components presented in the table below. Additionally, the Site owner or manager should regularly observe the u-tube manometer for visual evidence of system vacuum at each suction point.

Table 4-1– SSD System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
SSD Systems	Blower Operation	Power On or Off	Annually
SSD Systems	General Piping	Piping in-tact	Annually

If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not operational; maintenance and repair, is required immediately by a qualified service technician.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from select on-Site groundwater monitoring wells once every three (3) years. Sampling locations, required analytical parameters and schedule are provided in Table 4-2 – Groundwater Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 4-2 – Groundwater Sampling Requirements and Schedule

Sampling Location	Analytical Parameters		Schedule
	VOCs (EPA Method 8260)	Cr^{+6} (EPA Method 6010B)	
On-Site Groundwater Monitoring Wells MW-1, MW-2, and MW-5	X	X	Once Every 3 years
Off-Site Groundwater Monitoring Well 8	X	X	Once Every 3 Years

Detailed sample collection and analytical procedures and protocols are provided in Appendix E – Groundwater Sampling Plan and Monitoring Well Construction Logs and Appendix F – Quality Assurance Project Plan.

4.4.1 Groundwater Sampling

Groundwater monitoring will be continue to be performed once every three years to assess the improvements associated with the IRM contaminated soil excavation done in May 2006 for on-Site soil and August 2011 for off-Site soil and the enhanced anaerobic bioremediation application remedy which was done in May 2012 via injection points at the Site.

A select number of existing monitoring wells will be used to monitor both up-gradient and down-gradient groundwater conditions at the site (see Figure 2-1 for locations and designations of exiting monitoring wells). The three (3) on-Site and one (1) off-Site monitoring wells listed in the table above will be monitored in the similar manner and for same parameters as done during the post remediation work (i.e., VOCs and Cr^{+6}). Figure 2-1 shows the contaminant concentrations from pre- and post-bioremediation groundwater monitoring events between 2012 and 2015 which

show improvements in several perimeter groundwater wells with TCE and Cr+6 concentrations below their respective groundwater criteria.

Three monitoring wells (MW-1, MW-2, and MW-5) are located within the Site property boundary line and the remaining monitoring well (MW-8) is located at an off-Site property down gradient from the Site. These wells have been identified with TCE and Cr+6 concentrations exceeding their respective groundwater criteria after remedial injections completed at the Site. The respective monitoring well construction logs are included in Appendix E.

Groundwater monitoring will be completed once every three years until the NYSDEC decides continued monitoring is no longer necessary and/or practical.

Table 4-3 summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, 3 on-site wells and 1 downgradient well are sampled to evaluate the effectiveness of the groundwater remedial effort.

Table 4-3 – Monitoring Well Construction Details

Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation [1]			
				Casing	Surface	Screen Top	Screen Bottom
MW-1	Up gradient	42°5'52.96"N 76°4'9.06"W	2	102.41	100.0	90.0	75.0
MW-2	Up/Cross gradient	42°5'53.81"N 76°4'8.45"W	2	100.02	100.5	90.5	75.5
MW-5	Down gradient	42°5'53.45"N 76°4'10.98"W	2	97.21	97.5	87.2	77.2
MW-8	Down gradient	42°5'53.90"N 76°4'13.99"W	2	96.40	96.5	86.5	76.5

1) Elevations shown are relative to the top of PVC well casing of MW-4 which was assigned elevation 100.00 feet.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.2 Soil Vapor Intrusion Sampling

Soil vapor sampling will not be required to be performed to assess the performance of the SSD systems. Performance assessment of SSD system will be based on actual blower operation and vacuum meter reading less than -0.004-inchs as discussed in Section 4.3.

4.4.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling logs. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the Groundwater Sampling Plan provided as Appendix E of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the site to operate and maintain the SSD systems;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSD systems are operated and maintained.

Four SSD systems were installed by Enviro Testing of Binghamton, New York within the three on-Site buildings in 2009. The OM&M associated with the on-Site SSDS is as follows.

- Operation: The SSD system are hardwired into the electrical system at the Site and designed to operate continuously. If power loss occurs, the SSD system will shut down. Upon power restoration, the system will restart automatically.
- Maintenance: If a SSD system is no longer operating, malfunctioning or there is a loss of vacuum noted, maintenance of the SSD unit will be required. The type of maintenance could vary pending the identified problem. It will require a visit to the Site by a qualified vendor (i.e., Enviro Testing or similar installer) to assess the problem.
- Monitoring: The on-Site SSD system will be visually inspected annually. This inspection will be documented in the Institutional and Engineering Control Report that will be required to be submitted annually.

5.2 Remedial System (or other Engineering Control) Performance Criteria

Because the SSD system is designed to operate on a continual basis, the performance criteria for each unit will be limited to the following items.

- SSD system should always be operational
- SSD system piping should remain intact with pipe exhausting at the designated exterior location (e.g., through wall or through roof).

5.3 Operation and Maintenance of Sub-slab Depressurization System

The following sections provide a description of the operation and maintenance of SSD systems.

5.3.1 System Start-Up and Testing

The system testing described above will be conducted if, in the course of the SSD system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.3.2 Routine System Operation and Maintenance

The system is designed to run continuously and does not require any routine operational procedures other than periodic visual verification of manometer indicating system operation.

5.3.3 Non-Routine Operation and Maintenance

The system is designed to run continuously and routine equipment maintenance is not applicable for this system.

5.3.4 System Monitoring Devices and Alarms

The SSDS system has no warning device other than the visual observation of system manometer to indicate that the system is not operating properly. In the event that the manometer is observed to be at static atmospheric readings levels (indicative of no suction), applicable inspection, maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS system be restarted or replaced. Operational problems will be noted in the subsequent Periodic Review Report. Additionally, observations of the manometer can be made by the Site

owner/manager on a regular basis to verify vacuum is available at each suction point. In the event there is no vacuum, the Site owner/manager will notify respective contacts.

6.0. REPORTING REQUIREMENTS

6.1 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion or equivalent document e.g., Satisfactory Completion Letter, No Further Action Letter, etc. is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in Appendix D -Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable sampling forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Data summary tables and graphical representations of contaminants of concern by media (e.g., groundwater), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS^{TM} database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;

- The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;

- Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;

- Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and

- Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.

- The overall performance and effectiveness of the remedy.

6.1.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*

- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*

- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*

- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*

- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*

- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*

- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] for the site."

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

6.2 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.0 REFERENCES

- "Remedial Investigation & Alternative Analysis Report, 312 Maple Street Site, Endicott, New York, NYSDEC Site # B-00168-7: prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated July 2009.

- Proposed Remedial Action Plan, 312 Maple Street, Environmental Restoration Program, Village of Endicott, Broome County, New York, Site No. B00168, prepared by the NYSDEC dated October 2010.

- Record of Decision, 312 Maple Street, Environmental Restoration Program, Village of Endicott, Broome County, New York, Site No. B00168, prepared by the NYSDEC dated January 2011.

- "Off-Site Interim Remedial Measure, ERP#B00168-7, 312 Maple St., Endicott, NY" letter report prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated November 2011.

- "Site Remedial Activities Work Plans, 312 Maple Street, Endicott, New York" letter report prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated April 2012

- "Pre-Bioremediation Application Groundwater Sampling and Data Report, 312 Maple Street Site Endicott, New York, NYSDEC SITE # B-00168-7" prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated December 2013.

- "2013 Post-Bioremediation Application Groundwater Sampling and Data Report, 312 Maple Street Site Endicott, New York, NYSDEC SITE # B-00168-7" prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated December 2013.

- "2014 Post-Bioremediation Application Groundwater Sampling and Data Report, 312 Maple Street Site Endicott, New York, NYSDEC SITE # B-00168-7" prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated July 2014.

- "2015 Post-Bioremediation Application Groundwater Sampling and Data Report, 312 Maple Street Site Endicott, New York, NYSDEC SITE # B-00168-7" prepared for Broome County Department of Economic Development, Binghamton, New York by GZA GeoEnvironmental of New York, dated June 2015.

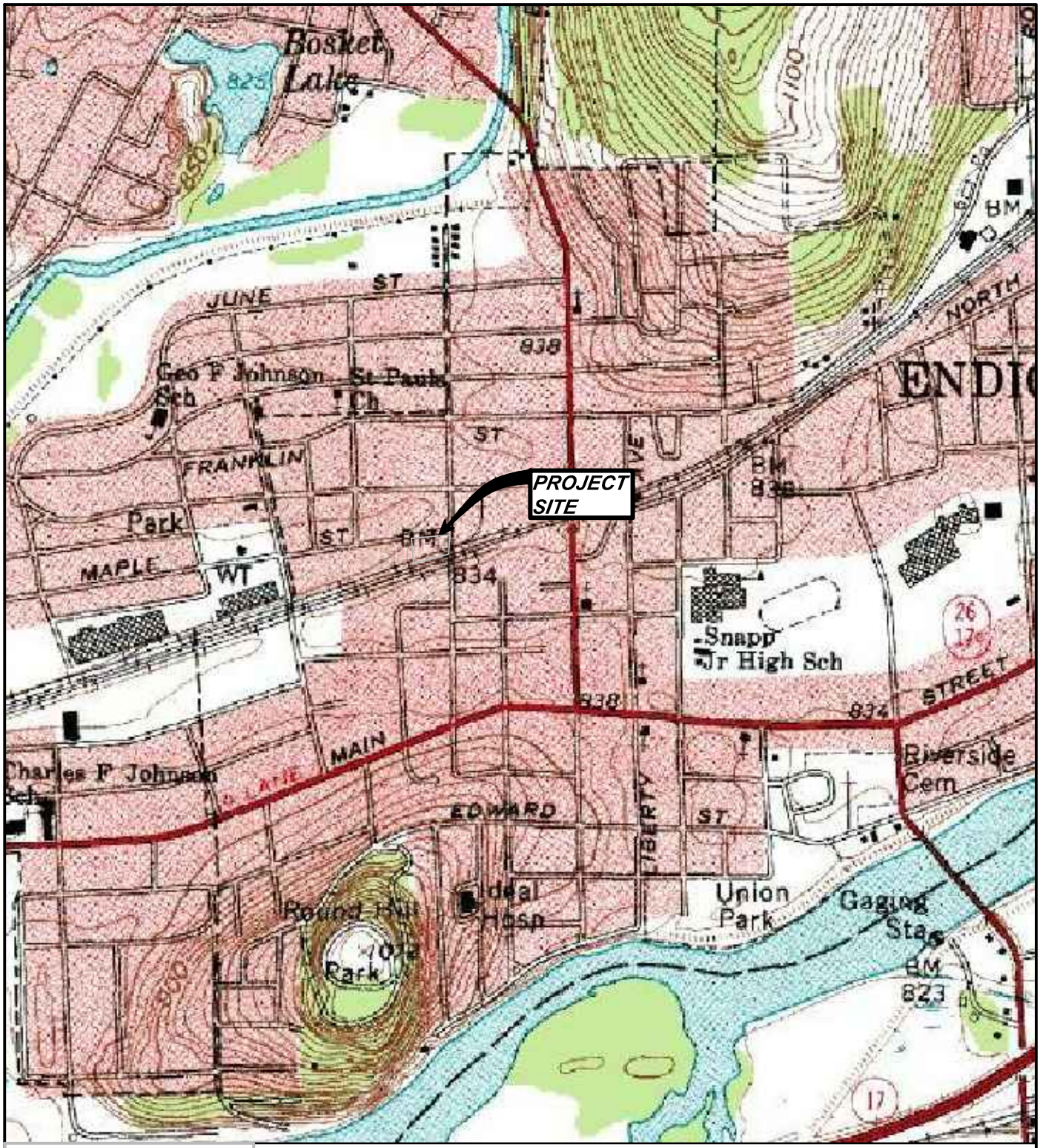
- 6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

- NYSDEC DER-10 – “Technical Guidance for Site Investigation and Remediation”.

- NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

- NYSDOH, 2006. Guidance for Evaluating Vapor Intrusion in the State of New York.

FIGURES



QUADRANGLE LOCATION

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

SCALE IN FEET

0 500 1000 2000

N W E S

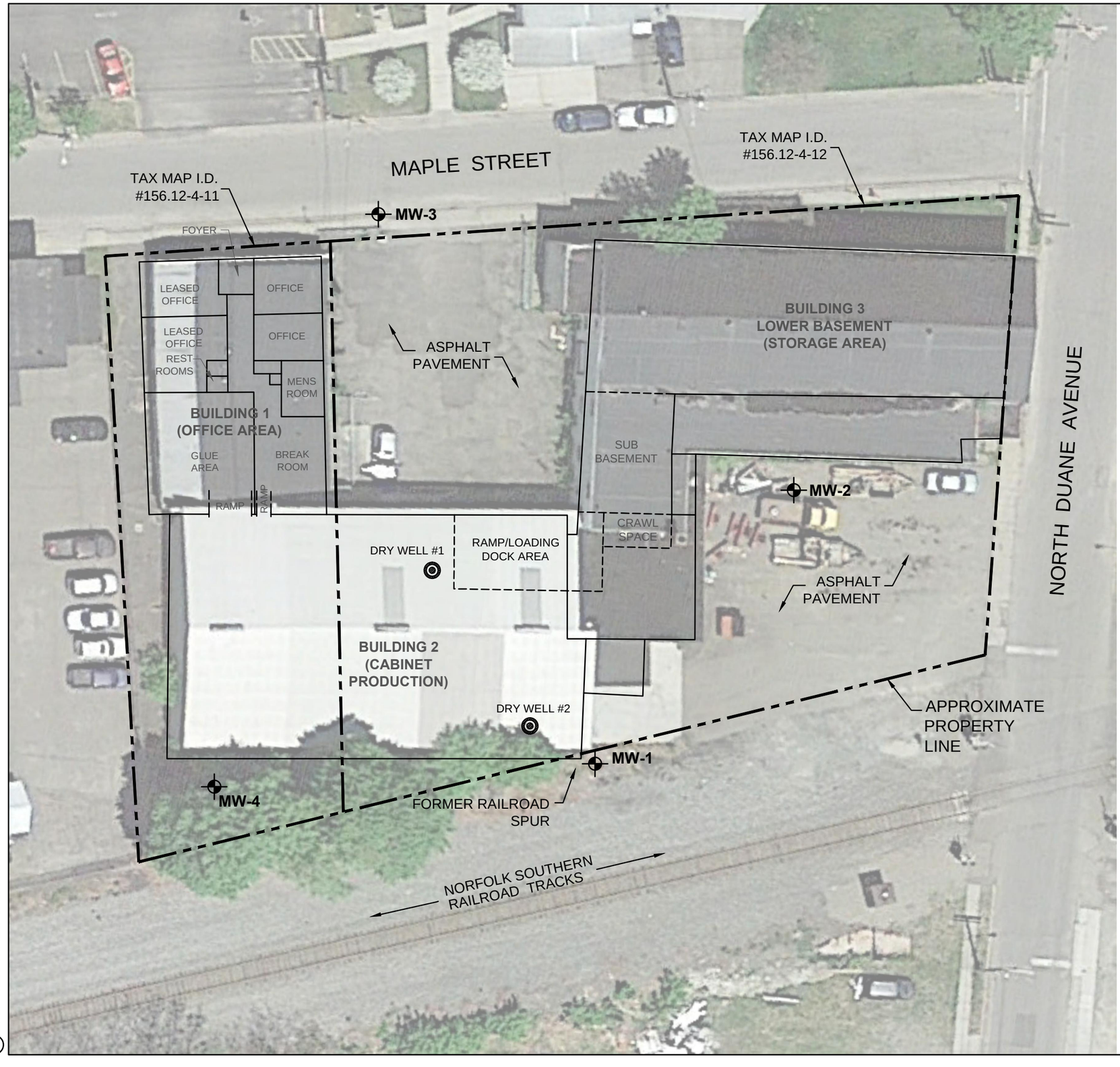
312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN - ERP SITE No. B-00168-7

SITE LOCATION PLAN

GZA GeoEnvironmental of NY
Engineers and Scientists
www.gza.com

DRAWN BY: DL
PROJECT NO. 21.0056127.10
DATE: JULY, 2015

FIGURE 1-1



LEGEND:

MW-1	APPROXIMATE LOCATION AND DESIGNATION OF EXISTING MONITORING WELLS
DRY WELL #1	APPROXIMATE LOCATION AND DESIGNATION OF EXISTING HISTORIC DRYWELLS.

NOTES:

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS COLLECTED BY GOOGLE EARTH PRO ON MAY 13, 2015.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: **DL / GB**

DATE: **JULY 2015**

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

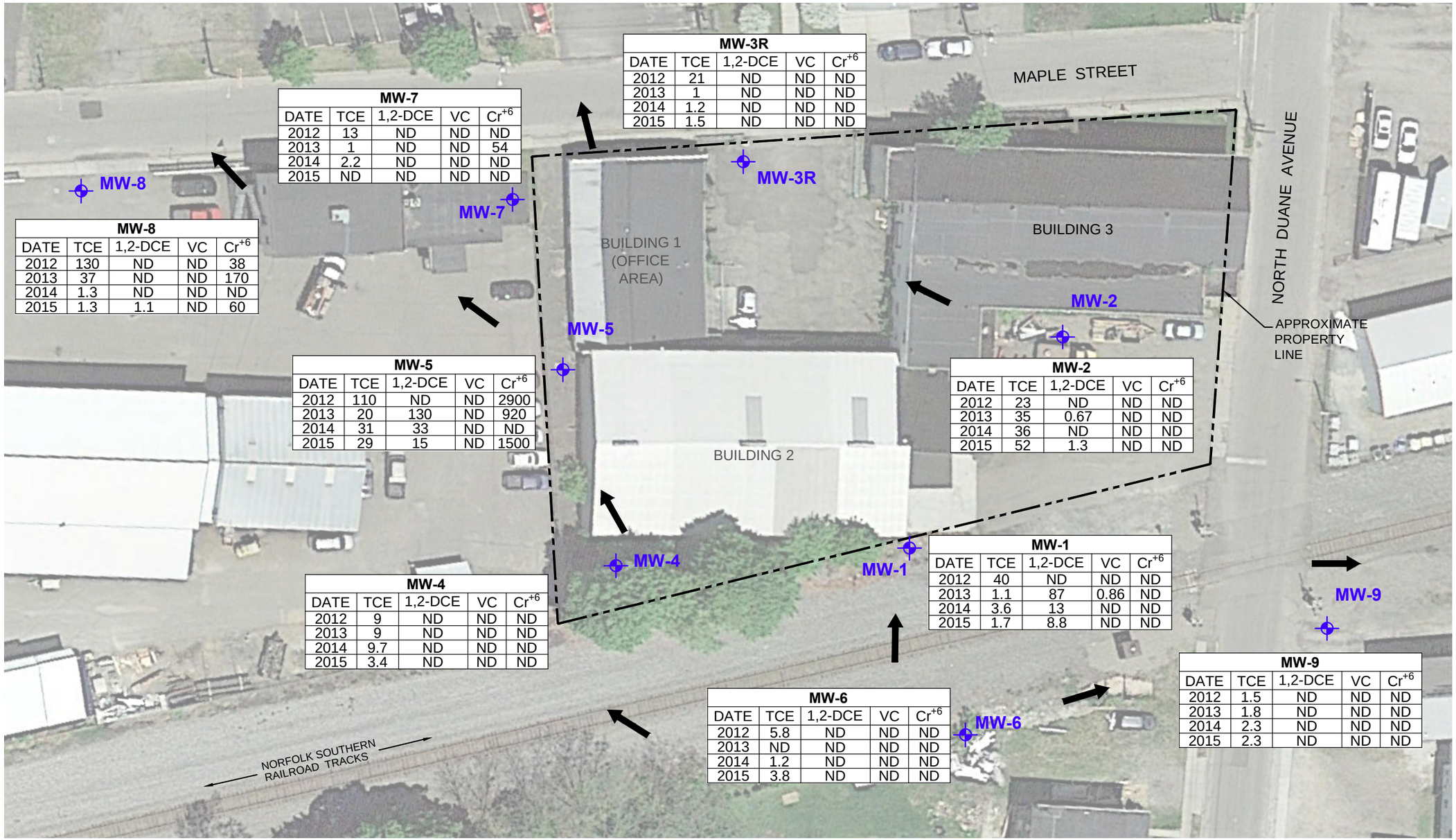
0 15 30 60

312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN
ERP SITE No. B-00168-7

SITE PLAN

PROJECT No.
21.0056127.10

FIGURE No.
1-2



MW-8

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	130	ND	ND	38
2013	37	ND	ND	170
2014	1.3	ND	ND	ND
2015	1.3	1.1	ND	60

MW-7

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	13	ND	ND	ND
2013	1	ND	ND	54
2014	2.2	ND	ND	ND
2015	ND	ND	ND	ND

MW-3R

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	21	ND	ND	ND
2013	1	ND	ND	ND
2014	1.2	ND	ND	ND
2015	1.5	ND	ND	ND

MW-5

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	110	ND	ND	2900
2013	20	130	ND	920
2014	31	33	ND	ND
2015	29	15	ND	1500

MW-2

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	23	ND	ND	ND
2013	35	0.67	ND	ND
2014	36	ND	ND	ND
2015	52	1.3	ND	ND

MW-4

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	9	ND	ND	ND
2013	9	ND	ND	ND
2014	9.7	ND	ND	ND
2015	3.4	ND	ND	ND

MW-1

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	40	ND	ND	ND
2013	1.1	87	0.86	ND
2014	3.6	13	ND	ND
2015	1.7	8.8	ND	ND

MW-6

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	5.8	ND	ND	ND
2013	ND	ND	ND	ND
2014	1.2	ND	ND	ND
2015	3.8	ND	ND	ND

MW-9

DATE	TCE	1,2-DCE	VC	Cr^{+6}
2012	1.5	ND	ND	ND
2013	1.8	ND	ND	ND
2014	2.3	ND	ND	ND
2015	2.3	ND	ND	ND

LEGEND:

MW-1 — APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL.

PRESUMED GROUNDWATER FLOW DIRECTION

TCE = Trichloroethene
1,2-DCE = cis 1,2 - Dichloroethene
VC = Vinyl Chloride
Cr^{+6} = Hexavalent Chromium

NOTES:

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS COLLECTED BY GOOGLE EARTH PRO ON MAY 13, 2015.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.
3. UNITS ARE LISTED IN MICROGRAMS PER LITER (µg/l) OR PARTS PER BILLION (ppb). ND INDICATES COMPOUND NOT DETECTED ABOVE METHOD DETECTION LIMIT.
4. TABLES SHOW SPECIFIC VOC AND Cr^{+6} CONCENTRATIONS FOR PRE-REMEDIAL (2012) AND POST-REMEDIAL ACTIVITIES (2013 TO 2015).

NORTH

DRAWN BY: DEW / GRB

DATE: JULY 2015

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET
0 20 40 80

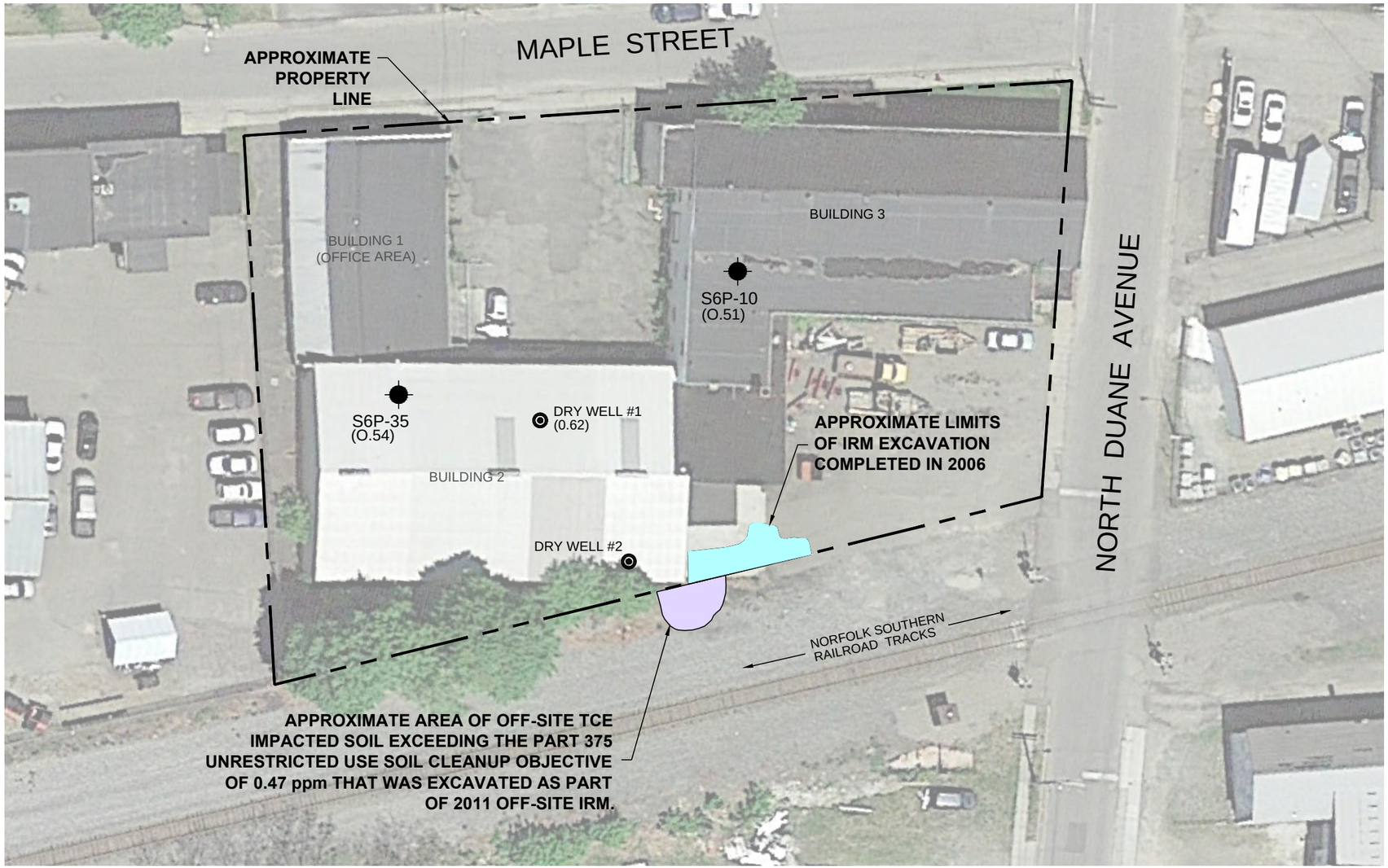
312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN
ERP SITE No. B-00168-7

GROUNDWATER FLOW DIRECTIONS AND CONTAMINANT CONCENTRATIONS

PROJECT No.
21.0056127.10

FIGURE No.
2-1

GZA-J:\Branch\Buffalo\2015-07-27 Submission\FIGURE 2-1.dwg [Figure 2-1] July 27, 2015 - 2:11pm deborah.landi



NORTH

SITE PLAN

0 20 40 80

APPROXIMATE SCALE IN FEET

LEGEND:

DRY WELL #1 — APPROXIMATE LOCATION AND DESIGNATION OF DRYWELL CLOSURE (WITH TCE CONCENTRATIONS IN PPM).

S6P-35 (O.54) — APPROXIMATE LOCATION AND DESIGNATION OF SOIL SAMPLE AT SOIL GAS SCREENING POINT (WITH TCE CONCENTRATIONS IN PPM).

NOTES:

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS COLLECTED BY GOOGLE EARTH PRO ON MAY 13, 2015.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

DRAWN BY: **DEW / GRB**

DATE: **JULY 2015**

GZA GeoEnvironmental of New York

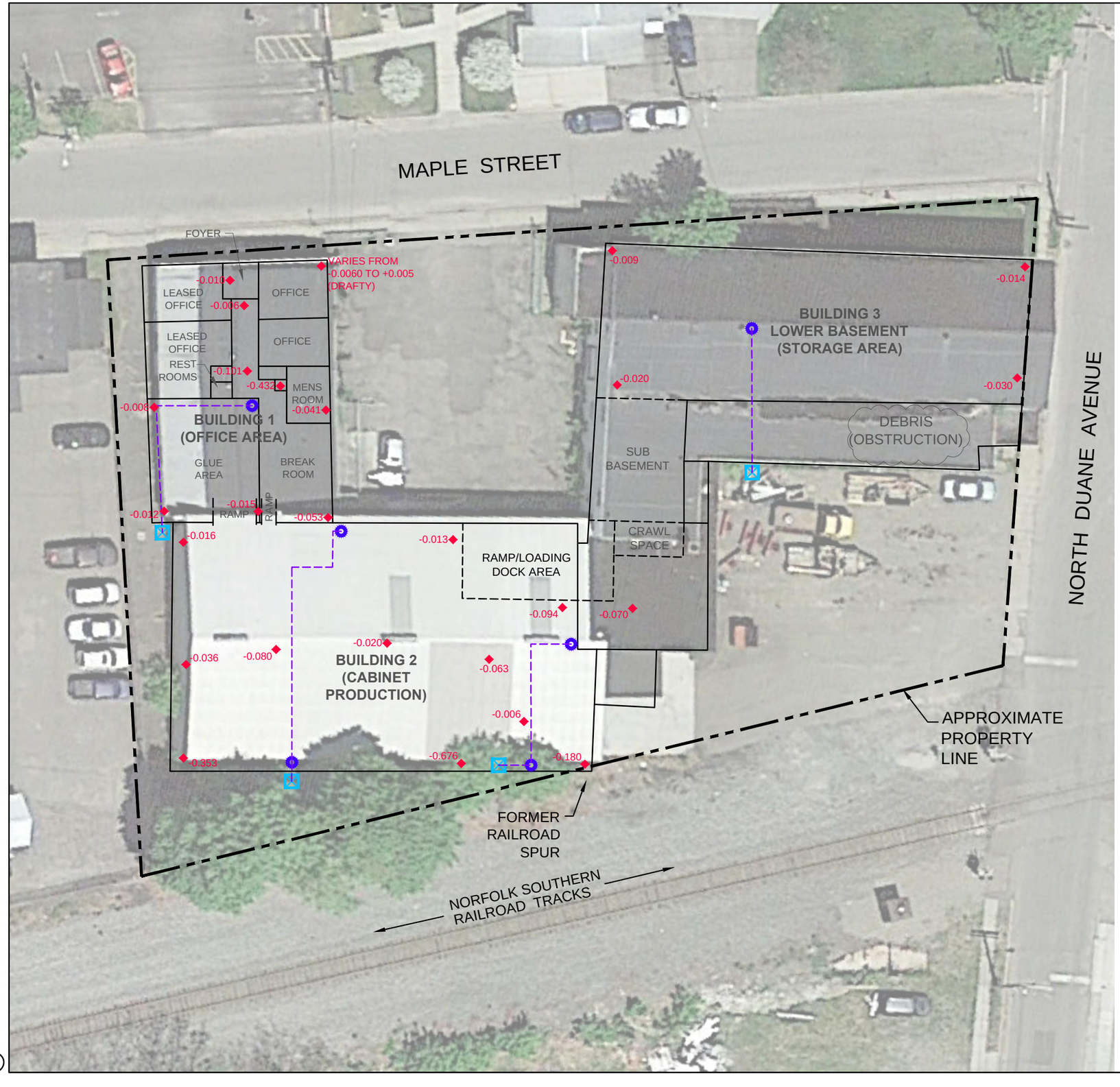
APPROXIMATE SCALE IN FEET: **AS SHOWN**

312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN
ERP SITE No. B-00168-7

REMAINING SOIL CONTAMINATION AND LIMITS OF IRM EXCAVATIONS

PROJECT No.
21.0056127.10

FIGURE No.
2-2



NORTH

LEGEND:

- APPROXIMATE LOCATION OF EXTERIOR VENTILATION STACK INSTALLATION BY ENVIRO TESTING INC.
- APPROXIMATE LOCATION OF OVERHEAD PIPING INSTALLATION BY ENVIRO TESTING INC.
- APPROXIMATE LOCATION OF SUCTION FAN THROUGH SLAB BY ENVIRO TESTING INC. WITH MANOMETER.
- -0.030 APPROXIMATE LOCATION OF VACUUM MONITORING POINT (WITH ASSOCIATED VACUUM READING IN INCHES OF WATER COLUMN) THROUGH SLAB BY ENVIRO TESTING INC.

NOTES:

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS COLLECTED BY GOOGLE EARTH PRO ON MAY 13, 2015.
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DRAWN BY: **DEW / GRB**

DATE: **JULY 2015**

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APPROXIMATE SCALE IN FEET

0 15 30 60

312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK
SITE MANAGEMENT PLAN
ERP SITE No. B-00168-7

SSD SYSTEM LOCATION

PROJECT No.
21.0056127.10

FIGURE No.
2-3

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
Mr. Frank Evangelisti c/o Broome County	607-778-2414/ FEvangelisti@co.broome.ny.us
Daniel Troy - GZA GeoEnvironmental of NY	716-844-7034/daniel.troy@gza.com
Gary Priscott – NYSDEC Project Manager	607-775-2545/gary.priscott@dec.ny.gov
Harry Warner - NYSDEC Regional HW Engineer	315-426-7400/harry.warner@dec.ny.gov
Kelly Lewandowski – NYSDEC Site Control	518-402-9569 /kelly.lewandowski@dec.ny.gov
Mr. Joe Bellardinelli (Current Site Tenant)	607-786-3539 office/607-206-8597 mobile

APPENDIX B – EXCAVATION WORK PLAN (EWP)

1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A

Table B-1: Notifications*

Gary Priscott -	607-775-2545/gary.priscott@dec.ny.gov
Harry Warner – NYSDEC Regional HW Engineer	315-426-7400/harry.warner@dec.ny.gov
Kelly Lewandowski – NYSDEC Site Control	518-402-9569 /kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix G of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil.

3 SOIL STAGING METHODS

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

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

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

4 MATERIALS EXCAVATION AND LOAD-OUT

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

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

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

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

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

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

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

5 MATERIALS TRANSPORT OFF-SITE

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

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

Truck transport routes will be determined at the time of planned excavation work and will be subject to local municipal and NYSDOT requirements. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport; (g) community input [where necessary].

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

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

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

6 MATERIALS DISPOSAL OFF-SITE

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

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

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

7 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site

will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

Soil and material excavated from within the site limits shall be staged on polyethylene and sampled to determine if the soil can be re-used on-site or needs to be disposed of off-site.

The following table identifies the sampling frequency to be utilized for soil characterization. Sample analysis shall include analysis for total analyte list for volatile organic compounds, semi-volatile organic compounds, inorganics, polychlorinated biphenyls, and pesticides unless otherwise approved by NYSDEC in writing. Sampling protocols may be done as indicated below.

Soil Quantity (Cubic Yard)	Number of Grab Samples	Number of Composite Samples
0 – 50	1	1
50 – 100	2	1
100 – 200	3	1
200 - 300	4	1
300 – 400	4	2
400 – 500	5	2
500 – 800	6	2
800 – 1,000	7	2

Laboratory analyses shall be performed by a laboratory having the applicable New York State and US EPA certifications/licenses for waste characterization testing. The soil may be re-used on-Site if sample analysis indicates compound concentrations do not exceed those listed in the NYSDEC Part 375 Restricted Residential SCOs. Final disposition of the soil shall require NYSDEC approval and copies of the applicable laboratory results shall be submitted to NYSDEC for its review.

Excess soil that is not to be reused on-site shall be transported to an off-site regulated solid waste (landfill) facility. Soil disposal requires the approval of the disposal facility that is accepting the regulated material prior to transport. NYSDEC shall also be notified of the disposal location prior to off-site disposal.

Excavation of subsurface materials may include impacted materials, along with uncontaminated backfilled materials that shall require different handling and stockpiling. The excavation and material handling of the separate types of excavated materials shall be conducted in a manner that limits mixing materials with potentially different types of contamination or reuse.

8 FLUIDS MANAGEMENT

All large volume of liquids requiring removal from the site, (e.g., excavation dewatering), will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

9 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

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

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

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

10 STORMWATER POLLUTION PREVENTION

A formal project specific SWPPP shall be developed for specific construction projects 1 acre or more in size that conforms to the requirements of NYSDEC Division of Water guidelines and NYSDEC regulations. However, for projects less than 1 acre in size, the following general erosion and sediment control practices shall be used:

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

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

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

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

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be

inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

11 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

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

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

APPENDIX C

RESPONSIBILITIES of

OWNER and REMEDIAL PARTY

Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the 312 Maple Street site (the "site"), Site number B00168, will be the site owner(s), as defined below. The owner(s) is/are currently listed as County of Broome (the "owner").

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is: County of Broome.

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in a(n) Environmental Easement remain in place and continue to be complied with. The owner shall provide a written

certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Appendix B, Table B-1 -Notifications.

6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Appendix B - Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The owner will maintain site groundwater monitoring wells and SSD system components (i.e., blowers and associated piping) on behalf of the RP. The RP remains ultimately responsible for maintaining the engineering controls.

9) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Appendix B - Notifications of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in Section 5 of the SMP.

8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX D

ENVIRONMENTAL EASEMENT / NOTICE / DEED RESTRICTION

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 29th day of December, 2015, between Owner(s) County of Broome, having an office at 60 Hawley Street, Binghamton, New York 13902, County of Broome, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 312 Maple Street and 1-3 Duane Avenue North in the Village of Endicott, County of Broome and State of New York, known and designated on the tax map of the County Clerk of Broome as tax map parcel numbers: Section 156.12 Block 4 Lots 11 and 12, being the same as that property conveyed to Grantor by deed dated February 9, 1994 and recorded in the Broome County Clerk's Office in Liber and Page 1834/1075. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.924 +/- acres, and is hereinafter more fully described in the Land Title Survey dated May 13, 2002 and last revised on July 22, 2005 prepared by Paul A. Waters, NYCLPS of Shumaker Consulting Engineering and Land Surveying, P.C., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation

established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of State Assistance Contract Number: NYWII-B00168-12-14, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Broome County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation

pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: B00168
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

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IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

County of Broome:

By: Debra Preston

Print Name: Debra A. Preston

Approved as to form
By
BROOME COUNTY
ATTORNEY'S OFFICE

Title: County Executive Date: 12/11/15

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Broome)

On the 10th day of December, in the year 2015, before me, the undersigned, personally appeared Debra A. Preston, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Karen M. Veruto
Notary Public - State of New York

KAREN M VERUTO
Notary Public, State of New York
No. 01VE5042801
Qualified in Broome County
Commission Expires April 24, 2019

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 29 day of December, in the year 2015, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

ENVIRONMENTAL EASEMENT DESCRIPTION
312 MAPLE STREET, ERP SITE NO. B00168
VILLAGE OF ENDICOTT, BROOME COUNTY

ALL THAT TRACT OR PARCEL OF LAND situate in Village of Endicott, in the Town of Union, County of Broome, and the State of New York, and described as follows:

BEGINNING at point at on the southerly boundary Maple Street at its intersection with the division line between the property of Susan M. Barnes and Karl E. Spencer (reputed owners) on the west and the property of the County of Broome on the east;

RUNNING THENCE South 86°46'25" E along the southerly boundary of Maple Street a distance of 268.61 feet to a point at the intersection the southerly boundary of said Maple Street and the westerly boundary of North Duane Avenue;

RUNNING THENCE South 10°53'25" W along the westerly boundary of North Duane Avenue a distance of 134.81 feet to a point at the intersection the westerly boundary of said North Duane Avenue with the northerly Right of Way of Pennsylvania Lines LLC (Formerly Erie Railroad Company);

RUNNING THENCE South 83°24'56" W along the northerly Right of Way of Pennsylvania Lines LLC (Formerly Erie Railroad Company) a distance of 255.85 feet to a point at the intersection with the division line between the property of Susan M. Barnes and Karl E. Spencer (reputed owners) on the west and the property of the County of Broome on the east;

RUNNING THENCE North 03°42'14" E along said division a distance of 177.21 feet to the POINT OF BEGINNING.

The above described parcel contains 40248± sq.ft. or 0.9240± acres.

APPENDIX E

GROUNDWATER SAMPLING PLAN

AND MONITORING WELL CONSTRUCTION LOGS

A groundwater sampling event will be completed once every three years to assess the effectiveness of groundwater remedy completed in 2012. The following four (4) monitoring well locations will be sampled as part of the baseline assessment.

- Three (3) on-Site monitoring wells (MW-1, MW-2, and MW-5); and
- One (1) off-Site well (MW-8).

Prior to collecting groundwater samples, a static water level will be measured from the top of the monitoring well riser and recorded on the monitoring well sampling log. Static water level data from the monitoring wells will be used to determine groundwater flow direction.

Low-flow sampling techniques will be used to collect groundwater samples to assess water quality data. A peristaltic pump will be used, with new, dedicated polyethylene tubing at each well location.

The peristaltic pump will be turned on and the first set of water quality readings (including, but not limited to: pH, temperature, specific conductance, dissolved oxygen and turbidity) will be collected when the flow-through cell is completely full and water begins to flow out. Readings will be recorded once a constant head is established and continued until water quality readings stabilized for three successive readings. 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 will be maintained as constant as possible. Sampling flow rates will be kept consistent with purging/monitoring flow rates. Altering the flow rates could likely change the chemistry within the well (i.e., stagnant water within the well will mix with formation 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 for VOCs (via EPA test method 8260) and hexavalent chromium (via Method SM3200D). 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 properly disposed of as solid waste.

Decontamination and Handling of Remediation Derived Waste

The sampling methods and equipment selected limit 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 Quality Assurance Plan (QAPP). Personal protective equipment and disposable sampling equipment will be placed in plastic garbage bags for disposal as a solid waste.

Purge water will be containerized in 55-gallon drums and stored on-Site, within a designated area, until analytical results are received. If analytical results are identified below Class GA criteria, the drummed water will be discharged to the ground surface at the Site. Should contaminants be present at concentrations exceeding Class GA criteria, GZA will coordinate with the Town of Endicott wastewater treatment facility for proper disposal, as previously done following similar groundwater sampling events.

APPENDIX F – QUALITY ASSURANCE PROJECT PLAN

A copy of the previously approved Quality Assurance Project Plan (QAPP) that was utilized at the Site for both the RI/RAR and for the Remedial Activities is included as an example of what will be required during future Site activities. Some modifications/revisions may be required to this plan depending on the specific work that is planned for the Site along with NYSDEC approval.

QUALITY ASSURANCE PROJECT PLAN

SITE REMEDIAL ACTIVITIES
312 MAPLE STREET
ENDICOTT, NEW YORK
SITE NO. B00168-7

SITE INVESTIGATION/REMEDIAL ALTERNATIVE REPORT
QUALITY ASSURANCE PROJECT PLAN
312 MAPLE ROAD
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SITE No. B00168-7

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1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

The purpose of this Quality Assurance Project Plan (QAPjP) 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 the 312 Maple Street Site in Endicott, New York (See Figure 1). The work will be completed by GZA GeoEnvironmental of New York (GZA) under a New York State Department of Environmental Conservation (NYSDEC) Environmental Restoration Project (ERP) agreement with Broome County.

1.2 PROJECT BACKGROUND

The Site is located at 312 Maple Street in Endicott, New York on the southwest corer of Maple Street and North Duane Avenue. Surrounding property is mixed residential/commercial. Northern Suffolk railroad tracks border the Site to the south. The Site is currently occupied by a manufacturer of wood cabinetry. Previous owners/operators include shoe companies, coal companies, electronic assemblers and a metal finishing job shop.

The Site is about 0.93 acres in size and includes three adjoining Site buildings (Buildings 1, 2, and 3 as shown on Figure 2). Building 1 is a single story masonry structure. Building 2 is a steel framed and sided structure with a concrete slab-on-grade floor. Building 3 is a masonry and wood framed two story building with a basement.

Based on previous studies performed by GZA, two source areas were originally identified at the site. The first is a zone of unsaturated soils contaminated with trichloroethene (TCE) located southeast of Building 2 (see attached Site Plan). The second is three dry wells located inside Buildings 2 and 3. Subsequent meetings and conversations with NYSDEC defined the surface soils east of Building 3 and south of Building 2 as areas of concern that may also require additional investigation/remediation. The groundwater at the site is contaminated with TCE but is not considered to be a source area.

> TCE Contaminated Unsaturated Soils: It is estimated that approximately 250 cubic yards (cy) of soil are contaminated based on our previous remedial investigations[1]. However, the contamination could extend beyond these limits (i.e. the TCE could extend beneath the building). The TCE contaminated soil source area appears to be on both the 312 Maple Street Site and the adjoining Northern Suffolk Railroad property.

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1 "Environmental Investigation, 312 Maple Street, Endicott, New York, GZA GeoEnvironmental of New York, June 11, 1999" and "Supplemental Environmental Site Investigation, 312 Maple Street, Endicott, New York, GZA GeoEnvironmental of New York, April 27, 1999"

Three Dry Wells: Two dry wells are located in Building 2 and one drywell is located in Building 3. Each dry well is about three feet deep. The areal dimensions of the dry wells are unknown. The levels of volatile organic compounds (VOCs) detected in the soil samples from the bottom of the dry wells are generally low. Metals and other compounds (e.g., semi-volatile organic compounds) are also present.

Surface Soils: Surface soils were sampled and identified to contain potentially elevated metals, primarily arsenic, in the area south and east of Building 3; and polycyclic aromatic hydrocarbons (PAHs), in the area south of Building 2. The metals and PAHs are considered typical in industrial settings. These areas of potential concern were identified during GZA's initial environmental investigations.

1.3 PROJECT DESCRIPTION

This QAPjP is the quality control basis for the scope of work completed as part of this ERP. The major tasks comprising the ERP are:

- Work Plan Development (Field Activity Plan, Health and Safety Plan, Citizens Participation Plan and Quality Assurance Project Plan).
- Site Investigation (SI) and an Interim Remedial Measure (IRM) to address source areas of Site contamination.
- Remedial Alternatives Report (RAR).

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. Daniel Troy, P.E., Project Manager, will have responsibility for overall project management and coordination with NYSDEC and Broome County Department of Planning and Economic Development and of implementing and coordinating the Site Investigation project activities.
Field Team	Mr. John Beninati will have overall responsibility for on-Site implementation of the Site Investigation project activities.

QA Officer — Mr. Ernest R. Hanna, 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. Todd Schara will be responsible for the preparation of the project health and safety plan, and tracking of its implementation.

1.4.2 Specific Tasks and Services

GZA has obtained subcontractor specialists for services relating to drilling and monitoring well installation, laboratory/analytical services, data validation services, field surveying, and waste transportation and disposal. The planned subcontractors for utilization for the 312 Maple Street in Endicott, New York are:

Laboratory Analysis - Mitkem Laboratory (MBE)

Data Validation - Data Validation Services (WBE)

Drilling Services - GeoLogic Services of New York. (WBE)

Surveying - Shumaker Consulting Engineering & Land Surveying, P.C. (WBE)

IRM Activities - LVI Services

2.0 SITE INVESTIGATION PROCEDURES AND RATIONALE

The 312 Maple Street Site is a suspected source of TCE detected in the soil and groundwater. The field work proposed by GZA is focused on removing a source of contaminated soil and supplementing data from previous investigations to obtain a better understanding of Site specific conditions. Environmental sampling and other field activities will be performed in general accordance with the appropriate techniques presented in the following guidance documents.

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

Guidance for Evaluating Soil Vapor Intrusion in the State of New York, NYSDOH, Draft, February 2005,

Table 1 contains a list of the various media to be sampled and the expected number of samples for each matrix.

Field activities are described in the following sections.

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). Monitoring will be done during invasive activities such as excavations, oil probes, drilling, monitoring well installation, well development, and sampling. Additional details are presented in the Site specific Health and Safety Plan.

2.2 GROUNDWATER SAMPLING

Groundwater sampling of existing monitoring wells includes initial recording of data, purging of the well, and collection of the sample. The text below addresses these items, as well as filtration of water samples for metals. Installation of monitoring wells is discussed in Section 2.10. Groundwater sampling of monitoring wells installed as part of this work will also be completed in general accordance with this section.

2.2.1 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, assessing 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 well development).
- Calculate the volume of standing water present within the well.

2.2.2 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 bailing or pumping 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, $\pm$0.2 units for

pH, and $\pm$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 (whichever comes first).

In the event that recharge is slow, the purging process will continue until the well is purged to dry-like conditions. 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.

2.2.3 Groundwater Sampling

Bailers or low flow samplers will be used for sample collection. Bailers will be equipped with a check-valve and will be dedicated, disposable high density polyethylene (HDPE). Bailers will be clean upon arrival at the Site; therefore Site decontamination will not be necessary. Bailers will be lowered gently with minimal water agitation into the well with dedicated polyethylene or polypropylene line.

Sample Collection

The first bailer sample volume of water will be collected for volatile organics or other light weight/volatile compound analyses. A portion of the first sample will also be retained for field measurements of pH, temperature, conductivity, and turbidity.

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 gently pouring water 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.

Subsequently sampled water will be collected for the remaining inorganic parameters as specified in the Field Activities Plan (FAP), and field parameter testing. The remaining sample bottles will be filled sequentially in the following order.

- Semi-volatile organic compounds (SVOCs)
- Polychlorinated Biphenyls (PCBs)
- Total (unfiltered) metals.

Sample bottles are discussed in more detail in Section 3.2. [Note: If filtered samples are to be analyzed, both a filtered and unfiltered sample shall be collected.]

2.3 IRM EXCAVATION

A track mounted or rubber wheeled backhoe, with a reach of approximately 12 feet, will be used to complete the soil excavations. The soils will be removed in approximate 12 inch layers, allowing observations to be made and samples to be collected and screened with an organic vapor meter. The test pit will not be excavated below the groundwater table. The backhoe bucket will be decontaminated (as described in Section 2.9.3) between test pit locations and prior to leaving the Site. Soil removed from the excavation will be placed on plastic sheeting or directly into a dump truck or dumpster for of-site disposal. Excavations will be backfilled with clean imported fill material.

2.4 TEST BORINGS/SOIL PROBES

The drill rig/soil probe rig, tools, augers, etc. will be decontaminated between holes at an on-Site temporary decontamination pad constructed in an area acceptable to NYSDEC and Atlantic Express. Decontamination will be accomplished using steam cleaning or high pressure wash equipment. Split spoon sampling devices will be cleaned manually with non-phosphate detergent 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 (I.D.) hollow stem augers (HSA). Drilling fluids will not be used. 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, in general accordance with ASTM D1586 (Standard Penetration Test). Upon completion, borings will be backfilled with excess soil unless a well is to be installed.

Soil probes will be advanced into the overburden and soil samples collected using a truck or track mounted probe unit equipped with a two inch O.D. by 4 foot long sampler. The probe unit will include a hydraulic push/hammer that will be used to advance the sampler. No drilling fluids will be used during soil probe work.

Soil samples will be classified by GZA in the field by visual examination in accordance with the Burmister soil classification. Selected samples will be retained for soil index properties testing (grain size distribution and Atterberg limits) to confirm field classification. A log of each boring will be prepared with appropriate stratification lines, blow counts, sample identification, sample depth interval, recovery and date.

2.5 MONITORING WELL INSTALLATION

Monitoring wells will be constructed of 2 inch I.D. 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 10 foot long section. The actual length of the well screen may vary depending upon subsurface 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 3.

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 the ground surface will be placed above the bentonite seal. The monitoring well will be completed by placing a locking steel casing or flush mount cover (4-inch diameter) over the riser. Concrete will be then placed in the borehole around the protective casing and sloped away from the casing.

Materials used in well installation will be stockpiled in an on-Site storage area (unless there is a possibility for vandalism) or brought on-Site for use as necessary. These items will be brought to the Site clean and in like-new condition and kept clean and in satisfactory condition for potential use. Well materials (screen and riser pipe), regardless of their condition when brought to the Site will be cleaned on-Site prior to use. The cleaning procedure is described in Section 2.9.4. Following cleaning, well materials will be wrapped in clean plastic sheeting for transportation to the well location. Site personnel handling well equipment after cleaning are required to wear clean gloves.

2.6 SOIL SAMPLING

Soil samples, with the exception of those for VOA, will be homogenized using a "coning and quartering" procedure. The soil will be removed from the sampling equipment and transferred to a clean surface (metal foil, steel pan, bowl, etc.) and, with the exception of VOA samples, mixed to provide a more homogeneous sample to the lab. The soil will be scraped from the sides, corners, and bottom of the clean surface, rolled to the middle, and thoroughly mixed until the material appears homogenous. An aliquot of this pile will then be transferred to the required sample containers, slightly tamped-down, filled to near the top of the container, and sealed with the appropriate cap. Any soil or sediment on the threads of the container will be wiped off prior to placing the cap on the sample container.

VOA samples will not be mixed but will be placed directly from the sampling equipment into the VOA vial sample container (a 4 oz. wide mouth jar), limiting head space by compacting the soil into the container. Samples for VOA will be placed into the appropriate container as soon as possible (ideally within 15 seconds of collection) prior to making field measurements or sample homogenization.

Excavation sidewall samples collected from IRM excavations will be collected from the backhoe bucket and transferred to the sample containers supplied by the laboratory using dedicated stainless steel spoons. Care will be taken to collect soil that has not come in contact with the backhoe bucket.

Soil collected from soil probe samplers or split-spoon sampler will be obtained by opening the split barrel, split spoon sampler (borings) or acetate tube (soil probes), 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 for VOA will be collected and transferred to sample containers as soo s possible after opening and slicing the 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 PID directly over the sample and, by headspace screening with the PID.

The PID 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 and about 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 PID 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.

2.7 SOIL GAS SAMPLING

The soil gas equipment (tubing, probes, etc.) will be cleaned prior to delivery to the Site. Soil gas probes and other associated equipment will not require cleaning or decontamination at the Site. New soil gas probes and high density polyethylene (HDPE) tubing will be used at each sample location and discarded between locations.

Soil gas, indoor air and vadose zone air samples including the required quality control/ quality assurance (QA/QC) measures will be collected via the methodology identified in the NYSDOH Soil Vapor Intrusion Guidance (currently in Draft form).

2.8 HYDRAULIC ASSESSMENT

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

Hydraulic conductivity testing will be done using either variable head methods or single well pump test methods if the wells are found to recover rapidly. Variable head tests will be completed using a stainless steel slug to displace water within the well or by removing water from the well with a bailer. The recovery of the initial water level is measured with respect to time. Single well pump tests will be completed by pumping the well at a constant rate and measuring the response of the water level within the well with respect to time. Data obtained using these test procedures 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 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.

2.9.1 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 application).

2.9.2 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.

2.9.3 Heavy Equipment

Certain heavy equipment such as backhoe buckets, drilling augers, 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 backhoe bucket and drilling augers will be cleaned between test pits/test borings; decontamination between samples at a single test boring will not be done. Samples submitted for analysis should not include material which has been in contact with the backhoe bucket/drilling augers.

2.9.4 Monitoring Well Construction Materials

Well construction materials including well screens, well riser and end caps/tailpieces will be cleaned prior to installation by steam cleaning or high pressure hot water rinse.

2.10 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 PID readings are less than 1 ppm. If less than 1 ppm, the material will be placed at a location agreeable to Broome County and NYSDEC. 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 the Work Plan budget. 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 the municipal sanitary sewer.

2.11 SURVEY

A licensed land surveyor will be subcontracted to measure the vertical and horizontal locations of the IRM excavation, new and existing monitoring wells and borings, soil probes and soil gas sampling locations. GZA will also identify other Site features, structures, etc. where horizontal and/or vertical measurements are required. These locations will be flagged by GZA. Vertical measurements will include the ground surface at investigation locations, plus, top of

casing and top of riser at monitoring well locations. The top of riser will serve as the water level monitoring point. Vertical measurements will be made relative to the National Geodetic Vertical Datum. Monitoring point measurements and top of protective casing measurements will be accurate to within 0.01 foot. Horizontal measurements and ground surface elevations will be accurate to within 0.1 foot.

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-YY

Where:

SL = Location identifier (2 or 3 characters, as below)
- SP = Soil Probe (SP) with numeric character indicating boring number from which the sample was obtained.
- TB = Test Boring (TB) with numeric character indicating auger boring number from which the sample was obtained.
- SG = Soil gas or vadose zone gas sample
- MW = Groundwater Monitoring Well
- EB = Equipment (Field Rinsate) Blank
- TB = Trip Blank
- EX = Excavation (IRM)

XX = Numerical location identifier (2 or 3 characters). This will ordinarily be a number corresponding to the soil probe, well, etc. location or may indicate the wall (EA=East) or bottom (BT) of excavations.

YY = Numerical sample identifier (2 or 3 characters). This will ordinarily be an arbitrary, sequential number and will correspond to sample location information and numbering. However, for soil borings it will identify from which split spoon the sample was obtained (e.g., S1, S2, etc; the number will be the same as indicated on the boring log).

Quality Control (QC) field duplicate samples will be submitted blind to the laboratory; a fictitious sample ID 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 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 IRM and SI. 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.
PCBs/Pesticides - cooled to 4 °C; no chemical preservatives added.
Metals - HNO_3 to pH ≤ 2; cool to 4 °C.

Ambient Air, Sub-Slab Gas, Vadose Zone Gas Samples:

VOCs – no cooling, nor chemical preservatives added.

Chemical preservatives will be added to the sample bottles (prior to sample collection) by the analytical laboratory. The pH of samples will be spot-checked in the field and additional preservative will be added as needed. 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. If it appears that the level of chemical preservation added is not adequate, laboratory preservative preparation and addition will be modified or additional preservative will be added in the field by the sampling team.

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 B1, 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 Ziploc 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. A label may be affixed identifying the cooler as containing "Environmental Samples" and 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, and inorganics (metals) 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
CLP PCBs/Pesticides	NYSDEC Method 95-3
CLP Metals	NYSDEC CLP-M Metals Methods[(1)]
Total Organic Carbon	SW846 Method 9060

[(1)] Analysis for arsenic, lead, selenium, and thallium will be by atomic absorption methods (CLP-M methods 206, 239, 270, and 279, respectively; or trace ICP if contract required detection limits (CRDLs) can be achieved. Analysis for mercury will be by CLP-M Method 245.1 or 245.2 (aqueous samples) or 245.5 (soil/sediment samples). Analysis for other TAL metals will be done by inductively coupled plasma (ICP), Method 200.7, CLP-M or by trace ICP.

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.

For the 312 Maple Street SI/RAR, a single laboratory (Mitkem) will be utilized for the soil and groundwater analysis. Centek Laboratories will be utilized for the collection and analysis of air samples. Both laboratories are certified by the NYSDOH Environmental Laboratory Approval Program and to be in good standing for all the ASP/CLP parameter groups.

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 QAPjP 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) Superfund 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.

Volatile Organics (ASP method TO-15). The Contract Required Quantitation Limits (CRQLs) for air samples is 1 $\mu g/m^3$ or less to allow for comparison of the results to background levels. 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 0.1 $\mu g/m^3$; 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.

PCBs/Pesticides (ASP Method 95-3). The CRQLs for pesticides range from 0.05 ug/L to 0.5 ug/L, except for toxaphene. Toxaphene has a CRQL of 5.0 ug/L Corresponding soil CRQLs are 1.7 ug/kg to 17 ug/kg (170 ug/kg for toxaphene). CRQLs for PCBs are 1 ug/L (33 ug/kg for soil) except for Aroclor 1221, for which the CRQL is 2 ug/L (67 ug/kg soil). The reporting limit for detected and non-detected results is the CRQL.

Inorganics (Metals). The CRDLs for inorganics are analyte-specific. The laboratory is required to perform an instrument detection limit (IDL) study quarterly; the reporting limit for non-detected metals is the IDL. Metals concentrations between the IDL and the CRDL are flagged "J" 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:

$$\% \text{ Recovery} = (R/S) \times 100$$

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)
PCBs/Pesticides	<CRQL (analyte specific)
Inorganics	< CRDL

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 bailers: For initial sampling, as well as at subsequent rounds of sampling when bailers are reused, at least one of the bailers used per decontamination batch, will be used to generate equipment (rinsate) blanks during groundwater sampling. Disposable bailers will be obtained from a single vendor for this project. One rinsate blank will be collected for the groundwater sampling event.

One rinsate blank will be collected for every 20 probe samples collected or one per week whichever is more frequent. The rinsate blanks will be collected from the probe soil sampler and probe groundwater sampling equipment.

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 ± 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 ± 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 B-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 Appendix A.

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 B-1.

4.4.4 Temperature

Temperature probes associated with instruments (such as the YSI SCT-33 conductivity and temperature meter) 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 Appendix A.

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, and as a Matrix Spike and Matrix Duplicate for metals.

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. For metals, a matrix spike and matrix duplicate are analyzed for each set of 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, samples collected 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:

- Soil probe 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 wells and surface water, 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.

During remedial excavations, field personnel will document excavation quantity, sampling measurements and soil disposal.

5.2 FIELD REPORTING FORMS

Field reporting forms (or their equivalent) to be utilized in this investigation are presented in Attachment B1. These include:

- Soil Probe & Piezometer Installation Log;
- Monitoring Well Field Measurements Log;
- Existing Well Assessment Form;
- 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 include: turbidimeter (turbidity per EPA Method 180.1), pH meter (pH per EPA Method 150.1), conductivity meter (specific conductance per EPA Method 120.1), thermometer, and photoionization detector. See also Section 4.4 of this QAPjP for additional discussion.

Calibration and standardization for the field water quality tests will be in conformance with the manufacturers recommendations.

The pH meter will be recalibrated (two points) 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).

Temperature will be measured with an NBS/NIST traceable thermometer, or with a platinum electrode, factory calibrated and coupled to the conductivity meter, or similar meter.

The HNu-PI 101 (or equivalent organic vapor analyzer) use 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 1995 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), and the audit performed by 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 computer diskette. The diskette 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 standby 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 RAR, 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., HNu 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

As part of the laboratory subcontractor procurement process under the Broome County ERP, the laboratory assigned to this project has been verified to be certified by the NYSDOH Environmental Laboratory Approval Program for the analytical protocols to be used. Therefore, no audit of the laboratory(s) during the RI will be performed unless warranted by a problem(s) that cannot be resolved by any other means, or at the discretion of GZA and 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.

TABLES

Table 1
Site Investigation / Remedial Alternative Report
Proposed Analytical Testing Program Summary
312 Maple Street
Endicott, New York

Location	Matrix	TCL VOCs	TCL SVOCs	TAL Metals	TCL PCBs	Full TCLP and C/R/I	TOC
IRM Confirmatory Samples							
Various[1]	Soil	12	12	12	12	0	0
Total		12	12	12	12	0	0
Waste Characterization							
Composite Sample	Soil	5	3	3	2	2	0
Dry Well Investigation							
Dry Well #1	Soil	8	8	8	8	0	0
Dry Well	Air[2]	2	0	0	0	0	0
Groundwater	Water	2	2	2	2	0	0
QA/QC Samples	Soil	4	4	4	4	0	0
Total		16	14	14	14	0	0
Surface and Subsurface Investigation							
Various[1]	Soil	11	11	4	0	0	10
QA/QC Samples	Soil	4	4	4	0	0	0
Total		15	15	8	0	0	10
Indoor Air/Sub Slab/Vadose Zone Air Sampling							
Ambient Air	Air[2]	4	0	0	0	0	0
Sub Slab Air	Air[2]	3	0	0	0	0	0
Vadose Zone	Air[2]	8	0	0	0	0	0
QA/QC Samples	Soil	3	0	0	0	0	0
Total		18	0	0	0	0	0
Groundwater Samples							
Monitoring Wells	Groundwater	5	5	5	5	0	0
QA/QC Samples	Groundwater	4	4	4	4	0	0
Trip[3]	Water	1	0	0	0	0	0
Total		10	9	9	9	0	0

Notes:
1) Actual sample location to be selected based on field observation.
   QA/QC Samples include blind duplicate, matrix spike, matrix spike duplicate and rinsate samples
   TCL VOCs - Target Compound List Volatile Organic Compounds.
   TCL SVOCs - Target Compound List Semi-volatile Organic Compounds.
   TAL Metals - Target Analyte List Metals.
   TCL Pesticides - Target Compound List Pesticides.
   TCL PCBs - Target Compound List Polychlorinated Biphenyls.
   TOC is total organic carbon
   TCLP - Toxic Characteristic Leaching Procedure
2) Air samples tested for VOCs via EPA Method TO-15
3) Trip - Trip Blank sample

Table 2
312 Maple Street Site
Quality Assurance Project Plan
Summary of Container, Preservation and Holding Time Requirements

Analysis	Method	Holding Time (days)		Containers		Preservative
		To Extraction	To Analyze	Number	Type	
Soil Samples						
TCL Volatiles	NYSDEC Method 95-1 (a)		7	1	L	Cool
TCL Semivolatiles	NYSDEC 95-2 (a)	5	40	1	J[1]	Cool
Cyanide	US EPA Method 335.2		12	1	J[1]	Cool
PCBs/Pesticides	NYSDEC 95-3 (a)	5	40	1	J[1]	Cool
TOC	SW 846 Method 9060 (b)		28	1	J[1]	Cool
TAL Metals	NYSDEC Metals Methods (a)		26/6 mo {c}	1	J[1]	Cool
Grain Size/Atterberg Limits	ASTM D422/4318			1	K	None
Aqueous Samples						
TCL Volatiles	NYSDEC Method 95-1 (a)		7	2	G	Cool
TCL Semivolatiles	NYSDEC 95-2 (a)	5	40	2	H	Cool
TAL Metals	NYSDEC Metals Methods (a)		26/6 mo {c}	1	I	HNO3
Cyanide	US EPA Method 335		12	1	I	NaOH
PCBs/Pesticides	NYSDEC 95-3 (a)	5	40	2	H	Cool

Notes:

Analytical Methods

(a) NYSDEC Analytical Services Protocol (ASP), October, 1995.

(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

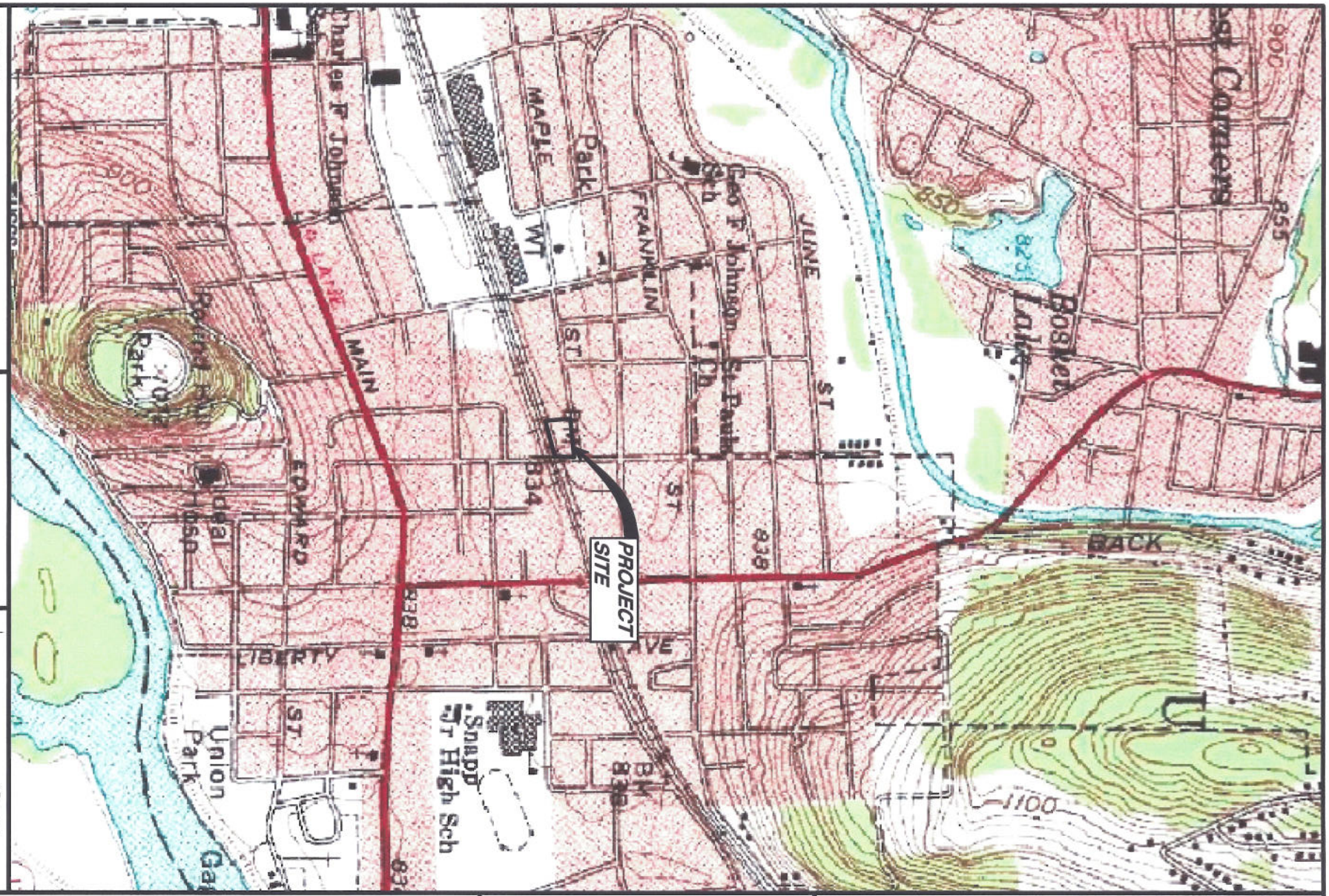
NaOH - Sodium Hydroxide to >12pH

HCl - Hydrochloric acid to pH<2

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

FIGURES

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



BROOME COUNTY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

312 MAPLE STREET
VILLAGE OF ENDICOTT, NEW YORK

QUALITY ASSURANCE PROJECT PLAN

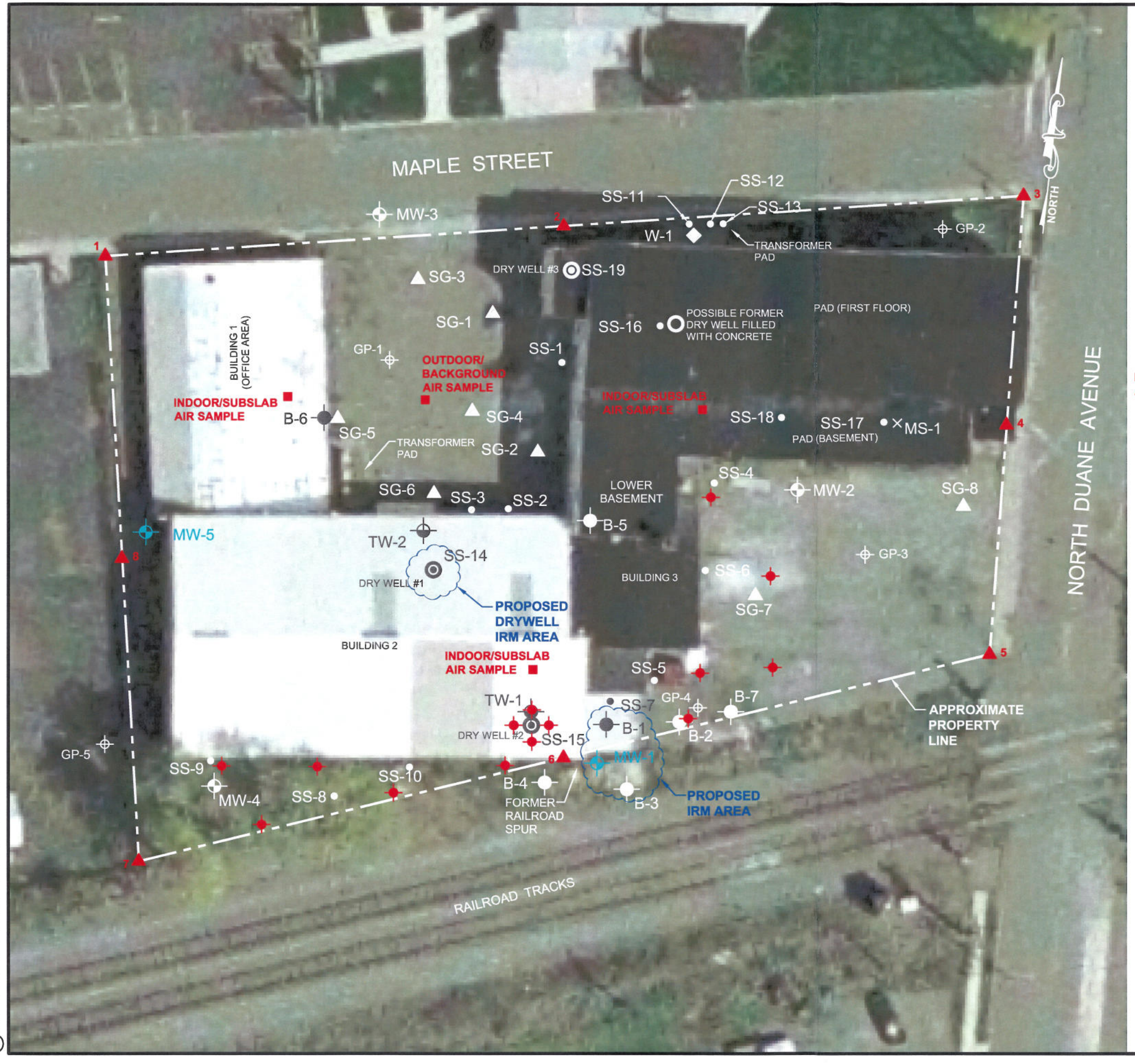
LOCUS PLAN

SCALE IN FEET
0 500 1000 2000

DRAWN BY: **DEW**
DATE: **SEPTEMBER 2005**

GZA GeoEnvironmental of New York

PROJECT No. **21.0056127.00**
FIGURE No. **1**



LEGEND:

- INDOOR/SUBSLAB AIR SAMPLE ■ — APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED AIR SAMPLE
- ⌖ — APPROXIMATE LOCATION OF PROPOSED SOIL PROBE
- 7▲ — APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED VADOSE ZONE SOIL GAS POINT
- ⌖ MW-5 — APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED MONITORING WELL
- ⌖ B-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SUPPLEMENTAL TEST BORING
- ⌖ TW-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SUPPLEMENTAL TEMPORARY MONITORING WELL
- ⌖ GP-1 — APPROXIMATE LOCATION AND DESIGNATION OF GEOPROBE LOCATION PERFORMED BY OTHERS WITH GROUNDWATER TEST RESULTS
- ⌖ MW-3 — APPROXIMATE LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- • SS-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SURFACE SOIL/SLUDGE SAMPLE
- ▲ SG-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SOIL GAS SAMPLING POINT
- ◆ W-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS WIPE SAMPLE
- × MS-1 — APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS MEMBRANE SAMPLE

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: SEPTEMBER 2005

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET

0 15 30 60

BROOME COUNTY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

312 MAPLE STREET

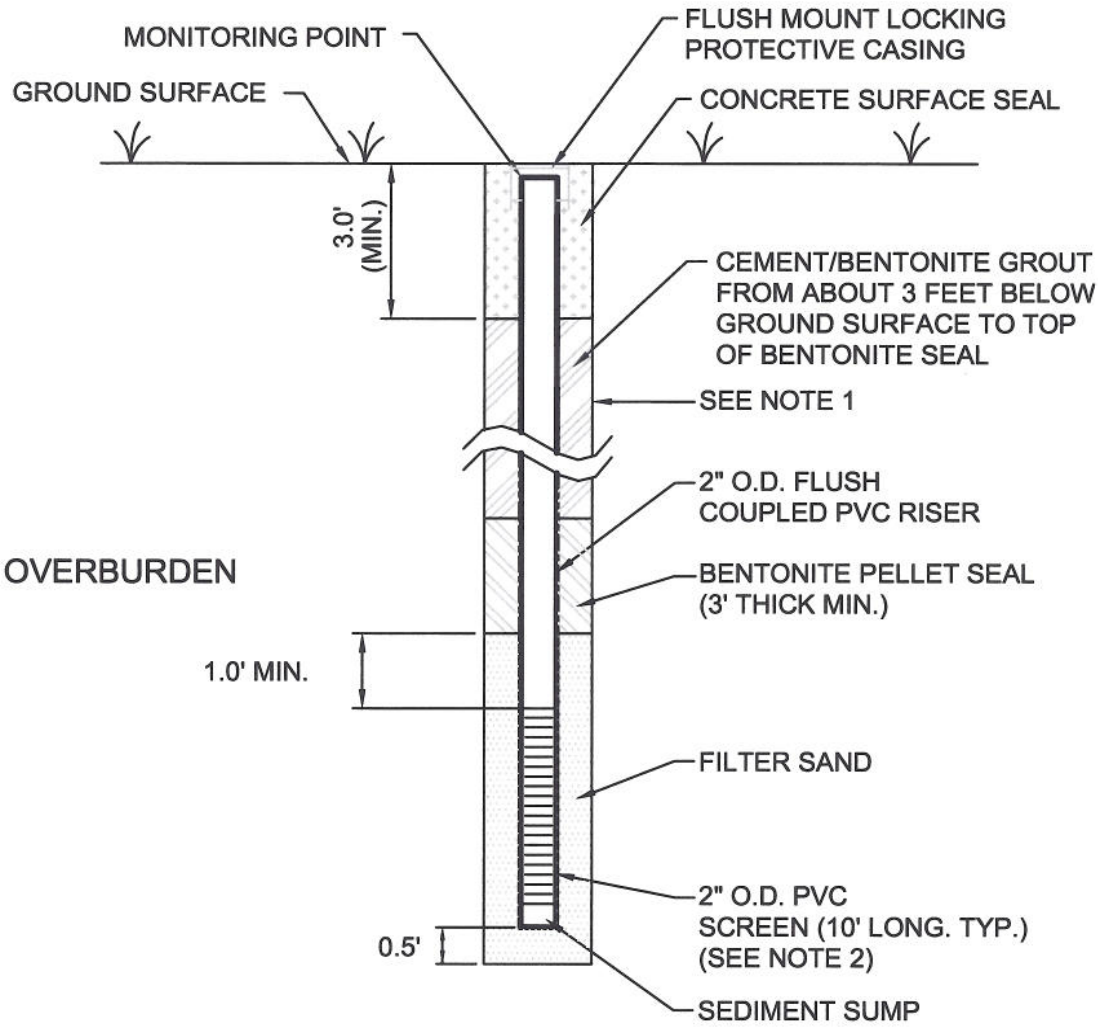
VILLAGE OF ENDICOTT, NEW YORK

QUALITY ASSURANCE PROJECT PLAN

SITE PLAN

PROJECT No. 21.0056127.00

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: SEPTEMBER 2005

GZA GeoEnvironmental of New York

SCALE IN FEET

NOT TO SCALE

BROOME COUNTY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

312 MAPLE STREET

VILLAGE OF ENDICOTT, NEW YORK

QUALITY ASSURANCE PROJECT PLAN

PROPOSED MONITORING WELL INSTALLATION DIAGRAM

PROJECT No.

21.0056127.00

FIGURE No.

3

ATTACHMENT B1

FIELD FORMS

File: Page

Preliminary Site Assessment
Sample Collection Log
[Site]
[Location]

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	TAL Metals	Hardness	TOC											

Summary of Field Measurements

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

Notes

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 BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	EQUIPMENT DESCRIPTION		OVM (ppm)
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: Job No. Page: _____

Project Name

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

GZA GeoEnvironmental of New York

File: Page: _____

Project Name
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: Page:

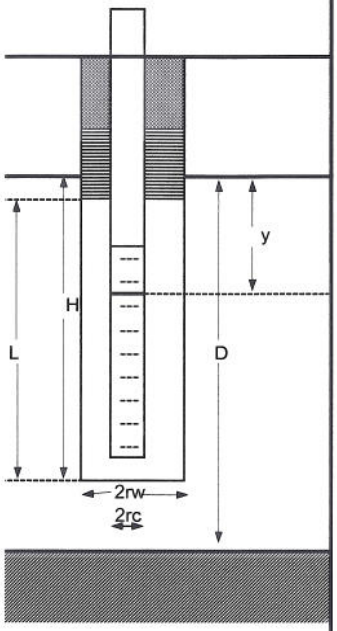
(Project)
Hydraulic Conductivity Test - _____

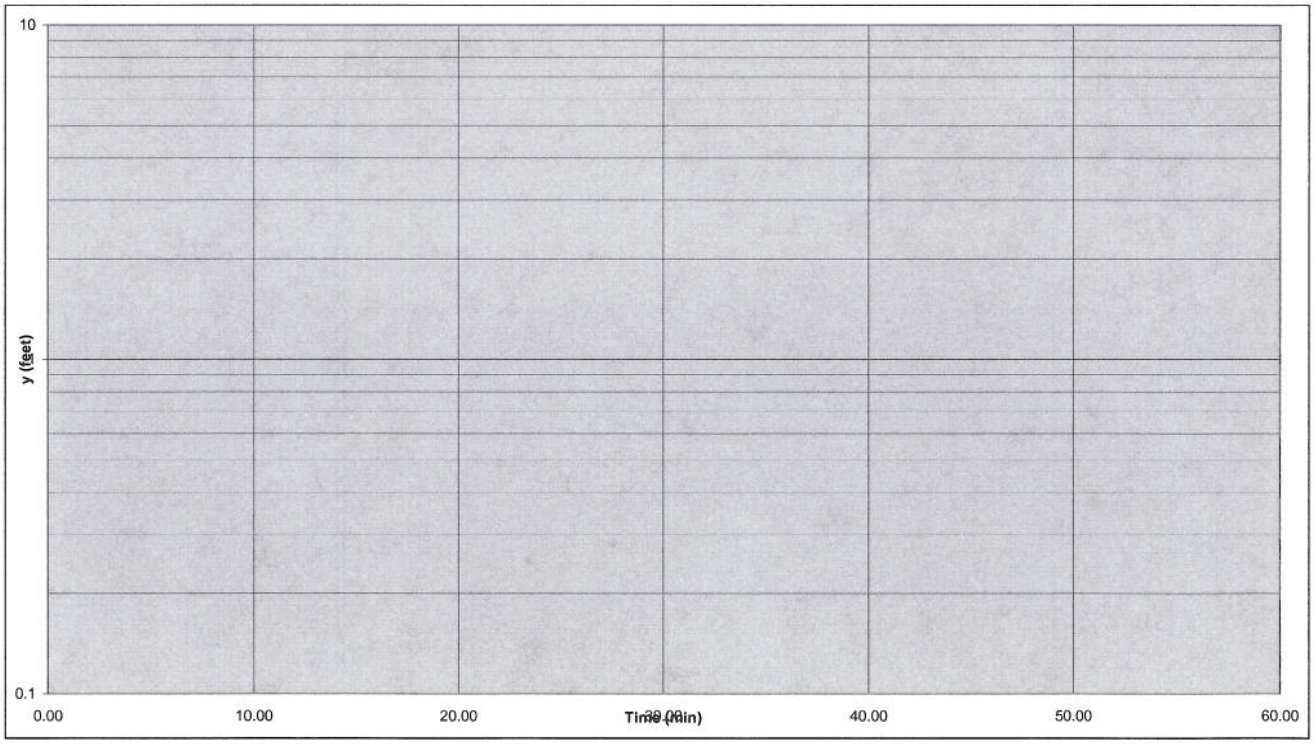
Well Identification		Test Information		Well Construction	
Monitoring Well :		GZA Representative:		Top of Intake Depth:	
Installation Date:		Test Date:		Bottom of Intake Depth:	
Installed By:		Weather Conditions:		Screened Zone:	
				Confined/Unconfined	

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) =	





Thermometer Calibration Worksheet

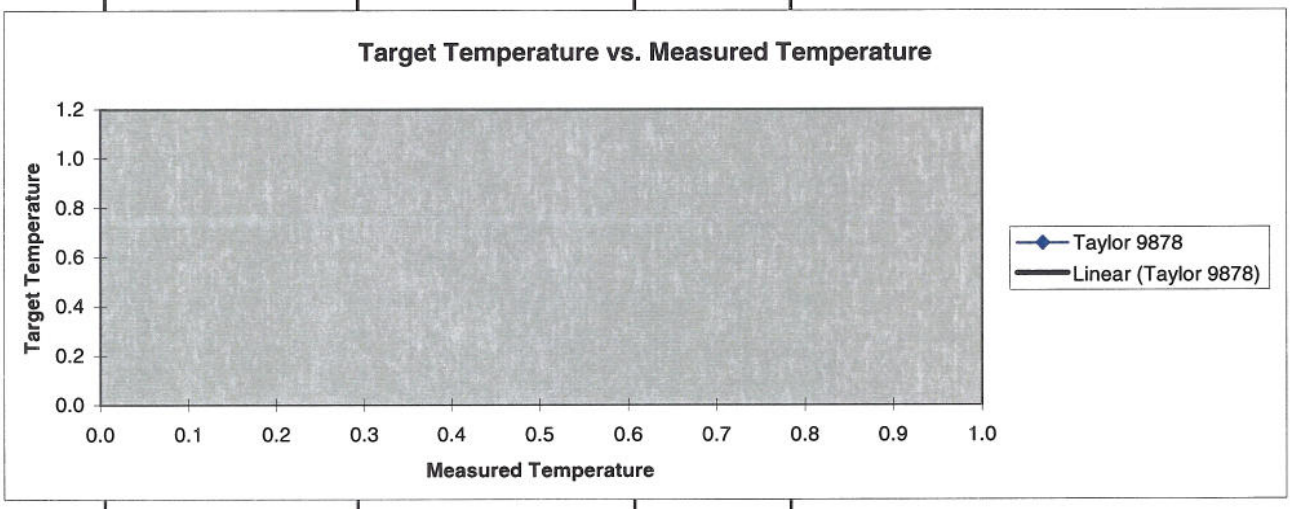
Project: **GZA File :**

Location: **Sample Collection Date:**

Thermometer Model:

Calibration (1)

Date	Target Temperature (C)	Observed Temperature (C)	Analyst's Initials	Remarks



Notes:

1) These calibrations were done in accordance with the NYSDOH's Environmental Laboratory Approval Program (ELAP manual, item 231 revised as of April 1, 1986)
2) Target temperature is the temperature of the National Bureau of Standards (NBS) traceable thermometer. The NBS thermometer was certified on July 11, 1985 and checked at the ice point on September 19, 1988.
3) The observed tempertature is the tempeature of the calibrated thermometer.
4) The correction factor of the calibrated thermometer is:

Corrected tamperature = 0.988 X Observed Temperature + 0.3774

Turbidity Meter Calibration Worksheet

Project:	**GZA File :**
Location:	**Sample Collection Date:**
Conductivity Meter Model:	

Calibration (1)

Date	Target Value (2) (uMhos/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.

pH Meter Calibration Worksheet

Project:	**GZA File :**
Location:	**Sample Collection Date:**
pH Meter Model:	

Calibration (1)

Date	Temperature	Set Points (2) (pH units)	Target Value (3) (pH units)	Actual Reading (4) (pH units)	Analyst's Initials	Remarks

Notes:

1) These calibrations were done in accordance with the NYSDOH's Environmental Laboratory Approval Program (ELAP manual, item 231 revised as of April 1, 1986)

2) For a one point calibration, the set point is the pH of the standard buffer solution used to initially calibrate the meter. For a two point calibration, the set points are the pH of the standard buffers used to calibrate the slope of the pH meter.

3) For a one point calibration, the target values are the pH of the standard buffers used to check the slope of the pH meter. For a two point calibration, the target value is the pH of the standard buffer used to check the initial calibration.

4) The accepted accuracy for the readings using a one point calibration is +/- 0.2 pH units. The accepted accuracy for the actual reading using a two point calibration is +/- 0.05 pH units of the target value.

Conductivity Meter Calibration Worksheet

Project:	**GZA File :**
Location:	**Sample Collection Date:**
Conductivity Meter Model:	

Calibration (1)

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

Notes:

1) Calibrations done in accordance with manufacturers recommendations and is completed by adjusting the meter to a standard of known specific conductance. The standard is selected to be as close to the sample measurement as possible.
2) Target value is the specific conductance of the standard solution.

APPENDIX G – HEALTH AND SAFETY PLAN

A copy of the previously approved Health and Safety Plan (HASP) that was utilized at the Site for both the RI/RAR and for the Remedial Activities is included as an example of what will be required during future Site activities. Some modifications/revisions may be required to this plan depending on the specific work that is planned for the Site along with NYSDEC approval.

HEALTH AND SAFETY PLAN

SITE REMEDIAL ACTIVITIES
312 MAPLE STREET
ENDICOTT, NEW YORK
SITE NO. B00168-7

SITE INVESTIGATION/REMEDIAL ALTERNATIVE REPORT
HEALTH AND SAFETY PLAN
312 MAPLE STREET
ENDICOTT, NY
SITE #B00168-7

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SITE INVESTIGATION/REMEDIAL ALTERNATIVE REPORT
HEALTH AND SAFETY PLAN
312 MAPLE STREET
ENDICOTT, NY
SITE #B00168-7

TABLE OF CONTENTS (Cont'd)

SITE INVESTIGATION/REMEDIAL ALTERNATIVE REPORT
HEALTH AND SAFETY PLAN
312 MAPLE STREET
ENDICOTT, NY
SITE #B00168-7

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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 at the 312 Maple Street Site in Endicott, New York (Site). The provisions of this plan apply to all 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 activities that include existing monitoring well sampling and assessment, soil excavation as pat of an interim remedial measure, completion of soil probes and test borings, monitoring well installation, groundwater sampling and soil gas/vadose zone survey. The exclusion zones for these activities are expected to be variable and temporary in accordance with planned daily activities. A more detailed description of work to be completed at the Site is included in the Field Activities Plan (FAP).

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, dumptrucks, backhoe, etc.), including noise exposure. However, since GZA personnel will not be involved with the actual operation of large mechanical equipment (i.e., drill rig and backhoe) or direct supervision of drilling crew and backhoe operator, exposure to these hazards by GZA personnel can be controlled by keeping a safe distance from heavy equipment.

Inhalation hazards may result from the presence of a variety of compounds including chlorinated solvents (trichloroethylene {TCE}, etc.) and those associated with petroleum products that may be 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, test borings, soil excavations, soil gas/vadose zone survey 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**	**Phone Numbers**	**Cell Phone Numbers**
Ernest R. Hanna	Principal-in-Charge	(716) 685-2300	(716) 570-2129
Daniel Troy	Task Leader	(716) 685-2300	(716) 570-6673
Daniel Troy	Field Team Leader/Site Safety Officer (SSO)	(716) 685-2300	(716) 570-6673
Mark Malchik	Corporate Health and Safety Director	(781) 278-3700	

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 C1) 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. GZA will request a copy of subcontractor HASPs but will not review or approve them.

2.0 SITE DESCRIPTION AND HISTORY

The Site is located at 312 Maple Street in Endicott, New York on the southwest corer of Maple Street and North Duane Avenue. Surrounding property is mixed residential/commercial. Northern Suffolk railroad tracks border the Site to the south. The Site is currently occupied by a manufacturer of wood cabinetry. Previous owners/operators include shoe companies, coal companies, electronic assemblers and a metal finishing job shop.

The Site is about 0.93 acres in size and includes three adjoining Site buildings (Buildings 1, 2, and 3 as shown on Figure 2). Building 1 is a single story masonry structure. Building 2 is a steel framed and sided structure with a concrete slab-on-grade floor. Building 3 is a masonry and wood framed two story building with a basement.

Based on previous studies performed by GZA, two source areas were originally identified at the site. The first is a zone of unsaturated soils contaminated with trichloroethene (TCE) located southeast of Building 2 (see attached Site Plan). The second is the three dry wells located inside Buildings 2 and 3. Subsequent meetings and conversations with NYSDEC defined the surface soils east of Building 3 and south of Building 2 as areas of concern that may also require additional investigation/remediation. The groundwater at the site is contaminated with TCE but is not considered to be a source area.

TCE Contaminated Unsaturated Soils: It is estimated that approximately 250 cubic yards (cy) of soil are contaminated based on our previous remedial investigations. However, the contamination could extend beyond these limits (i.e. the TCE could extend beneath the building). The TCE contaminated soil source area appears to be on both the 312 Maple Street Site and the adjoining Northern Suffolk Railroad property.

Three Dry Wells: Two dry wells are located in Building 2 and one drywell is located in Building 3. Each dry well is about three feet deep. The areal dimensions of the dry wells are unknown. The levels of volatile organic compounds (VOCs) detected in the soil samples from the bottom of the dry wells are generally low. Metals and other compounds (e.g., semi-volatile organic compounds) are also present.

Surface Soils: Surface soils were sampled and identified to contain potentially elevated metals, primarily arsenic, in the area south and east of Building 3; and polycyclic aromatic hydrocarbons (PAHs), in the area south of Building 2. The metals and PAHs

are considered typical in industrial settings. These areas of potential concern were identified during GZA's initial environmental investigations[1].

3.0 SCOPE OF WORK

Field activities during this investigation shall be comprised of the following activities which will result in the handling, excavation or boring of potentially contaminated materials. The field activities planned are briefly described below, additional details are included in the site specific work plan.

3.1 Existing Well Assessment

This assessment will be done to determine the condition of existing on-site wells for future monitoring. This task will include opening the well, measuring water levels, measuring the total depth and purging. The top of the well riser will be screened for the presence of VOCs and explosive gases upon initial opening of each well and the purge water will be screened during well development. This task will be done by GZA personnel.

3.2 Interim Remedial Measure

Based upon the results of GZA's previous investigations, approximately 250 cubic yards (or approximately 400 tons) of TCE contaminated soil is assumed to be located around MW-1 (assumed "source area"). Due to the concentrations of TCE detected in the previously analyzed soil samples, this material will likely be treated as a hazardous waste. The activities completed as part of the IRM will include excavation of impacted soil by backhoe. Soil excavation will also be completed by hand when the excavation is close to building foundations or other possible underground structures. Additionally, where allowable, soil will be removed from the on-Site dry wells located inside buildings 2 and 3. Excavated soil will be screened using an OVM and placed into trucks or stockpiled on plastic sheeting prior to loading into trucks for transportation to a facility permitted to accept the waste soil.

3.3 Soil Probes

The nature and extent of unsaturated subsurface soil contamination will be further assessed by completing additional soil probes at the site. The probes will be advanced by direct push methods into the overburden and soil samples will be collected using a truck or track

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[1] "Environmental Investigation, 312 Maple Street, Endicott, New York, GZA GeoEnvironmental of New York, June 11, 1999" and "Supplemental Environmental Site Investigation, 312 Maple Street, Endicott, New York, GZA GeoEnvironmental of New York, April 27, 1999"

mounted soilprobe unit equipped with a two-inch outside diameter (O.D.) by four-foot long sampler. The soil probe unit includes a hydraulic push/hammer that is used to advance the sampler. Probes will be advanced to the water table estimated to be at a depth of 15 to 17 feet. The soil samples will be screened during sampling by GZA personnel with an organic vapor meter. The soil probe unit will be operated by a subcontractor and GZA personnel will not be involved with the actual operation of probe equipment.

3.4 Test Borings and Monitoring Well Installation

A series of test borings will be advanced utilizing a drill rig to permit sampling of the soil materials and for the purpose of monitoring well installation. Borings will be advanced using hollow stem augers and rotary drilling methods. Samples will be collected using split spoon methods. The drill rig will be operated by a drilling subcontractor and GZA personnel will not be involved with the actual operation of drilling equipment.

As soil samples are collected from the borehole by the drilling crew, GZA will log the soil samples and retain the samples in jars. 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 organic vapor meter. Monitoring wells will be installed by a drilling subcontractor within boreholes to permit the collection of groundwater samples.

3.5 Groundwater Sampling

GZA will collect groundwater samples from newly installed and existing monitoring wells and submit them to an analytical laboratory for testing. GZA will screen the well casing for the presence of VOCs using an organic vapor meter (OVM) prior to sampling.

3.6 Soil Gas Survey

At the request of NYSDEC and NYSDOH, subslab and indoor air monitoring is needed for the three on-site buildings. One air sample will be collected from the ambient air inside each building in a location within the area of likely higher contamination and close to the remedial area if possible. An additional air sample will be collected from the air space beneath the floor of each of the three buildings, again close to an area of known contamination. The air samples will be collected under the floor slab through an approximate 1-inch diameter hole drilled in the floor. Dedicated plastic tubing will be placed into the hole and sealed. Additionally, vadose zone air sampling will be completed at the four corners of the property boundary and at the four mid-point locations between the property corners. The vadose zone air sampling will be completed with the aid of a direct push soil probe rig.

4.0 HAZARD ASSESSMENT

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

4.1 CHEMICAL HAZARDS

Based on the information provided to the author of this HASP, the chemical hazards anticipated on-Site are those associated with chlorinated solvents, PAHs and metals. The associated hazards may include the following.

4.1.1 Volatile Organic Compounds

Exposure to the vapors of many volatile organic compounds 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 volatile organic compounds 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 the organic compounds of concern, respiratory protection may be required. Because this site is open and the anticipated quantities of contamination are small, overexposure potential is expected to be small.

Previous studies and historical information indicated that chlorinated solvents (PCE, TCE, vinyl chloride etc.) are present at the site. Petroleum products (which contain benzene, toluene, ethylbenzene and xylene) from possible USTs may also be present on site.

4.1.2 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 in wearing of 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 environment is not likely.

4.1.3 Metal Compounds

Overexposure to metals has been associated with a variety of health hazards, both acute and chronic in nature, with chronic effects being most significant. Direct contact with dust of some metal compounds can result in contact or allergic dermatitis. The American Conference of Governmental Industrial Hygienists (ACGIH) has established inhalation exposure limits, expressed as Threshold Limit Values (TLVs), to which most workers can be exposed (on an 8-hour time-weighted average (TWA) basis) without adverse affect. To limit potential exposure visible clouds of dust should be controlled as required and workers and observers will remain upwind of intrusive activities.

Similarly, metals 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.

The most significant route of exposure is likely to be skin contact with the contaminated soils. Protective measures, such as the wearing of chemically resistant gloves, to minimize contact are addressed in Section 6.0 of this plan.

4.1.4 Polychlorinated Biphenyls

Prolonged skin contact with polychlorinated biphenyls (PCBs) may cause a condition know as chloracne. PCBs are considered to be suspect carcinogens and may also cause reproductive damage.

It should be noted that PCBs have extremely low vapor pressures. This makes it unlikely that any significant vapor concentration (i.e. exposures above the OSHA PEL) will be created in the ambient environment. This minimizes the potential for any health hazards to arise due to inhalation unless the source is heated or generates an airborn mist.

4.1.5 Pesticides

Pesticides can be grouped into three major categories; organophosphates, carbamate and chlorinated hydrocarbons. The actual PEL as set by OSHA, vary depending on the specific compound. Organophosphates, including Diazinon, Malathion and Parathion, are quickly absorbed into the body by inhalation, ingestion and direct skin contact. The symptoms of exposure include headache, fatigue, dizziness, blurred vision, sweating, cramps, nausea and vomiting. More severe symptoms can include tightness of the chest, muscle spasms, seizures and unconsciousness. It should also be noted that the Malathion and Parathion PELs both carry the *Skin* notation, indicating that these compounds adversely effect or penetrate the skin. OSHA specifies that skin exposure to

substances carrying this designation be prevented or reduced through the use of the appropriate personal protective equipment (PPE).

Chlorinated hydrocarbons such as Chlordane, DDT and Heptachlor can cause dizziness, nausea, abdominal pain and vomiting. The more severe symptoms include epileptic like seizures, rapid heart beat, coma and death. These compounds also carry the OSHA *Skin* notation.

4.1.6 Methane

Methane is an odorless, colorless, tasteless gas, and is a significant fire and explosion hazard. It also acts primarily as a simple asphyxiate when present in high concentrations. Methane has a lower explosive limit (LEL) of 5% and an upper explosive limit of 15%.

4.1.7 Hydrogen Sulfide

Hydrogen sulfide, characterized by its "rotten egg" odor, is produced by decomposition of organic matter. In many instances, hydrogen sulfide is found in the same area as methane gas. An important characteristic of hydrogen sulfide is its ability to cause a decrease in ones ability to detect its presence by smell. So although you may no longer smell it, it still may be present in harmful concentrations.

The symptoms of over exposure include headaches, dizziness, staggering and nausea. Severe over exposure can cause respiratory failure, coma and death. The OSHA PEL is 10 ppm.

4.1.8 Chemicals Subject to OSHA Hazard Communication

Chemicals brought on site such as solvents, reagents, decontamination solutions, or other hazardous chemicals must be accompanied by the required labels, Material Safety Data Sheets (MSDS), and employee training documentation (OSHA 1910.120). GZA will maintain these documents on site. For additional information refer to the GZA Hazard Communication Program contained in GZA's Health and Safety Program Manual.

4.2 PHYSICAL HAZARDS

Personnel on site should be provided with the information and training necessary to avoid accidental injury. This includes assuring that the site is maintained in such a way that slip, trip and fall hazards as well as cut, puncture and abrasion hazards such as nails, scrap metal, rusted containers and construction derbies are recognized and eliminated or controlled. Basic personal protective equipment must be available and its use enforced.

4.2.1 Construction Hazards, Drill Rigs, Backhoes

The use of drill rigs, backhoes and other heavy equipment represent 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. All personnel must avoid standing within the turning radius of the equipment or below any suspended load. 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 o 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 Trenching and Excavation

OSHA requires that a competent person, who is trained to recognize the hazards associated with trenching and excavating activities and has authority to control these hazards within the limits established by OSHA Trenching and Excavation Standard (29 CFR 1926.650-652) be present at all times. Trenching and excavating will be done by a subcontractor. GZA personnel involved in these activities will be in accordance with GZA Trench and Excavation Safety and Health Guide contained in GZA's Health and Safety Program Manual. GZA will maintain a copy of this guide on-site.

4.2.2.1 Drums and Buried Drums

As a precautionary measure, personnel must assume that labeled and unlabelled drums encountered during field activities contain hazardous materials until their contents can be confirmed and characterized. Personnel should recognize that drums are frequently mislabeled, particularly drums that are reused.

Only trained and authorized personnel should be allowed to perform drum handling. Prior to any handling, drums must be visually inspected to gain as much information as possible about their contents. Trained field personnel must look for signs of deterioration such as corrosion, rust or leaks, and for signs that the drum is under pressure such as swelling or bulging. Drum type and drumhead configuration may provide the observer with information about the type of material inside, (i.e., a removable lid is primarily designed to contain solids, while the presence of a bung indicates liquid storage).

Although not usually anticipated, buried drums can be encountered when digging test pits. Therefore, the following provisions must be observed if drums are encountered. Machine excavation (i.e. backhoe) should cease immediately anytime a drum is encountered. The appropriate management personnel should be notified immediately. Personnel must not enter an excavation where drums have been uncovered, even for monitoring purposes, unless all provisions of OSHA's trenching and excavation standard have been met and the appropriate level of personal protective equipment is utilized. Sampling of unknown drums requires Level B protection. Buried drums must not be moved unless it can be accomplished in a safe manner and overpack drums are available. Contacting/disturbing drums is not included in the scope of work for this project.

4.2.3 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 organic vapor meter, is required.

Excessive organic vapors can cause an explosion hazard. Therefore, whenever excessive organic vapors are detected using an organic vapor meter (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.

4.2.4 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, backhoe 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.

4.2.5 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.

4.2.6 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.

4.2.7 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, ramps roadways or railroad tracks.

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.

Active railroad tracks are located adjacent to the Site on the south near an area of proposed Site IRM activities. These railroad tracks, owned by Norfolk Southern consist of two lines. GZA personnel and GZA's subcontractors will not perform Site work within the boundaries of the railroad stone ballast and rail lines nor will heavy equipment be allowed to enter this segment of the Site. Work that is required to be completed adjacent to or within other portions of the railroad right-of-way will be completed from the Site property facing the railroad tracks. A "spotter" will accompany all personnel requiring entering the railroad right-of-way for the sole purpose of watching for on coming trains from both directions. GZA will also attempt to obtain schedules for railroad traffic for the purpose of limiting or ceasing site activities during the passage of trains. Site activities shall temporarily cease during the passage of railroad vehicles.

4.2.8 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.

4.2.9 Underground Utilities and Hazards

The identification of underground storage tanks, pipes, utilities and other underground hazards is critically important prior to 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. I New York State, the "Dig Safe" notification 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.

4.2.10 Confined Space

Confined space entry activities, such as entering sewer systems requires specialized procedures beyond the scope of this plan. Therefore, if circumstances require such activities, this plan must be modified accordingly.

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 site 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

Air Monitoring falls into three separate categories; real time monitoring, community air monitoring and personal exposure monitoring. Real time monitoring will be conducted within the exclusion zone (EZ). Community air monitoring will be done at the down wind perimeter of the EZ. Table 1 summarizes the type of environmental monitoring as well as appropriate response actions applicable to the Site. Additional details regarding air monitoring are presented below.

5.1 REAL TIME MONITORING

The real time monitoring required to determine the airborne concentrations of the representative compounds and the corresponding response action for the site, will be conducted using the instruments indicated in Table 1. Although the data provided by these instruments can be used to determine the appropriate control actions and personal protective equipment requirements, the data may be inappropriate for use in determining employee time weighted average exposures as required by OSHA.

Monitoring with the specified instruments will be conducted at a frequency necessary to adequately characterize airborne contamination levels for each area and each representative task in each area of the site. Initial monitoring will be most frequent and will be either continuous or at intervals of once every 15 minutes as directed by the Site Safety Officer (SSO). Monitoring shall be conducted in close proximity to the source material (auger spoil, excavated soil, etc.) during all intrusive activities described in this HASP; if instruments indicate the presence of target compounds in source area, the general breathing zone in the EZ should then be monitored to determine appropriate response action in accordance with the action levels specified in this section.

Equipment calibration must be performed in accordance with the manufacturer's instructions. Field checks using the appropriate reference standards must be made on site at the minimum frequency of twice per shift (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 Total Volatiles Organics

A photoionization detector (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. Additionally, specific target compounds (e.g., vinyl chloride and benzene) will be monitored for if the total VOC readings exceed 1 ppm above background. The level of protection may be upgraded and new action levels established by the SSO after the compound causing elevated organic vapor readings is determined using detector tubes.

5.1.2 Combustible Gas Indicator

Monitoring using a CGI, calibrated using pentane as a reference standard, may be required if unknown contamination is encountered. If combustible gas levels equal 10 % or greater of the LEL, operation should be shut down and the area evacuated until appropriate control measures have been established and verified safe for reentry. Steps necessary to minimize fire and explosion must be observed.

5.1.3 Dust Monitoring

GZA will monitor for dust based on visual observations. If dust clouds are observed GZA will request that dust control be used (i.e., wet down the material).

5.2 COMMUNITY AIR MONITORING

Real-time air monitoring, for volatile compound levels at the perimeter of the work area will be conducted as follows. 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.

5.2.1 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.

5.2.2 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 the 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 (See Section 5.2.3).

5.2.3 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 (See Section 11.2).

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.

5.3 PERSONAL EXPOSURE MONITORING

According to OSHA 1910.120 personal exposure monitoring for the purpose of determining individual time-weighted average exposures is required only during site cleanup or other remedial activities. This project does not involve site remediation or cleanup. Therefore, determinations regarding individual exposure potentials will be based on the work area monitoring described above. Separate personal air sampling will not be conducted.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

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, which include the private well assessment, geophysical survey and topographic survey, will require Level D protective equipment. This equipment is defined as:

- Hard hat;
- Chemically resistant rubber over boots (as required by the SSO) and steel-toed work boots;
- Work clothes;
- Hearing protection (if necessary); and,
- Eye protection - contact lenses may not be worn on site.

6.2 INTRUSIVE ACTIVITIES

Intrusive activities, which include soil excavation, soil probes, existing monitoring well redevelopment, soil gas/vadose zone survey, and monitoring well installation, will require Level D protective equipment. This equipment is defined as:

- Hard hat;
- Tyvek coveralls (as required by SSO);
- Chemically resistant rubber outer boots(as required by the SSO), and steel-toed work boots;
- Disposable latex gloves;
- Eye protection (if full-face respiratory protection is not worn); and,
- Hearing protection (see Section 4.2.4).

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. Contact lenses may not be worn on site.

7.0 SITE CONTROL

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with personal protective equipment requirements will be clearly identified. GZA designates work areas or zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November, 1985. They recommend the area surrounding each of the work areas to be divided into three zones; the exclusion or "Hot" zone, contamination reduction zone (CRZ), and the support zone.

7.1 EXCLUSION ZONE

Due to the scattered locations of the activities covered within the scope of this HASP, the actual zones are expected to change frequently in accordance with daily activities. Therefore, all

exclusion zones (EZ) are expected to be temporary or dynamic. Site personnel will be advised of the locations of temporary work zones as part of the routine site safety meetings described in Section 9.0.

Each EZ will consist of the active work areas where site investigations are taking place. A 15-foot radius will be established as the typical perimeter of the zone; however, this may be increased as necessary in order to protect personnel from contact with vapors that may arise from these operations. The perimeter of the zone will be marked with traffic cones or brightly colored hazard tape. All personnel entering these areas must wear the prescribed level of protective equipment.

7.2 CONTAMINATION REDUCTION ZONE

Each contamination reduction zone (CRZ) will be a clearly marked corridor between the exclusion and support zones. The actual length and/or location of the corridor will also be temporary or dynamic in accordance with the locations of the exclusion zones. The CRZ is where personnel will begin the sequential decontamination process when exiting the EZ. To prevent cross contamination and for accountability purposes, all personnel must enter and leave the exclusion zone through the CRZ. A separate heavy equipment decontamination zone will also be established at the site.

7.3 SUPPORT ZONE

The support zone (SZ) will coincide with the project command post, and will consist of an area outside the exclusion zone and CRZ where support equipment will be staged. Eating, drinking and smoking will be allowed only in this area. Sanitary facilities will be located within the SZ. In addition, potable water and water and soap for hand washing will be available at the site, along with containers for solid waste for use by GZA and GZAs subcontractor personnel. The containers will be removed from the site by GZA for proper disposal. Hazardous, or potentially hazardous, materials will be drummed, labeled and stored with other drums of substances generated during this project for future disposal as required by the project specific work plan.

7.4 OTHER SITE CONTROL AND SAFETY MEASURES

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- The "buddy system" will be used at all times by all field personnel. No one is to perform field work alone. The standby team member must be intimately familiar with the procedures for initiating an emergency response.

- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Protect air monitoring equipment from water by bagging.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited except in the support zone after proper decontamination.

- Beards or other facial hair that interfere with respirator fit are prohibited for anyone who is required to wear a respirator.

- The use of alcohol or drugs is prohibited during the conduct of field operations.

- All equipment must be decontaminated or properly discarded, as designated by the SSO, before leaving the site.

- Safety equipment (PPE) described in Section 6.0 will be required for all field personnel unless otherwise approved by the local/regional health and safety representative or the SSO.

7.5 SITE SECURITY

The GZA Site Manager is responsible for identifying the presence of all GZA and GZA subcontractor employees on site. A sign-in/sign-out log will be maintained for this purpose.

Equipment left on site during off hours must be locked, immobilized and/or otherwise secured to prevent theft or unauthorized use or access.

8.0 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 personal protective equipment will be disposed as a solid waste.

8.1 PERSONNEL DECONTAMINATION

Personnel decontamination will be accomplished by following a systematic procedure of cleaning and removal personal protective clothing (PPE). Contaminated PPE such as boots and face shields will be rinsed free of gross contamination, scrubbed clean in a detergent solution and then rinsed clean. To facilitate this, a three-basin wash system may need to be set up on site. The wastewater will be transferred to drums, which will be labeled and left on site for disposal as required by the project specific work plan.

Respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Alternative chemical decontamination procedures, such as steam-cleaning or pressure washing field boots, may be used if available.

8.1.1 Decontamination Sequence

Steps required will depend on the level of protection worn in accordance with Section 6.0:

1. Remove and wipe clean hard hat.
2a. Rinse outer boots and outer gloves (if used) of gross contamination.
2b. Scrub boots and gloves clean.
2c. Rinse boots and gloves.
3. Remove outer protective boots .
4. Remove outer gloves.
5. Remove tyvek coveralls.
6. Remove respirator, wipe clean and store.
7. Remove inner gloves.

Boots that have been decontaminated can be worn into the support zone.

8.2 EQUIPMENT DECONTAMINATION

To the extent possible, measures should be taken to prevent contamination of sampling and monitoring equipment. Sampling devices become contaminated, but monitoring instruments, unless they are splashed, usually do not. Once contaminated, instruments are difficult to clean without damaging them. Delicate instruments which cannot be easily decontaminated should be protected while it is being used. It should be placed in a clear plastic bag, and the bag taped and secured around the instrument. Openings are made in the bag for sample intake and exhaust.

If solvents are used for decontamination of equipment all safety precautions specified on the manufacturer's warning label and MSDS must be observed (see Section 4.1.6 Chemicals Subject to OSHA Hazard Communication). Rinsate generated during the decontamination process will

be field screened using a portable organic vapor meter. If readings are less than 1 ppm the water will be discharged at a location agreeable to NYSDEC and Broome County. If the readings are greater than 1 ppm the material will be drummed and labeled

Drilling rigs, trucks, backhoes, and other heavy equipment are difficult to decontaminate. The method generally used is to wash them with water under high pressure or to scrub accessible parts with detergent/water solution under pressure. A decontamination pad will be constructed on-site by the excavation contractor and/or drillers for equipment decontamination.

In some cases, shovels, scoops and augers may require steam cleaning. Particular care must be given to those components in direct contact with contaminants. Personnel doing the decontamination must be adequately protected for the methods used since these can generate contaminated mists and aerosols.

9.0 MEDICAL MONITORING AND TRAINING REQUIREMENTS

9.1 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.

GZA's medical monitoring program is administered by GZA's Director of Corporate Health and Safety in association with Health Resources Inc., 304 Cambridge Road, Woburn, Massachusetts 01801.

9.2 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.

9.3 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.

9.4 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. Sign-off sheets will be collected at this meeting. Short safety refresher meetings will be conducted by the SSO weekly (at a minimum) or as needed throughout the duration of field activities. 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.

10.0 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.

11.0 EMERGENCY ACTION PLAN

11.1 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.

11.1.1 Employee Information

General training regarding emergency evacuation procedures are included in the GZA initial and refresher training courses as described above in Section 9.2 of this HASP. Also as described above in Section 9.4, 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.

11.1.2 Emergency Signal and Alarm Systems

An emergency communication system must be in effect at the site. 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.

11.2 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	(607) 771-2263

Hospital Location (Binghamton General Hospital)

The hospital is located at Mitchell Avenue, Binghamton, New York. See Figure 2 (Map of Route to Hospital).

Other Emergency Contact Information

GZA GeoEnvironmental – Daniel Troy	(716)685-2300
Broome County Dept. Environmental Planning	(607)778-2414
NYSDEC – Daniel Fuller	(607)775-2545

11.3 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 C1.

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.

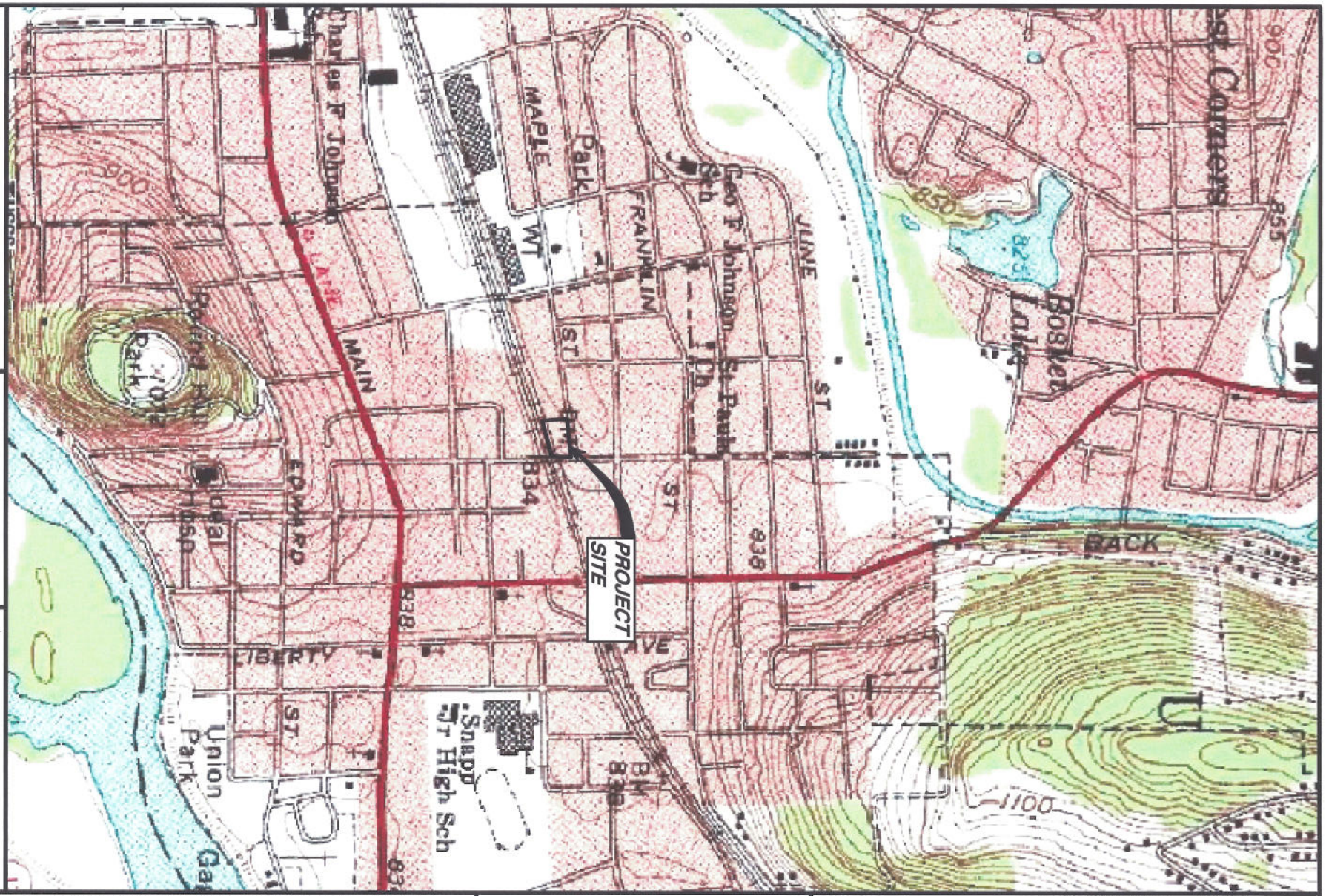
TABLES

TABLE 1
ACTION LEVELS
312 Maple Street Site

	Monitoring Type	Concentration	Instrument	Monitoring Location	Monitoring Frequency	Required Action
Real time Monitoring	Total VOCs	< 1 ppm	PID (10.2 ev)	EZ	At least every 15 minutes	Continue monitoring
Real time Monitoring	Total VOCs	> 1 ppm	PID (10.2 ev)	EZ	Continuous	Test for specific compounds with detector tubes (vinyl chloride and benzene). Set new action level after consulting with SSO.
Community Air Monitoring (intrusive activities only)	Total VOCs	< 5 ppm above background	PID (10.2 ev)	down wind of EZ	At least every 1 hour	Continue monitoring of EZ (potential source) and down wind perimeter of the EZ (work zone).
Community Air Monitoring (intrusive activities only)	Total VOCs	> 5 ppm above background	PID (10.2 ev)	down wind of EZ	Continuous	Stop work. If organic vapors levels are >5ppm over background but less than 25 ppm over background at the perimeter of the work area than work can resume provided the organic vapor level 200 feet down wind of the work area or half the distance to the nearest structure is < 5ppm. If the level is > 5 ppm 200 feet downwind, follow procedures outlined in section 5.2.2 (Major Vapor Emissions) of this plan.
Community Air Monitoring (intrusive activities only)	Total VOCs	> 25 ppm above background	PID (10.2 ev)	down wind of EZ	Continuous	Stop work. Follow air monitoring procedures outline in section 5.2.2 (Major Vapor Emissions) of this plan.
Real time Monitoring	Combustible Gas	<10% LEL	CGI	EZ	At least every 15 minutes	Eliminate all ignition sources
Real time Monitoring	Combustible Gas	>10% LEL	CGI	EZ	Continuous	Stop work and contact SSO. Evaluate cause of gas.
Visual	Dust	Visible amount	None	EZ/work area	Continuous	Stop work and reduce dust by wetting the area or changing operation.

EZ= Exclusion Zone (work zone).
LEL=Lower explosive limit.
VOCs=Volatile organic compounds.

FIGURES



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

NORTH

NEW YORK

BROOME COUNTY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

312 MAPLE STREET

VILLAGE OF ENDICOTT, NEW YORK

HEALTH AND SAFETY PLAN

LOCUS PLAN

SCALE IN FEET

0 500 1000 2000

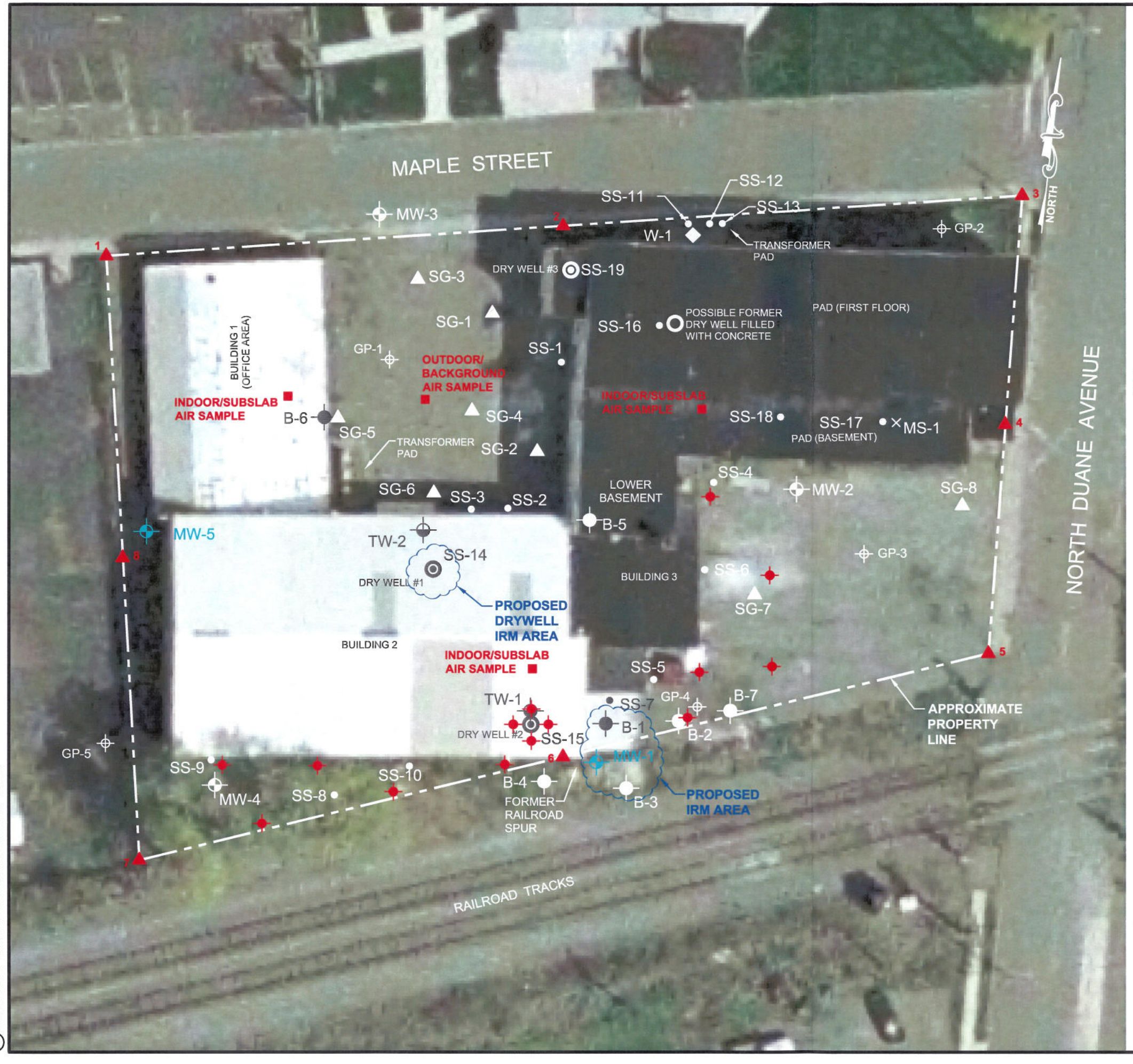
DRAWN BY: **DEW**

DATE: **SEPTEMBER 2005**

GZA GeoEnvironmental of New York

PROJECT No. **21.0056127.00**

FIGURE No. **1**



LEGEND:

INDOOR/SUBSLAB AIR SAMPLE ■	APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED AIR SAMPLE
⌖	APPROXIMATE LOCATION OF PROPOSED SOIL PROBE
7▲	APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED VADOSE ZONE SOIL GAS POINT
⌖ MW-5	APPROXIMATE LOCATION AND DESIGNATION OF PROPOSED MONITORING WELL
⌖ B-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SUPPLEMENTAL TEST BORING
⌖ TW-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SUPPLEMENTAL TEMPORARY MONITORING WELL
⌖ GP-1	APPROXIMATE LOCATION AND DESIGNATION OF GEOPROBE LOCATION PERFORMED BY OTHERS WITH GROUNDWATER TEST RESULTS
⌖ MW-3	APPROXIMATE LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
• SS-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SURFACE SOIL/SLUDGE SAMPLE
▲ SG-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS SOIL GAS SAMPLING POINT
◆ W-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS WIPE SAMPLE
× MS-1	APPROXIMATE LOCATION AND DESIGNATION OF PREVIOUS MEMBRANE SAMPLE

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: SEPTEMBER 2005

GZA GeoEnvironmental of New York

APPROXIMATE SCALE IN FEET 0 15 30 60

BROOME COUNTY DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

312 MAPLE STREET

VILLAGE OF ENDICOTT, NEW YORK

HEALTH AND SAFETY PLAN

SITE PLAN

PROJECT No. 21.0056127.00

FIGURE No. 2

FIGURE 3

Yahoo! Driving Directions FROM SITE TO HOSPITAL

Starting from: A 312 Maple St, Endicott, NY 13760-4023

Arriving at: B WILSON MEMORIAL MEDICAL CENTER 33 Harrison St, Johnson City, NY

Distance: 6.4 miles **Approximate Travel Time:** 14 mins

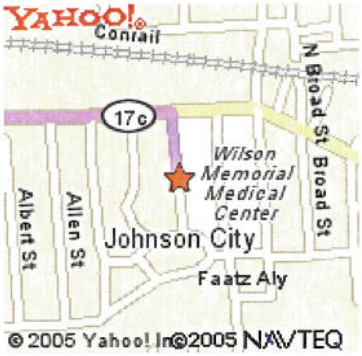
Your Directions

1.	Start at **312 MAPLE ST, ENDICOTT** - go **< 0.1** mi
2.	Turn R on **DUANE AVE** - go **0.3** mi
3.	Turn L on **MAIN ST[RT-17C]** - go **3.3** mi
4.	Continue to follow **RT-17C** - go **2.8** mi
5.	Turn R on **HARRISON ST** - go **0.1** mi
6.	Arrive at **WILSON MEMORIAL MEDICAL CENTER**

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Your Full Route

Your Destination



Address:
WILSON MEMORIAL MEDICAL CENTER 33
Harrison St
Johnson City, NY

ATTACHENT C1

GZA HEALTH AND SAFETY BRIEFING/SITE ORIENTATION RECORD

SITE SIGN-IN SHEET

GZA INCIDENT INVESTIGATION FORM

GZA Health and Safety Briefing /Site Orientation Record

312 Maple Street
Endicott, 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 312 Maple Street 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:_____

Site Sign In Sheet

312 Maple Street
Endicott, New York

Name (Print)	Signature	Company	Date	Time In	Time Out

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.